Expressions of Non-Epistemic Modality in American English

A Corpus-Based Study on Variation and Change in the 20th Century

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ABBREVIATIONS

ARCHER	A Representative Corpus of Historical English Registers
av.	average
BNC	British National Corpus
Brown	The Standard Corpus of Present-Day Edited American English
Brown family of corpora	"core": LOB (1961), FLOB (1991), Brown (1961), Frown (1991/2) "extended": + BLOB (1901), BLOB (1931), BE06 (2006), AmE06 unless indicated otherwise, references point to the "core family"
CB	Collins COBUILD corpus
CLAWS	Constituent Likelihood Automatic Word-Tagging System
CLMET	The Corpus of Late Modern English Texts (extended version)
COCA	The Corpus of Contemporary American English
COHA	The Corpus of Historical American English
CONCE	Corpus of Nineteenth-Century English
C-US	corpus comprising parts of SBC and Frown (cf. Collins 2009a: 3)
d.f.	degree(s) of freedom
Diff.	Difference
DCSPE	The Diachronic Corpus of Present-Day Spoken English
dg.	degree (of a polynomial function)
FLOB	The Freiburg-LOB Corpus of British English
Frown	The Freiburg-Brown Corpus of American English
ICE,	The International Corpus of English:
-AUS, -GB	Australia, Great Britain
inf.	infinitive
iwcm	interchangeable with core modals
lin. f. / l.f.	linear function
KWICs	keywords in context
LCSAE	Longman Corpus of Spoken American English
LLC	London-Lund Corpus
LSWE	Longman Spoken and Written English Corpus
LOB	The Lancaster-Oslo/Bergen Corpus
Log likhd, LL	log likelihood, i.e. the natural logarithm of the likelihood function
mc	my calculation based on data given in the indicated source
MDS	multi-dimensional scaling
(M)DCA	(multiple) distinctive collexeme analysis

N	total number of occurrences in a particular corpus subsection
n	size of sample
ns	not significant ($p > 0.05$)
PDE	Present-Day English
p_{fe}	p-value obtained by means of Fisher's exact test
polyn. f. / p.f.	polynomial function
R^2 adj.	(adjusted) coefficient of determination indicating the amount of variance captured by the model
SBC	Santa Barbara Corpus of Spoken American English
sd	standard deviation
sp.	spoken
SoA	state of affairs
SEU	Survey of English Usage
tVP	tensed verb phrase
V	Cramer's V indicating the effect size
VNC	variability-based neighbor clustering
w/m	number of occurrences per million words
τ (t in graphs)	Kendall's tau coefficient (based on yearly values)
τ_{dec}	Kendall's tau coefficient (decades on decade averages)
χ^2	chi-square value
(*)	wildcard replacing any kind of word
*, **, ***	$p \leq 0.05$, $p \leq 0.01$, $p \leq 0.001$

1. Introduction

"Many pages, chapters, books" have been written on the subject of modality and auxiliarihood (Leech 1987: 71). Yet, modality does not cease to intrigue linguists who try to capture its seemingly ever-elusive essence (cf. Klinge and Müller 2005: 1). Attempting to explain the appeal of studying modality, they have used a variety of creative, gripping metaphors: Robin P. Fawcett, for instance, in his foreword to Perkins (1983) likens the quest to "understand modality […] to set[ing] out on a fascinating voyage of discovery in the human mind" (1983: ix). As Facchinetti (2009: 54) explains, the abundance of scholars who devote their time to paving their way through this jungle, testifies

> to the fact that modality has coaxed and entangled inextricably into its raveled net more than one scholar, who start up with the most noble intentions – typically setting order in this field – and conclude by falling into the trap of providing further food for thought, which, in principle, is not wrong at all.

Modality has in turn become one of the topics in linguistics that have received the most scholarly attention (cf. Lampert 1993: 1, Depraetere 2015: 370). Biber observes that modal verbs "are probably the most studied subsystem of stance in English" (2004a: 117). As Heine explains, "in the recent history of linguistics, auxiliaries have provided one of the most popular battlegrounds for disputes on linguistic theory" (1992: 26), and modality has been approached by researchers working within the frameworks of functional linguistics, formalist semantics (cf. e.g. Kratzer 1977, 1981, von Fintel 2006, Aijmer 2016), cognitive semantics (cf. e.g. Talmy 1988, Sweetser 1990), and construction grammar (cf. e.g. Wärnsby 2002, Boogaart 2009, Boogaart and Fortuin 2016).

It is thus not surprising that modality is often criticized as the trigger of a "never-ending" discussion and for the "excessive number of taxonomies and categorizations" (Facchinetti 2009: 53) that are produced without any prospect of arriving at a "final solution" (Nuyts 2005: 5). Jacobsson underlines that this "terminological profusion and confusion […] plagues the literature on modals and modality" (1994: 167), while de Haan draws attention to the "muddy waters of modal terminology" into which researchers dive (2012: 703). Similarly, Facchinetti (2009: 53) stresses that

> whenever we try to box it [modality] and narrow it down to some sort of relativizing framework, or even to question its very concept, it springs up again and thrives with new terminologies and with ever more flourishing buds and branches.

As Klinge and Müller explain, "studies in modality hold challenges at all levels of linguistic description" (2005: 1). Palmer calls the syntax and semantics of modality "one of the biggest problems for grammatical analysis" (2003: 1). Moreover, Krug points out that when it comes to defining auxiliarihood and modality, "agreement is largely confined to acknowledging the difficulty of this undertaking" (2000: 39).

The incessant interest in modality is fueled by recent changes in the modal system of English and in the frequency of use of various expressions of modal meanings such as possibility, necessity, and obligation. Not only can the so-called core modals or central modals (cf. 1. below), semi-modals, or quasi-modals be used (cf. 2. below)[1], there are also adjectives and adverbs, lexical verbs, and nouns available to express similar shades of meaning (cf. 3.-5. below).

1. *can*, *could*, *may*, *must*, *shall*, *should*, *will*, *would*, *(need*, *dare*, *ought to*, *used to*, *be to)*
2. *need to*, *have (got) to*, *want to*, *going to / gonna*, *(had) better / best*, *would rather*, *be supposed to*, *be bound to*, *be able to* etc.
3. *arguably*, *certain*, *certainly*, *critical*, *crucial*, *desirable*, *essential*, *important*, *necessary*, *likely*, *necessarily*, *perhaps*, *possible*, *possibly*, *probably*, *surely* etc.
4. *allow*, *appear*, *demand*, *entail*, *forbid*, *force*, *involve*, *insist*, *let*, *make*, *mean*, *necessitate*, *require*, *permit*, *prohibit*, *require*, *seem*, *suppose*, *wish*, *want* etc.
5. *belief*, *certainty*, *conviction*, *doubt*, *permission*, *request*, *obligation*, *requirement* etc.

More than thirty years ago, Bolinger already noticed a "wholesale reorganization" (1980: 6). Similarly, Givón observed that '[n]ew operators are still being introduced into the system; and both those and the system as a whole are in the process of being reshaped" (1982: 187). These developments are increasingly well documented. Contrary to the popular perception that grammatical changes are slow, it has been shown that changes in the modal system can already be observed in the short time span of 10-30 years that Mair calls "brachychrony" (1997). Whereas the core modals have been the center of scholarly attention for decades, semi-modal usage has only recently been examined in more detail (cf. e.g. Krug 2000, Leech 2003, Smith 2003, Mair 2006, Leech *et al.* 2009, Close and Aarts 2010: 166), especially since the advent of electronic corpora, which facilitate frequency comparisons. Modals and semi-modals have, for instance, been extensively studied in the 1-million-word Brown corpora (Brown, LOB, Frown, FLOB), in the *International Corpora of English* (ICE), and in ARCHER. It became apparent that overall the core modals drastically decline in use, whereas semi-modals gradually become more frequent (cf. e.g. Leech 2003, 2013). Mair and Leech (2006: 327) and Close and Aarts (2010: 277) speculate that the two developments may be linked. Leech supposes that a causal relationship is very likely in spoken language because it is not "inhibited by a 'prestige barrier', the taboo that discourages the use of highly colloquial forms in written (especially printed) texts" and because evidence shows the semi-modals to be "seriously rivaling the core modals, particularly in certain semantic areas" (2013: 110). However, in written English, the increase of semi-modal usage does not fully compensate for the loss of modal meaning caused by the retreat of the core modals. Leech speaks of a "modality deficit" (2013: 110) and asks the seminal question "Where have all the modals gone?" (2013), which may incite researchers in the field to set out to solve this mystery.

[1] The distinction between the first and second group of verbs is not as clear-cut as the listing seems to imply. Models of gradience (cf. e.g. Quirk *et al.* 1985: 137) and prototypicality (cf. e.g. Krug 2000: 236) are employed in different classifications. Krug (2000) reserves the term 'emerging modals' for a subgroup of the latter group of verbs, the so-called semi-modals (cf. the discussion of classification schemes in Ch. 2.1).

In an effort to shed more light on the processes of change in the system of modality, it is, first of all, essential to go beyond a mere analysis of frequency and to determine which meanings decline and which ones increase in use. Since it would require enormous efforts to manually code a sufficient number of examples to make reliable claims about the observed changes, many researchers wishing to investigate changes in the modal field focused on frequencies alone and only carried out exemplary analyses of the meanings of certain modal verbs (cf. e.g. Leech 2003, Leech *et al.* 2009, and Millar 2009). Yet, as Aarts *et al.* (2013: 20) stress,

> [a] study of modal auxiliaries should ideally […] distinguish between semantic subcategories (deontic, epistemic, etc.) to identify the particular set of alternants at any given juncture. It could also take into account other competing variants to modals, such as semi-modals or adverbial expressions.

The existing studies that compare the meanings of the potentially competing modal verbs of obligation and necessity distinguish only broad categories, i.e. generally epistemic meanings (which refer to "estimation[s] […] of the probability of the state of affairs" (Narrog 2005: 10), cf. example (1) and Ch. 2.2.1) and non-epistemic (i.e. root or deontic / dynamic) meanings (which refer to "the necessity or possibility of the actualization of situations" (Depraetere and Reed 2006: 274), cf. example (2) below). Formulaic meanings (cf. example (3) below) are either separated or excluded.

(1) But if you're talking about 20 people, let me suggest to you - and I'm not a scientist - that there must be an absolutely enormous margin of error when it's that small a sample. (1990/01/17, "Does oat bran work?" *ABC Nightline*, COCA)

(2) And I understand their concerns, and I believe that we must respect their point of view. (2009/03/11, "President Obama urged new efforts…" *PBS NewsHour*, COCA)

(3) Gen. Westmoreland: Well, your perspective, I must say, is somewhat simplified. (1990/04/26, "ABC News/'Time' forum: Beyond Vietnam," *ABC Special*, COCA)

Many of these studies document the differences between various modals (and semi-modals) at a specific time or in a particular corpus. Collins, for instance, compares the meanings of various modal and semi-modals in ICE-GB, ICE-AUS, and a "specially assembled" American corpus (C-US), identifying AmE as the most progressive variety when it comes to the increased use of the semi-modals (2009a: 1, 159). However, the lack of more fine-grained distinctions of sources and meanings in his comprehensive study can be deplored as "a missed opportunity for more careful analysis" (Salkie 2013: 220). Promising exceptions are proposals by Depraetere and Verhulst (2008) and Verhulst *et al*. (2013) to classify the data according to the sources of the obligation or necessity, but the studies are very small in scale. Like many other researchers, Depraetere and Verhulst are interested in uncovering patterns that govern the variation between *have (got) to* and *must.* To this aim, multivariate analyses are repeatedly used to detect differences between close rivals in meaning, taking such factors as grammatical person, animacy of the subject, type of verb etc. into account (cf. e.g. Jankowski 2004). The focus often lies on the use of these verbs at a specific point in time (cf. e.g. Tagliamonte 2004) or on making comparisons between two periods (cf. e.g. Smith 2003, Close and Aarts 2010). Seggewiß (2013), who tries to uncover discovers between various modals

of obligations in a register-based multivariate analysis, is one of the few authors tackling an analysis of the semantics of as much as twenty (semi-)modal verbs at two moments in time in the British Diachronic Corpus of Present-Day Spoken English (DCPSE). However, she, too, uses a very broad classification scheme to code her data.

Secondly, as Aarts *et al.* stress, it is crucial to identify all alternative means of expressing particular nuances of meaning (2013: 20), even if this widening of the perspective makes clearly defining the boundaries of what can and should be considered modal more difficult. Yet despite the realization that "[s]tudies which recognize that the English modal system is in a state of flux herald a sea change in modality research, with their wider focus on modal expressions as a whole, rather than on the modal auxiliaries alone" (Hoye 2005: 1299), alternatives to the core modals and semi-modals have only rarely been included in empirical studies on the meanings of the English modal verbs and / or the changes in the frequency of use (cf. also Aijmer 2015: 267), even though their cross-linguistic importance has been realized (cf. Narrog 2016: 91). Perkins (1983) identifies a certain number of English adjectives, adverbs, participles, and nouns that express modal meaning besides the modals and semi-modals, but contents himself with proposing subcategories and describing the semantics of these expressions. Hunston observes that "modal-like expressions" are actually very frequent in English, "far beyond what is apparent from the frequency of modal auxiliary verbs themselves" (2011: 85), but she does not give any numbers. Leech (2013) "takes a tentative first step" to detect the frequency of use of what he calls "lexical modal expressions" in an extended set of BrE Brown corpora. However, he does not make any attempt at disentangling different meanings and simply concludes that these expressions "strengthen the 'modality deficit'" (2013: 108). A more thorough analysis will reveal that there are major differences between various types of expressions of epistemic and non-epistemic modality. Kranich and Gast show that the use of the core modal verbs with epistemic meanings increases, whereas the epistemic lexical modal verbs, modal adjectives, modal adverbs, and modal periphrases decline (2015: 8). Much of the remaining literature on the topic focuses on epistemic modality (cf. e.g. Hoye 1997, Nuyts 2001), which means that deontic modality is a field that can still greatly benefit from comparative studies of changes in the use of modal expressions. Only recently did Van linden publish a monograph on the development of modal adjectives with deontic meanings (2012). Modal nouns have, so far, almost never been treated in empirical investigations of English modality.

Finally, it needs to be added that the majority of data used in these studies is representative of British English (BrE), while comments about semantic changes in American English (AmE), especially in spoken AmE, have remained relatively rare. Seggewiß (2013), for instance, only analyzes *should*, *must*, *have to*, *(have) got to*, and *need to* in the Santa Barbara Corpus of Spoken American English for the sole purpose of comparison to the BrE data. It remains a desideratum to shed more light on the use of modal expressions in this variety, which can be considered the "main driving-force of change" in semi-modal usage (Mair and Leech 2006: 328).

1.1. Objective and Methodology

The focus of this study will lie on obligation and necessity, i.e. on the "unsettled system of deontic modality in contemporary English" (Tagliamonte and Smith 2006: 344). 'Deontic' here is to be understood as the counterpart of epistemic modality (i.e. 'non-epistemic') and is used synonymously with the term "root" modality (i.e. 'root,' 'deontic,' and 'dynamic'). In this "more complex semantic field than epistemic modality" (Aijmer 2015: 271), the English language in particular "seems to have a more varied repertoire for the expression of obligation [than Norwegian], allowing more nuances of meaning" (Johansson 2013: 380). Epistemic modality will only be discussed briefly, with remarks limited to issues that concern the delineation between the two types of modality and comments about the frequency of use with the analyzed expressions.

The main objective is to investigate changes in this semantic field. More precisely, the study is aimed at retracing the changes in the frequency of various modal expressions, taking not only core and semi-modals, but also modal adjectives, nouns, and lexical verbs into account. Furthermore, a thorough analysis and description of the semantics of various (groups of) expressions will make it possible to identify true alternatives to the core modals (and the semi-modals) and will shed light on the variation and the interrelated nature of the relationships that govern the distribution of all these expressions of obligation and necessity. The inclusion of previously neglected expressions (cf. Ch. 3 for information on existing studies) will constitute an important step towards gaining further insight into the "puzzling" (Leech 2013: 114) changes that occur in the modal system. To this end, the use of the following thirty-one expressions will be analyzed:

- the core modals *must*, *should*, *shall*, *need*, *ought to*, *be to*
- the semi-modals *have to*, *need to* (simple and progressive aspect), *have got to / gotta*, *want to* (including *wanna* as well as forms preceded by *would /'d*, *might*, *will / 'll*, *may*, *should*, and *could*), *(had/'d) better*, *be supposed to*, *be bound to*
- the passive forms of the lexical verbs *force*, *require*, *oblige*, *urge*, and *compel* and first person singular and plural forms of *force*, *require*, *oblige*, *urge*, and *demand*
- the adjectives *necessary*, *essential*, *imperative*, *critical*, and *crucial*
- the modal nouns *constraint*, *demand*, *need*, *necessity*, *obligation*, *request*, and *requirement*

The expressions are chosen on account of their semantics (i.e. (preferably) strong obligation and necessity) and their frequency in the database (*indispensable*, *vital*, *mandatory*, and *obligatory*, for instance, are too rare to be included in the discussion here). Evidently, it would be interesting to take other expressions such as *important*, *order*, *require* etc. into account, however, a cut-off line has to be drawn to ensure the feasibility of a fruitful in-depth study of the frequency and the semantics of all selected expressions. Both qualitative and quantitative evidence will be gathered from two recently compiled mega-corpora, *The Corpus of Historical English* (Davies 2010-, 400 million words) and *The Corpus of Contemporary American English* (Davies 2008-, 570 million

words), which have (not yet) served as the basis of comparable thorough analyses of modal meanings. *The Corpus of Historical English*, which contains data from many different text types from exclusively written sources (1810-2009), constitutes an ideal database for detecting changes in the use of the analyzed expressions over a long period of time. It provides data that can be compared to changes observed in the 1-million-word corpora of the Brown family (1961/ 1992), but is much more fine-grained and has the advantage that even low-frequency items (such as *need to* in the progressive aspect) are available for examination. *The Corpus of Contemporary American English* (1990-2017) serves as a source of comparable data from spontaneous and scripted speech. It can be exploited for qualitative data for a time span that has not been extensively analyzed yet. The extracted examples are manually coded using a detailed classification scheme. A large part of the data was later rechecked. The results of this corpus analysis allow for conclusions about possible directions in which the use of modal expressions might be heading in AmE. In light of previous reports that spoken AmE can be considered the "'bell wether' variety in the vanguard of English language change globally"[2] (Leech 2013: 113), it might be speculated that similar processes will follow in other, more conservative varieties (e.g. in BrE, cf. Collins' comments (2009a: 160) on "American innovativeness" and "British conservatism").

My study provides further empirical evidence for the validity of Van linden and Verstraete's proposal "to shift the core of deontic modality from obligation/permission to desirability" (2011: 152). I adopt a scalar view of deontic modality and consider only those cases of subjective deontic modality as 'directive' utterances in which the speaker gives an addressee an order (cf. Nuyts *et al.* 2010: 24-26 for a different scope of the notion). Since a considerable number of the analyzed expressions can be used performatively, this study has implications for our views of how language can be used strategically to alleviate the force of an utterance that conveys orders and how seemingly "harmless" constructions can be used to give commands. As a by-product, it also produces insights into the functions of semi-modal verbs in the progressive aspect and retraces the development of the mandative subjunctive as a competitor of certain modal verbs.

1.2. Structure of the Present Study

This study is structured as follows: Chapter 2 provides the theoretical foundation for the ensuing semantic analysis of selected modal expressions of obligation and necessity and gives definitions of the concepts that are applied in the data analysis. It addresses different ways of categorizing modal verbs, outlines pertinent attempts at defining the essence of modality, and illustrates the struggle for a satisfactory terminology. It also contains a concise review of grammaticalization paths and of the function of modal verbs in directive utterances, in instances of dynamic modality, and in the domains of volition and evaluation. It needs to be added that in the face of the large body

[2] Note that there are counterexamples to this tendency and trends for both varieties to develop in different directions (cf. Hundt 2009: 32-33). For an overview of the differences between BrE and AmE, see Jäger and Mondorf (2015).

of previous research on modality, an exhaustive survey of the literature would go beyond the scope of this study. The review of the literature is thus limited to observations relevant for my purposes. Chapter 3 only gives an overview of empirical studies on modal verbs and lexical expressions of obligation and necessity, concentrating on changes in the 20th century, as they become obvious in the Brown family of corpora. I then also briefly describe the state of research on modal expressions in spoken British and American English before commenting on the reasons that are suspected to drive the changes in the modal system.

In Chapter 4 the composition of the corpora that served as databases, *The Corpus of Historical American English* (1810-2009) and *The Corpus of Contemporary American English* (1990-2017), and the difficulties in data extraction that had to be overcome are presented. Additionally, the chapter supplies information on different methods to measure frequencies and explains the choices made in favor of normalization per million words, of Kendall's tau (τ) to indicate trends, of variability-based neighbor clustering to group data, and of various measures to determine statistical significance. Since this study is limited to expressions that can be used interchangeably, only the contexts in which this would theoretically be possible are considered even if different nuances of meaning might be expressed. I will explain in more detail why certain tenses, co-occurrence patterns, and types of clauses are excluded, showing how much of the data was eliminated. The search commands that were used are listed in Appendix A.3.

Chapter 5 gives a brief overview of the findings of the corpus-based analysis, revealing changes in frequency that different groups of expressions undergo in COHA and in the broadcast transcripts that the spoken language section of COCA contains. A quick exploration of the use of these verbs, adjectives, and nouns in all syntactic contexts and tenses (without any restrictions) will allow comparisons to other studies. Thereafter, all comments will only refer to the use in those contexts in which the analyzed expressions can be used interchangeably. Additional information about the lemmas is relegated to Appendix B.

Chapter 6, which is divided into five comprehensive sections on core modals, semi-modals, lexical verbs, modal adjectives, and modal nouns of obligation, necessity, and desirability, contains an in-depth analysis of the findings of the corpus study. The development of the frequency of use of each expression is examined separately before the results of the manual analysis of the semantics are presented. Further comments about particularities, such as a special morphosyntax, different complementation patterns, or the existence of double modal forms, are added when the phenomenon is particularly salient. A special interest in the contrastive analysis of the frequencies, the polarities, and the semantics of *need to* and non-assertive *need*, building on a previous research project on the use of this verb in the TIME magazine corpus (1923-2006, Davies 2007-), led to an additional chapter on non-assertive *need.* Particular attention is also devoted the use of *have to* and *need to* in the progressive aspect. The beginnings of both forms are retraced in COHA before their distribution in different text types and types of speech and their semantics are scrutinized. Special emphasis is also placed on a small-scale investigation into the use of the mandative subjunctive

triggered by the adjectives analyzed here. Further information on the topic can be found in Appendix E. Finally, a few brief comments on other expressions of obligation (such as (indirect) questions, infinitive clauses, declarative sentences functioning as demands, imperatives, and phrasal verbs) complete the empirical corpus study.

In Chapter 7 the observed developments are considered in their entirety, both relative to each other as well as relative to the decrease of the whole group of analyzed expressions between 1900 and 2009. Additionally, the overall changes in meaning are examined before the main contributors to these in-/decreases are determined. Finally, the identification of the key meanings of certain groups of expressions will suggest that there is a functional division of labor. Chapter 8 provides a summary and an interpretation of the main findings, points out limitations of this study, and suggests avenues for further research.

The Appendix contains additional information about the corpora, the search procedures, and particular expressions. In addition to that, it comprises lists of the results of the multiple distinctive collexeme analysis in the spoken language section of COCA.

2. The Essence of Modality

At the origin of differences in the definitions of modality lie different conceptualizations. Like all scientific observations, these conceptualizations are by their very nature subjective, "(at least partially) arbitrary," and reflect a "'world view' that takes categories to be independent of the organisms that conceive of them," all the while professing to being objective (Lampert and Lampert 2000: 12). In studies on modality, Lampert and Lampert identify a logical model, according to which modality is defined with reference to possibility and necessity, and a national model, which departs from the semantics of the modal verbs. Advocates of the functional modal view modality as the "speaker's attitude toward the veridicality status of a proposition."

In the following, the survey of the classifications of modality will be restricted to an overview of the basic characteristics of influential proposals that are particularly relevant for the purpose of the ensuing analysis of the semantic field of obligation and necessity. (For a discussion of the philosophical implications of these as well as other conceptualizations of modality, see Lampert and Lampert 2000 and the handbook surveys in Nuyts and van der Auwera (2016).) I hold the view that while the theoretical foundations may differ quite substantially, many of the labels used to distinguish various types of modal meanings can be considered largely interchangeable (see the comparison to a cognitive semantics approach in Ch. 2.3). I will neither discuss modal logic and formalizations of language nor functional models of modality, such as those proposed by Fillmore and Givón. Halliday's framework will receive some attention because it does not solely focus on the English modal verbs, i.e. on the best-studied expressions of modal meanings, but also takes other expressions of modal meaning into account. After concentrating on formal classifications of the English modals (cf. Ch. 2.1.), I will look at semantic approaches to English modality (cf. Ch. 2.2), at grammaticalization paths (cf. Ch. 2.4), and at meanings that are considered peripheral to the category of modality in the English language (cf. Ch. 2.5).

2.1. Formal Classification

Instantiations of the conceptual category modality range from modal auxiliaries to modal nouns, adverbs, and adjectives, but the starting point of most studies on modality in English is the class of modal auxiliaries. The distinction between lexical verbs and auxiliary verbs, or more specifically, the subcategory of modal auxiliaries, is often made on the grounds of (morpho-)syntactic criteria. In the first edition of *A Linguistic Study of the English Verb* (cf. also Palmer 1974: 18-25), Palmer established four criteria to identify auxiliary verbs (1965: 19-27):

(a) modal auxiliaries have *-n't* negative forms (negation),
(b) they can occur in first position before the subject (inversion),
(c) they can recur without a full verb as for example in *so should we* (code),
(d) they can be used, when stressed, in affirmation of a denied or doubted statement, as in *but he 'can!* (emphatic affirmation).

Following Huddleston's review of the second edition of Palmer's monograph, these characteristics have come to be known as "the NICE properties" (1976: 333) and are used to distinguish English auxiliaries in reference grammars and standard works on modal verbs from full verbs (cf. e.g. Coates 1983[3]). Quirk *et al.* also specify that the English auxiliaries can function as operators in reduced clauses and that they appear in the pre-adverb position. In contrast to main verbs, auxiliaries can precede quantifiers modifying the subject of a clause, they are semantically independent (i.e. they can have inanimate subjects), they can be constructed with existential *there*, and changes from the active to the passive voice do not lead to any changes in meaning (cf. Quirk *et al.* 1985: 126-127).

To identify modal auxiliaries, Quirk *et al.* add more criteria: use with the bare infinitive, non-existence of non-finite forms, absence of 3rd person inflection and "abnormal time reference" (modals can refer to present and future time, and, in some cases, also to the past in indirect speech, 1985: 125-127). Formal criteria generally lead to the identification of nine central or core modals: *can*, *could*, *may*, *might*, *shall*, *should*, *will*, *would*, *must* (cf. e.g. Quirk *et al.* 1985: 137, Biber *et al.* 483-484). Huddleston and Pullum also include *ought to* in this list (cf. Table 1) – as do Coates in her seminal study on the semantics of the modal auxiliaries and Collins in his comprehensive study of (semi-)modal verbs in BrE, AmE, and AusE (cf. Table 2). *Need* and *dare*, "the semantic black sheep of the modal family" (Perkins 1983: 29) and *used to* are often qualified as marginal modals (cf. Quirk *et al.* 1985: 137, Biber *et al.* 1999) or considered to be dually categorized as auxiliaries and lexical verbs (e.g. by Huddleston and Pullum 2002 and Collins 2009: 12).

[3] Huddleston stresses that there are no comparable criteria for auxiliary verbs in other languages (1976: 334) and that this definition is only valid for English (which is one of the reasons why Lampert and Lampert (2000: 184ff.) qualify it as "the national model"). Langacker stresses that the German modals, for instance, have their own structure: They form past participles that are used with '*have*' (*Ich habe gekonnt*) and they have inflections (*du kannst* – 'you may') and infinitival forms (1991: 271).

The differences in classification illustrate how difficult it is to draw a line between modal and non-modal English verbs. Kruisinga goes so far to say that "the question whether a verb is to be counted among the auxiliaries is one of grammatical convenience" (1925: 277). Calbert stresses that the semantics of these verbs further complicate the matter (1975: 4). Kirchner reports that it "is a well-known fact that a considerably greater number of verbs may be used in the function of auxiliaries than are commonly included among this class." These constructions include *be due to*, *belong to* ("in the sense of *ought to* as it is used in North Carolina"), and *want to* (Kirchner 1940: 129). Curme lists *need*, *want* "(popular)," *am obliged*, *am compelled*, *am (is*, *are) to* (which have a milder force than *must/have to*), and *going to* as expressions of the modal idea of constraint. Furthermore, he mentions that sentence adverbs such as *necessarily* and *of necessity* have a modal force (1931: 396).

Yet for a long time studies of modality have almost exclusively focused on the core modals or central modals listed above. Only recently have the considerable changes observed in the category as a whole (cf. Ch. 1) received well-deserved scholarly attention. In his very influential study, Krug (2000: 243) underlines that there seems to be a pronounced tendency for marginal modals like *need to*, *ought to*, and *dare to* to adopt more characteristics of lexical verbs (e.g. *do*-support, *to*-infinitives, cf. also Quirk *et al.* 1985: 140). He argues that that the so-called emerging modals *going to*, *got to*, *want to*, *have to* as well as the more marginal emerging modals *need to*, *ought to*, and *dare* "should be considered proper auxiliaries." The marginal modals could then be viewed as auxiliaries that leave the subdomain of the core modals to "move to the side" of the "main verb – auxiliary cline" (2000: 244). This point of view has the advantage that the problem created by an apparent violation of the unidirectionality constraint of grammaticalization theory disappears (cf. Ch. 2.4).

Denison highlights that "the category Modal is developing in several directions at once." *Be able to*, *be supposed to*, *be going to* "bring[…] in inflection" – a trend that is at odds with the absence of verbal inflections (2006: 454). *Be to*, which is no longer used in non-tensed forms such as in example (4), exhibits signs of more auxiliary-like behavior.

(4) N.B. No snuff *being to* be had in the village she made us some. (Keats (1818) *Letters*, quoted by Denison 2006: 453)

Better is increasingly used without a subject, which is unusual for modals. *Will* now primarily expresses temporal meanings and has thus moved away from the modal core meanings (Denison 2006: 454). An example of an auxiliary losing its characteristic contracted negation is *may*[4] (cf. Daniels 2001 for a comprehensive overview of the (recent) changes in the use of *mayn't*). Denison believes that *might* and *shall* undergo the same development, with *ought* and *used* having lost contracted negations among speakers from younger generations. He concludes (2006: 454):

[4] A quick glance into COHA confirms that *mayn't* and *mightn't* occur indeed less than 0.5 times per million words in the 2000s. *Shan't* is slightly more frequent with 0.8 w/m in the same period.

> So the recent history of modals is not an uninterrupted, unidirectional progress towards purer and purer modalhood. Rather, the nature of the modal category – indeed the modals themselves – may be subtly changing (cf. Cort and Denison 2005). […] Any category is the sum (or average) of its members.

When its members start patterning differently, it "skew[s] the overall perception of the category" (Denison 2006: 454). The category is thus clearly in a period of transition that proves interesting for the analysis of modal expressions.

Changes in the morphosyntax of (semi-)modals are also reflected in this study, and they pose a particular challenge for classification. In the following, I will group *need* in non-assertive contexts with the core modals (cf. Ch. 6.1.4), but *need to* with other semi-modals (cf. Ch. 6.2.3). *Ought to*, positioned on the outskirts of Krug's prototypicality ranking of the emerging modals, will equally be treated with the core modals (cf. Ch. 6.1.5). Likewise, in accordance with Palmer (1990: 164), Declerck (2010: 36), and Smith and Leech (2013: 79), for instance, *be to* is discussed with the core modals (cf. Ch. 6.1.6). The term 'semi-modals' (cf. e.g. Biber *et al.* 1999, Leech 2003, Mair and Leech 2006, Depraetere 2015) is retained simply because of its widespread use.

Quirk *et al.* (1985: 137)	core modals	marginal modals	modal idioms	semi-auxiliaries	catenatives	main verb + non-finite verb clause
	1 VERB PHRASE ←					→ 2 VERB PHRASES
	can, *could* *may*, *might* *shall*, *should* *will*/*'ll*, *would*/*'d* *must*	*need*, *dare*, *ought to*, *used to*	*BE to* *HAVE got to* *had better* *would rather /sooner* *etc.*	*HAVE to* *be bound to*, *be likely to*, *be supposed to*, *be due to*, *be meant to*, *be obliged to* "verb idioms" with "modal or aspectual meaning […] introduced by HAVE" or BE	*APPEAR to*, *HAPPEN*, , *SEEM to*, *GET -ed participle*, *KEEP -ing participle*, etc.	*HOPE to-infinitive*, *BEGIN-ing participle*, *etc.*
Biber *et al.* (1999: 483-484)	core modals	marginal auxiliary verbs	semi-modals	relatively fixed expressions with meanings similar to modal auxiliaries		
	can, *could* *may*, *might* *shall*, *should* *will*, *would* *must*	*need (to)*, *dare (to)* *ought (to)*, *used (to)* "can behave like modals" in negations and questions, "extremely rare and largely confined to BrE" (484)	*(have) got to*, *gotta* *have to*, *(had) better* *be supposed to* *be going to*, *gonna* fixed idiomatic phrases with function similar to that of modals	*want to* *be able to*, *be obliged to* *be likely to*, *be willing to* differ from semi-modals in that the component parts contribute independently to the overall meaning of the phrase		
Huddleston and Pullum (2002: 92, 173)	auxiliaries modals	dually categorized: (auxiliary / lexical verb)	non-modals:	auxiliaries some of them appear in idioms	lexical modals	
	can, *could* *may*, *might* *shall*, *should* *will*, *would* *must* *ought*	*need*, *dare* *use* *have* *do*	*be* *have* *do* *use*	*be going to* *have got* *had better/best* *would rather / sooner* the first verb is an auxiliary, not the whole idiom	*possible*, *necessary*, *likely*, *probable*, *bound*, *supposed* *perhaps*, *possibly*, *necessarily*, *probably*, *certainly*, *surely* *insist*, *permit*, *require* *possibility*, *necessity*, *permission* + similar derivatives	
Carter and McCarthy (2006: 638-678)	core modal verbs:	semi-modal verbs:	other expressions of modality			
			other modal VPs	modal expressions with *be*	other verbs which can express modal meanings / with modal uses	modal nouns, adjectives and adverbs
	can, *could* *may*, *might* *shall*, *should* *will*, *would* *must*	*dare* *need* *ought to* *used to*	*be to*, *be going to*, *had better*, *have (got) to*, *would rather*	*be bound to*, *be certain to*, *be due to*, *be likely to /that*, *be meant to*, *be obliged to*	*e.g. allow*, *demand*, *entail*, *forbid*, *force*, *involve*, *let*, *make*, *mean*, *necessitate*, *require*, *permit*, *prohibit*, *wish*, *want*	

Table 1 Classification of modal expressions in various reference grammars

Coates (1983: 4-5)	modal auxiliaries	both modals & main verbs	quasi-modals						
	can, *could*, *may*, *might*, *shall*, *should*, *will*, *would*, *must*, *ought*	*need*, *dare*	*HAVE to*, *BE going to*, *BE able to*, *BE bound to*						
Perkins (1983)	modal auxiliary verbs		quasi-auxiliary modal expressions	adjectival, participial and nominal expressions				modal adverbs	modal lexical verbs
	primary modal verbs	secondary modal verbs		*is to* & expressions incorporating only *BE... to*	incorporating non-verbally derived adjectives	incorporating verbally derived adjectives & participles	modal nominal expressions		
	can *may* *shall* *will* *must*	*could* *might* *should* *would* *ought to*	*HAVE (got) to* *NEED to* *HAD better*	*is to*, *BE going to*, *BE about to*, *BE bound to*, *BE liable to*, *BE apt to*	e.g. *BE sure /certain / likely / possible / necessary / compulsory / imperative / mandatory / obligatory to/that*	e.g. *BE advised / advocated / asked to* etc.	e.g. *command*, *demand*, *directive* etc.	e.g. *allegedly*, *apparently*, *arguably*, *clearly* etc.	e.g. *ask*, *beg*, *command*, *demand*, *direct*, *order*, *require* etc.
Collins (2009a: 12-17)	modals	may be AUX/ lexical verbs	quasi-modals						
			semi-modals 1st element: AUX, no non-tensed forms	lexico-modals[5]: 1st element: not AUX, but mostly *BE*, have non-tensed forms					
	can, *could* *may*, *might* *shall*, *should* *will*, *would* *must*, *ought to*	*dare* *need* *used to*	*BE to*, *HAVE got to* *had better /best* *would rather /* *sooner / (just) as soon etc.* *may / might (just) as well*	*HAVE to* *BE bound to*, *BE likely to*, *BE supposed to*, *BE due to*, *BE meant to*, *BE obliged to* *BE going to*, *BE (unable) to BE apt to*, *BE (unwilling) to*, *BE about to*					

Table 2 Classification of modal expressions in influential studies on English modal verbs

[5] Salkie criticizes Collins' grouping, arguing that "in this messy area of grammar no distinction is likely to be watertight, but this one seems to leak somewhat" (2013: 221). The NICE criteria are not only met by the semi-modals – which is what would be to expect when the first element is an auxiliary –, but also by the lexico-modals, which, according to Collins, do not have an auxiliary as the first element. He stresses that *BE to* does not have non-tensed forms (cf. also Perkins 1983: 71); yet Salkie finds one example of *will be to* in the BNC, which, as he concedes, might be a performance error. He also finds only two uses of non-tensed *would(n't) BE supposed to*. Salkie believes that the 33 other examples of non-finite *BE supposed to* are not lexico-modals, but have a sense of 'be assumed to.' He thus concludes that the corpus evidence does not legitimate a categorical distinction between *BE to* and *BE supposed to* (2013: 221). There are seven occurrences of a modal + *BE to* in COCA, but they all appear in the formulaic expression *BE to blame*, which seems to support Collins' claim. For a discussion of the senses of *BE supposed to*, see Ch. 6.2.7.

2.2. Semantic Classification

Modality is often characterized as a "mainly semantic" category, for example by Lyons (Hermerén 1978: 10) – whose work had a great impact on subsequent attempts at defining modality (Narrog 2005b: 169) –, by Frawley (1992: 386), and by Huddleston and Pullum (2002: 172[6]). Lampert and Lampert observed in the 2000s that equating modality with the semantics of the modal verbs is "the [h]egemonic conceptualization of "Western" [m]odality" (2000: 184). Narrog stresses that while a definition of morphosyntactic features may be useful for English and possibly related languages, it would have no cross-linguistic value. Conversely, a semantic definition offers the possibility to be potentially universal (2005b: 166-167).

As Palmer observes, there is, however, "no simple, clearly definable, semantic category" (1990: 2). In most approaches, the starting point is effectively the formal class of the modal verbs, but there are various challenges to finding a common semantic denominator – particularly the integration of ability and volition (cf. Ch. 2.5.3). Serious doubts have been raised about the felicitousness of the notion itself (e.g. by Nuyts 2005). According to Nuyts, modality is a "'supercategory' (Nuyts 2005, 2006)" that is not comparable to time and (types of) aspect in terms of structure (2016: 33). He argues that if the aim is to adopt a wide definition, the defining property of modal meanings should be their "'attitudinal' character, i.e. the fact that they are all about types of commitments to states of affairs" (2005: 27). This, in turn, means that expressions conveying emotional states of the speaker (such as surprise, disgust, dislike etc.) are considered modal, whereas circumstantial necessity is excluded from the category of modality – a view that, as Nuyts himself observes, markedly differs from traditional definitions (2005: 27).

Nuyts criticizes the common practice to use modality as an umbrella term under which various meanings find shelter. Quirk *et al.* try to find a general definition of modality, but acknowledge that this definition "makes only an imperfect match with the correspondingly-named formal category, that of modal auxiliary verbs" (1985: 219). They relate the two types of modality they identify to the notions of possibility, necessity, and prediction as well as to permission, obligation, and volition (1985: 219). Biber *et al.*, who also depart from a formal definition, mention that modal auxiliaries have "a wide range of meanings" and three major categories of meanings, namely permission, possibility, and ability, obligation and necessity, and volition and prediction (expressed by *will*, *would*, *shall*, *be going to*, 1999: 485). As Lampert and Lampert stress, despite professions to the contrary many of these characterizations[7] thus effectively treat the "classical" modal verbs, which express possibility and necessity, as the prototypical members of the category (2000: 196).

Other linguists adopt a definition in terms of necessity and possibility, in the same way modal logic does, right from the start. Van der Auwera and Plungian, for instance, directly and simply

[6] Initially, Palmer also identifies modality as "a semantic term" (1979: 4), but later comes to view it as "a grammatical, or semantic-grammatical, category" (1990: 2).

[7] They specifically refer to all categorizations analyzed in their chapter on the national model, i.e. Quirk *et al.* (1985), Coates (1983), Palmer (1979, 1990), and Wunderlich (1981) (cf. Lampert and Lampert 2000: 184-198).

define modality with reference to necessity and possibility (1998: 80). Larreya characterizes modality as "a mental system – or subsystem – based on the mutually related concepts *possibility* and *necessity*" (2009: 9).

By contrast, Huddleston and Pullum (2002: 173) and Salkie (2009) choose a prototype approach.[8] In their definitions of modality, the former combine various approaches to defining modality and "allow for indeterminacy at the boundaries of the categories" (2002: 173). They postulate that "necessity and possibility are core concepts of modality" and that "modality is centrally concerned with the speaker's attitude towards the factuality or actualization of the situation expressed by the rest of the clause" (but can also refer to more "something more objective [such as in] *If x is a prime number between 90 and 100 it must be 97*" (2002: 173)[9]).

This notion of speaker attitude is also frequently used in definitions of modality. Jespersen already observes that "[m]oods express certain attitudes of the mind of the speaker towards the content of the sentence," adding that there are exceptions (1924: 313). Givón similarly remarks that modality signals "the speaker's attitude toward the proposition" (1994: 266). Radden and Dirven state that modality "is concerned with the speaker's assessment of, or attitude towards, the potentiality of a state of affairs" (2007: 234). Lyons stresses that markers of subjectivity are "devices whereby the speaker, in making an utterance, simultaneously comments upon that utterance and expresses his attitude to what he is saying" (1977: 739). Speaker commitment is also often recognized as the defining criterion. Fairclough, for instance, observes that modality encodes the degree to which "people commit themselves when they make Statements" and the different ways of doing so (2003: 165). Palmer (1986: 16) claims that modality can be considered to be the "grammaticization of speakers' (subjective) attitudes and opinions" (cf. also his acceptance of the "opinion and attitude of the speaker" as a working definition, 1990: 2) – a definition that is later adopted by Bybee *et al.* (1994: 176). Quirk *et al.* observe (1985: 219) that

> [a]t its most general, modality may be defined as the manner in which the meaning of a clause is qualified so as to reflect the speaker's judgment of the likelihood of the proposition it expresses being true.

This definition only covers what Quirk *et al.* call extrinsic modality (which "typically involve[s] human judgement of what is or is not likely to happen", i.e. epistemic modality), but not intrinsic

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[8] Cf. also Traugott's definition of modal utterances with respect to non-factuality (irrealis), relativization of the state of affairs to a set of possible worlds, and the speaker's comment on the necessity or possibility of the state of affairs (2011: 382).

[9] Salkie (2009) takes issue with Huddleston and Pullum's notion of varying degrees of modality, arguing that the low degree of modality in some modalized clauses can be explained by various factors, e.g. by semantic bleaching (in idiomatic expressions) and by the adoption of modal qualities of unmodalized sentences (2009: 96-99). Salkie's own classification is similar to Huddleston and Pullum's, but differences lie, for instance, in the mention of subjectivity or the speaker's attitude (which Salkie classifies with reference to the commitment of the speaker, 2009: 82-87). Even though different aspects are stressed (i.e. the deontic source by Huddleston and Pullum and pragmatic processes such as saturation and free enrichment by Salkie), there is no evidence to suggest that these approaches lead to different classifications. Utterances that express dynamic necessity, for instance, are in both cases considered peripheral (Salkie 2009: 88). A merit of Salkie's approach, though, lies in the attention paid to pragmatic processes.

modality, which is, however, explicitly mentioned in the ensuing discussion and characterized as referring to "some kind of intrinsic human control over events" (1985: 219). Interestingly, the first type of modality (extrinsic) involves a human judgment, but this component is absent from the definition of intrinsic modality. Technically, this definition excludes situations in which the circumstances can be considered the source of the necessity or obligation (circumstantial, dynamic modality). Yet Quirk *et al.* also mention their existence, observing that there is "no implication […] of human control, and this distinguishes the root necessity use of *must* from its other root sense of obligation" (1985: 225). This inconsistency in the application of the extrinsic-intrinsic terminology and the relapse to more traditional terms is only one strategy that deserves comment. Lampert and Lampert also criticize the "ad-hoc proliferation of senses," such as root possibility, epistemic necessity, and root necessity (2000: 191).

Narrog points out various disadvantages of the equation of modality with subjectivity or speaker attitude (as done by Fillmore 1995: 112): First, it is difficult to define either of these two concepts without "a fair amount of vagueness" (2005b: 170). The second problem, which ties in with the first, is that it is particularly difficult to sharply delineate subjective and objective or attitudinal and non-attitudinal modality (2005b: 170). As Narrog demonstrates (and as I will discuss in more detail in Ch. 2.2.2.2), the subjectivity or objectivity of a modal expression depends largely on the context of the utterance. Narrog claims that a clear distinction is impossible (2005b: 175). Furthermore, Narrog stresses that the term 'proposition,' which is used, for instance, by Fillmore (1968: 24, i.e. sentence → modality + proposition) and Givón (1995: 112), is an unfortunate choice because it is more technical than, for example, the term 'expression' and "its actual range of application in natural language data can be stretched and is actually being stretched as much as that of the term modality" (2005b: 184). Instead, he (2005b: 184, 2012: 6) proposes to define modality with reference to factuality:

> Modality is a linguistic category referring to the factual status of a state of affairs. The expression of a state of affairs is modalized if it is marked for being undetermined with respect to its factual status, i.e. is neither positively nor negatively factual.

Similarly, Halliday defines modality as "the area of meaning that lies between yes and no – the intermediate ground between positive and negative polarity" (2014: 691). According to Narrog, factuality refers to the semantic, but not to the pragmatic level (2005b: 185). Narrog's approach differs from Palmer's definition (2001: 1-4) with regard to terminology (Palmer prefers 'realis' and 'irrealis') and insofar as no additional reference to the notion of assertion is made (cf. Palmer 2001: 3-4). Presupposed propositions, such as in the Spanish subjunctive (*Me alegra que sepas la verdad*), are treated as non-asserted by Palmer. However, Narrog argues in favor of the abandonment of the notion of assertion (2005b: 185-187). A similar treatment of presupposed states of affairs (SoA) as non-modal is advocated by Van linden and Verstraete (2011) and Van linden (2012). This is also the position that is adopted in the following.

Narrog stresses that the term 'factual' is "related to human judgment (Eisler 1930: 3.214)" (2012: 7). He further specifies: "When we are dealing with modality, we are dealing with speakers' judgments expressing their world view, and not language reality outside language" (2012: 7). The speaker's judgment is thus still a relevant factor in the process of identifying modal meanings, though arguably of minor importance, as it is only relevant in very particular situations. This specification is meant to clarify that the time at which the factuality of a state of affairs is determined is not necessarily identical to the time of utterance, so that situations that are presented as factual may not objectively conform to reality.

Finally, Halliday's classification of modal expressions deserves further comment, as it does not focus on modal verbs alone, but also implies that adjectives and lexical verbs express modal meanings. Halliday defines modality as "the area of meaning that lies between yes and no – the intermediate ground between positive and negative polarity" (2014: 691). Three variables are important to describe the expressions that are analyzed here in Halliday's classification scheme. First, Halliday distinguishes two fundamental functions of language that relate to the exchange of information (called modalization, 'indicative' type) or of goods and services (called modulation, 'imperative' type, 2014: 135). Information clauses convey "some degree of probability or usuality," whereas goods and services clauses refer to "some degree of obligation or of inclination" (Halliday 2014: 691).[10] Halliday additionally distinguishes between subjective and objective as well as explicit and implicit orientations. The speaker can either make the source of his/her conviction explicit, presenting it as objective, as in *it is certain*, or "as a subjective judgement on the speaker's part, as in *I'm certain that…* ," or s/he may "leave implicit the source of the conviction" (such as in *that must be true* (subjective) or *that's certainly true* (objective), cf. Halliday 2014: 181). The third variable is the distinction between high, median, and low values of modality, illustrated in (5) with (positive) subjective expressions of obligation and probability.

(5) high: *must*, *ought to*, *need*, *has to*, *is to*
median: *will*, *would*, *shall*, *should*
low: *may*, *might*, *can*, *could* (Halliday 2014: 696)

If we focus only on obligation, we obtain the taxonomy that is displayed in Table 3 below. Note that explicitly subjective modality, which is not listed in this table, is, for example, instantiated by *I want John to go* (cf. Halliday 2014: 693). Other explicitly objective wordings that do not figure in Table 3 are *it is demanded / imperative / important that* (Halliday 2014: 703).

[10] Usuality and inclination are considered only marginally relevant for this study and will not be discussed in more detail. Incidentally, they are less restricted in their use than probability and obligation because they do not have any subjective explicit uses (Halliday 2014: 692).
The category that includes ability and potentiality (often referred to as dynamic modality) "is on the fringe of the modality system" (2014: 696, cf. Ch. 2.2.2.3). It can have objective implicit (*be able to*) or explicit orientation (*it is possible (for ...) to*), or subjective implicit orientation (*can / can't)* (note that there are no subjective explicit expressions of ability / potentiality). The latter is very close to inclination. Hence Halliday tentatively proposes to posit the existence of a supercategory of 'readiness' with inclination and ability as subcategories (2014: 696).

Type:	Value	Implicitly Subjective	Implicitly Objective	Explicitly Objective
modalization: probability	high	*Mary must know*	*Mary certainly knows*	*it's certain* [[*that Mary knows*]]
	median	Mary'll know	Mary probably knows [in all probability] [M. is likely to know]	it's likely [[that Mary knows]]
	low	*Mary may know*	*Mary possibly knows*	*it's possible [[that Mary knows]]*
modulation: obligation	high	*John must go*	*John's required to go*	*it's required [[that John goes]]*
	median	John should go	John's supposed to go	it's expected [[that John goes]]
	low	*John can go*	*John's allowed to go*	*it's allowed [[that John goes]]*

Table 3 Examples of types and orientations of modality (adapted from Halliday 2014: 693, 697[11])

Halliday claims that "certain grammatical environments constitute metaphorical realizations of modality" (2014: 686).[12] *I think (it is so)* in (6) is a metaphorical expression of probability and means "*it probably is so*" (Halliday 2014: 687). Halliday further demonstrates his point by stressing that a question tag added to (6) would call the probability of precipitation into question, and not John's particular stance on it. In (7) the command to vote against a CCC endorsement "is realized metaphorically by a hypotactic clause nexus" (Halliday 2014: 701). Again, the appropriate question tag (*will you?*) would target the addressees' willingness to perform the action. It would be odd to ask if it is indeed the speaker who is urging the addressee(s) (*do I?*). Halliday concludes that "just like modality, speech function can be represented as a substantive proposition in its own right" (2014: 701). Other illustrations of metaphorical realizations of proposals, which exemplify different types of declarative and interrogative sentences, are summarized in Table 4.

(6) John: I think it's going to rain, isn't it? *don't I? (Halliday 2014: 687)

(7) Therefore, I urge you to vote against a CCC [California Common Cause] endorsement of the nuclear freeze initiative. [Text 6] (quoted by Halliday 2014: 700)

	Declarative		Interrogative: Yes/No
Subject Person	Deicticity: Temporal: Present	Deicticity: Modal: Modulation	Deicticity: Modal: Modulation
Speaker (speaker+)	*I (we) implore you → to* *I (we) want → you to*	*I (we) would advise you → to* *I (we) would want → you to*	*may I (we) advise you → to*
Addressee	*you are urged by me (us) → to*	*you would be advised by me (us) → to*	*could you possibly be persuaded by me (us) → to*

Table 4 Examples of metaphorical realizations of proposals (commands) involving projection nexuses (adapted from Halliday 2014: 704)

In most cases the "subject person" is "interactant" (cf. example (8)), but it can also be "non-interactant" (cf. example (9)) (Halliday 2014: 703).

(8) Your essay, if I may just cut across for one moment || we'd like || you to re-read this little passage […] as an example. *speaker-plus subject* (Text 135)

[11] The examples for high and low values of modality (indicated in italics) are not given by Halliday, but constitute adaptions on the basis of positive propositions and proposals in Halliday's Figure 10-8 (2014: 697).

[12] With reference to the different orientations of various expressions of modality (cf. Table 3), Halliday observes that the explicit forms of modality are "all strictly speaking metaphorical, since all of them represent the modality as being the substantive proposition" (2014: 698).

(9) Section 15(2) of the Act requires || leases to be stamped within thirty days of execution… *source of authority as subject* (LOB_J)

The option of choosing metaphorical expressions of modality leads to an enormous "expansion of the speech functional system" (Halliday 2014: 704). It allows the speaker to create more social distance between him-/herself and the addressee(s), which, in turn, makes it easier for the addressee(s) to refuse to comply with the request. As Halliday (2014: 705) explains, the metaphors are

> part of a principle of interpersonal iconicity: metaphorical variants create a greater semiotic distance between meaning and wording, and this enacts a greater social distance between speaker and addressee. The semiotic distance is often manifested directly in the lexicogrammar as a syntagmatic extension of wording.

This principle is illustrated in (10), where three clauses are used instead of the simple question *What does that mean?*, thereby creating a social distance between speaker and addressee that attenuates the force of the request. Other "delicate ways of commanding" can be created when indicatives (declarative *you must/ ought / should / will /may / can + do* or interrogative *must you / would you / can you*) are used to express modulation of the obligation or readiness kind. Halliday also considers the fact that "the line between proposals directed to the addressee and propositions about how the world ought to be" is blurred a result of the possibility to express proposals with indicative sentences. *Must you do that*, for instance, is equivalent to saying 'don't do that!' (2014: 706). The indicative can then also serve as a means to express general advice (cf. Halliday 2014: 691-706).

(10) I wonder || if you'd explain || what that means? (Text 7, quoted by Halliday 2014: 705)

Halliday's classification scheme has the great advantage that it recognizes the close link between modal verbs and lexical expressions of modal meaning and grants the latter a place in the modality system. As it does not only encompass declarative sentences, but also interrogative clauses serving similar purposes, it constitutes an important step towards the realization that obligation and necessity can be expressed in a myriad of ways and that the core modals alone should not be the sole focus of scholarly attention. Many of the strategies mentioned by Halliday will be discussed in the following (cf. e.g. Ch. 6.4 and Ch. 6.6). As Halliday himself admits, however, his approach shows that a clear line between metaphorical and non-metaphorical expressions of modality is not easy to draw (2014: 689).

2.2.1. Epistemic Modality

The distinction between epistemic modality (cf. example (11)) and non-epistemic modality (sometimes also referred to as root modality, cf. Chapter 2.2.2.1) "play[s] a prominent part" (Jacobsson 1979: 297) in the description of modal meanings. The term 'epistemic modality' is generally perceived as non-controversial (cf. Nuyts 2005: 10, Van linden 2012: 12) and used by the majority of linguists to describe "judgements about the probability of the truth of the proposition" (Palmer 1990: 5, cf. also e.g. Bybee *et al.* 1994: 179, Krug 2000: 41, Nuyts 2005: 10). Coates works with a slightly wider definition that refers to "the speaker's assumptions or assessment of possibilities, and, in most cases, it indicates the speaker's confidence (or lack of confidence) in the truth of the proposition expressed" (1983: 18). According to Biber *et al.*, the notion of extrinsic modality (which is roughly equivalent to epistemic modality) is connected to "the logical status of events or states, usually relating to assessments of likelihood: possibility, necessity, or prediction" (1999: 485). This is a particularly comprehensive definition, as I will discuss in more detail below.

(11) MOOS: Folks who normally rage at Maher couldn't believe their ears: "I must be in the twilight zone. I agree with this so and so." (2009/06/15, *CNN Situation*, COCA)

However, some aspects of epistemicity are disputed in the literature. One of them is the existence of objective epistemic meaning and thus of a subdivision parallel to that in the field of non-epistemic modality (cf. e.g. Lyons 1977: 797, Goosens 1999: 197, Nuyts 2001: 34, Verstraete 2001, Traugott and Dasher 2003: 114, Facchinetti 2009), another the treatment of evidentiality (cf. e.g. Aikhenvald 2004: 3 for a definition of the term, Lampert and Lampert 2010 for information on the conceptualization of evidentiality, and Aikhenvald (2018) for a comprehensive handbook treatment). The inclusion of inevitability meanings is the one that deserves further comment here, as it has been shown to be relevant in recent studies of *need to.* Some researchers (cf. e.g. Coates 1983, Nokkonen 2006, 2010, 2012) adopt a wider definition of epistemic necessity, in which meanings with an 'inevitability sense' (paraphrase: *it is(n't) inevitable that…*) are included, whereas others advocate a restriction to conclusions about the existence of a SoA (paraphrase: *it is(n't) necessarily the case that*…., cf. example (12)).

(12) B: oh gosh getting married is an awfully complicated business (*other speakers argue*) B: actually it needn't be it can be very straightforward. (SEU)
→ *It isn't necessarily the case that it is awfully complicated.* [and / or]
→ *It isn't inevitable that it is awfully complicated.* (Coates 1983: 50)

However, Westney argues that considering these sentences instantiations of epistemic meanings is a misinterpretation (cf. also Nuyts' comments (2016: 35) on the controversial status of this sense, which he considers to be a case of "situational modality," in Ch. 2.2.2.3), claiming that in example (13), first cited by Coates (1983: 51), the paraphrase *Is it necessarily the case that it happened* is unsuitable (1995: 147). Similarly, he believes using the paraphrase *It isn't necessarily the case that this suffering etc. happened* (1983: 51) for Nokkonen's example (cf. (14) below) does not make any sense. In his opinion, only examples (15)-(16) truly express epistemicity.

(13) The basic questions for the new American administration are two: need the quarrel with Cuba ever have happened, and, can it be put into reverse? (Coates 1983: 51) → *Was it necessary for it to happen?* (Westney 1995: 147)

(14) None of it, not the sufferings of one mutilated soldier or murdered civilian, had been inevitable. None of it needed to have happened. Hitler and Mussolini could have been stopped long before. (FLOB General fiction K14: 35, quoted by Nokkonen 2006: 57) → *it wasn't inevitable that this happened*

(15) He may be there but he needn't be. (Palmer 1979: 54)
→ *It isn't necessarily the case that he is there.*

(16) "He must have finished by now!" "No, I don't think he need have / Surely he needn't have." (Westney 1995: 148) → *It isn't necessarily the case that has finished by now.*

A narrow definition of epistemic modality will be applied in my study. While the inevitability sense may be covered by Coates' "speaker's assumptions or assessment of possibilities" (1983: 18) and Biber *et al.*'s judgments of the "logical status of events or states," it is not considered to fit definitions of epistemic modality that are solely based on judgments of the likelihood that the described state of affairs is, has been, or will be true (cf. e.g. Quirk *et al.* 1985: 219, Nuyts 2008: 187).

A few comments should also be made about the interplay between tense, aspect, and epistemic modality. Coates observes that epistemic *must* frequently co-occurs with the perfective and the progressive aspect, but not with the future (1983: 42-44). However, with regard to example (17), which she considers to have a future meaning, it can be argued that the speaker in this sports commentary expresses that it is desirable at the moment of utterance that "it" needs to be caught (without assuming that it is necessarily true that "it" is or will be caught). Example (18) also refers to the present tense (even though the time of verification lies in the future), but unlike in example (17), the paraphrase *it is necessarily the case that she is very nice* can be used.

(17) McKenzie in bowls to Edrich and that pops up and must be caught no it's over Burge's head. My word that was a lucky one (T.10.1.16, quoted by Coates 1983: 43)

(18) B: is it nice getting it sort of settled NSC: (laughs) I think it's nice to have a few sort of em – pinpoints in the future…
B: I think it must be very nice (S.2.10.118, quoted by Coates 1983: 41)

That "simultaneous and anterior time references for the proposition [generally] coincide with epistemic interpretations," whereas deontic utterances typically refer to posterior events (Wärnsby 2009: 85) has been stressed in many subsequent studies (cf. e.g. Heine 1995: 33-35, Traugott and Dasher 2002: 116-117, Verhulst 2009[13]), sometimes without mention of the fact that this time constraint does, of course, not apply to *should* (an exception are Traugott and Dasher 2002: 116). Time constraints will be described again in various parts of this study (e.g. in Ch. 6.2.3 on *need to* as well as in Appendix D).

[13] Klinge (1996: 48) also notices that the progressive can be used to express a directive in a few "rare" real-life examples (cf. below), concluding that "the constraint on interpretation […] lies in the infrequence of situations where we wish to impose obligation or grant permission only to produce the ACTIVITY-element of an ACT" (1996: 50).
(FN 1) You must be working when I return (Davidsen-Nielsen 1990: 20, quoted by Klinge 1996: 50)

2.2.2. Non-Epistemic Modality

There is considerable disagreement about the number, the labels, and the extent of the subcategories of non-epistemic modality that should be distinguished. Some linguists argue in favor of just one broad category called root modality (e.g. Coates 1983: 20 and Sweetser 1990: 152) or deontic modality (e.g. Lyons 1977, Traugott 1989, 1997), others distinguish deontic from dynamic modality (e.g. Collins 2009a). Traugott argues that a "three-way division" into dynamic, epistemic, and, if necessary, deontic modality "is now considered optimal for historical research" (2011: 392). Good tabulated overviews of the different approaches are given by Depraetere and Reed (2006: 280), Narrog (2012: 287-290), and Van linden (2013: 26). Van der Auwera and Plungian state that "[m]odality and its types can be defined and named in various ways. There is no one correct way. The only requirement is that one makes clear how one uses one's terms" (1998: 80).[14]

Confusion about the terminology (cf. e.g. Traugott 1989: 32, de Haan 2012: 703-704)[15] is due to the fact that some linguists reserve the term 'deontic modality' for a special subcategory of non-epistemic modality. Van der Auwera and Plungian (1998: 81), for instance, view deontic modality as "a special case / hyponym" of what they call participant-external necessity, which typically characterizes obligations imposed by the speaker or permissions granted by the speaker. Sweetser refrains from using the term because of its frequent association with "purely social or moral obligation" (1990: 152).

In the following, root modality will be used as a hypernym of deontic and dynamic modality. I will look at the definitions of root (Ch. 2.2.2.1), deontic (Ch. 2.2.2.2), and dynamic modality (Ch. 2.2.2.3) before considering refinements of these classifications and alternative categorizations (Ch. 2.3), grammaticalization paths and subjectification (Ch. 2.4), and the status of directive utterances, and dynamic, volitive, and evaluative meanings, which are considered peripheral or closely related to modality (Ch. 2.5).

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[14] Cf. also Narrog's space of modal meaning with its two dimensions: event-orientation vs. speech act orientation and volitive vs. non-volitive meaning (2012: 49-56).

[15] Quirk *et al.* (1985) and Biber *et al.* (1999) propose an entirely different terminology. According to Quirk *et al.* (1985: 219), intrinsic modality refers to "some kind of intrinsic human control over events" (e.g. permission, obligation, volition) whereas extrinsic modality "typically involve[s] human judgement of what is or is not likely to happen." Quirk *et al.* specify that they consider root and epistemic modality to be subtypes of extrinsic modality (1985: 220) and they apply terms like root, (logical) necessity, obligation, compulsion etc. in the discussion of the meanings of various modals instead. Biber *et al.* explicitly equate intrinsic with deontic meaning and extrinsic with epistemic meaning (1999: 485). Yet the use of these alternative terms has not caught on in the literature because they "prove ill-motivated in running counter to canonical use" (Lampert and Lampert 2000: 190): 'Extrinsic' refers to what is usually called epistemic modality, i.e. to processes *in* the human mind, whereas 'intrinsic' refers to external forces such as rules and regulations.

2.2.2.1. Root Modality

The term 'root' modality seems to have first been used by T. R. Hofmann (1966) and later by Jenkins (1972), Steele (1975), Coates (1983; cf. also Palmer 1990: 37), and Sweetser (1990). Coates' seminal study of *The Semantics of the Modal Auxiliaries* has proven to be particularly influential. She rejects the idea that a further subdivision of non-epistemic modality can be justified in the way that Palmer (1979) advocates it. In her opinion the term 'deontic' is limited to the logic of permission and obligation and does not cover the full range of what she calls root modality (1983: 21). Her data suggest that only the root – epistemic distinction is valid because root and epistemic modals have "distinct syntactic and semantic features" (i.e. the close link to animate subjects, agentive verbs, the passive voice in the case of the root modals), particular stress and intonation patterns (cf. Coates 1983: 21), and because different paraphrases can be applied.

Nonetheless, both categories "involve indeterminacy" and express "a range of meaning" (1983: 10). Coates draws parallels to Lotfi A. Zadeh's fuzzy sets theory, using a "fuzzy-cum-discrete model" (1983: 22) that situates the meaning of utterances within the core, the skirt, or the periphery of a fuzzy set. There is a "continuum from Subjective to Objective meaning" (1983: 10). In the case of root *must*, for instance, it ranges from strong meanings ("*it is imperative / obligatory*") to weak meanings of obligation ("*it is important*," 1983: 32). In the case of root modality, the meaning at the core is subjective and strong. This is the stereotypical use and the sense first learned by children, but it is actually infrequent in Coates' corpus data. The majority of the examples are found in the skirt or at the periphery, where uses are identified as objective or weak (cf. Coates 1983: 13). An illustration of a core meaning is example (19), whereas (20) is an example of a sentence in which the sense of obligation is extremely weak.

(19) "You must play this ten times over", Miss Jarrova would say, pointing with relentless fingers to a jumble of crotchets and quavers. (Lanc1-G332, quoted by Coates 1983: 34).

(20) Clay pots / . . . / must have some protection from severe weather. (Lanc1-403, quoted by Coates 1983: 35).

Coates argues that a subdivision of root modality, as proposed by Palmer (1979), masks the "essential unity" and close semantic relation of the root modals and entails the choice of "arbitrary cut-off points." While there may be contexts in which strong obligation meanings ('deontic' uses in Palmer's terminology) can clearly be identified, this is not possible in others. However, the basic meaning, namely '*it is necessary for*' is the same in all utterances, even in cases where the involvement of the speaker can hardly be felt (cf. example (20) above).

Coates' fuzzy set model with central and peripheral meanings of root modality can easily be compared to approaches distinguishing deontic and dynamic modality (cf. Vihla 1999: 32, Nokkonen 2006: 33, Nuyts 2001: 25, Nuyts *et al.* 2010: 17). She herself professes to using root modality as a cover term for deontic and dynamic modality (1983: 22). As such, root modality has been criticized as imprecise and vague (cf. de Haan 2012: 704).

Another argument in favor of a binary distinction is the fact that, as Narrog points out, a bipartite classification of modality is also valid in some non-Indo-European languages (e.g. in Modern Chinese, 2005a: 682). There is also a correspondence between the binary distinction into epistemic modality and root modality and the basic psychological dichotomy of affect / action vs. knowledge (cf. Larreya 2009: 11 as well as Langacker's (2013) distinction between effective control and epistemic control), which explains the use of the term 'root modality' in various works in cognitive semantics (e.g. by Sweetser 1990).[16] The inclusion of circumstantial dynamic meanings under the umbrella term 'root modality' in cognitive semantic accounts may thus be interpreted as evidence of the difficulty of creating two separate categories.

[16] Note that some authors interpret Sweetser's comments on the topic as an equation of root modality with deontic modality and contrast them with her explanations on the topic, which seem to imply the exclusion of dynamic modality (cf. Van linden 2012: 22, Nuyts 2016: 41). In my view, however, a footnote clarifies that Sweetser understands root modality to be a broader term (1990: 49, 152).
Talmy refers to Sweetser's comments (1984) on the extension of "root (deontic)" to epistemic uses (1988: 80), but he includes a (circumstantial) dynamic use of *have to* in his discussion elsewhere (1988: 79). Langacker, who makes a distinction between "root (or deontic) modals on the one hand, and epistemic modals on the other," uses "social domain" as a gloss for root modality (in contrast to the "domain of reasoning" that is epistemic modality, 1991: 271, 273). However, he mentions that the "locus of the potency" can be "some unspecified facet of the physical […] world" (1991: 273). It might be argued that both Talmy and Langacker's parenthetical references are recognitions of a label that is used interchangeably with root modality and attempts at facilitating the readers' understanding of the notion. They could also indicate that deontic modality is a particularly frequent instantiation of root modality.

2.2.2.2. Deontic Modality

Nuyts *et al.* claim that unlike epistemic modality, deontic modality has rarely received specific attention (2010: 17) and is usually just defined as referring to obligation and permission (e.g. by Frawley 1992: 419). Deontic modality is considered to refer to "the necessity or possibility of acts performed by morally responsible agents" in the logical tradition (Lyons 1977: 823, cf. also Nuyts 2005: 9, Depraetere and Reed 2006: 274). It "typically proceeds, or derives from some source or cause," such as a person or an institution, moral standards or social norms, or even "some inner compulsion" (Lyons 1977: 824). Palmer (2001: 10) specifies that

> although Deontic modality stems from some kind of external authority such as rules or the law, typically and frequently the authority is the actual speaker, who gives permission to, or lays an obligation on, the addressee.

Many empirical studies, however, show that the cases functioning as directive utterances in which the speaker is the source of the obligation do not account for the majority of the occurrences (cf. also Ch. 2.4). Coates, for instance, stresses that "statistically, [such] core examples occur infrequently" (1983: 13). In their study of the semantic development of *ought to*, Nordlinger and Traugott notice that many cases cannot simply be subsumed under definitions that refer to obligation and requirement or to agent-orientation – a notion that also includes desire –, but are better described with reference to advisability ("*it is a good idea that…*" / "*it is proper/fitting that*," 1997: 299). They conclude (1997: 300):

> This evidence suggests that we may need to expand our ideas of modality and possible modal meanings, to include a notion of 'advisability' and/or 'suitability'. Such notions have not been given much attention in the general discussion of modality, although Coates (1983: 73) and Myhill & Smith (1995: 254) mention it briefly in connection with *ought to;* Bybee *et al.* (1994: 183) cite some language in which the meanings of obligation auxiliaries are glossed as 'be fitting, be proper'…

Depraetere and Verhulst stress that the speaker cannot always succeed in imposing his or her will. Still, this does not mean that s/he is not the deontic source (2008: 13). They argue that "speaker involvement […] may be as subtle as the reflection of the speaker's point of view on what is necessary," but they do not give any further information about the distribution of utterances functioning as directives and simple statements of personal opinions (2008: 13). Van linden and Verstraete, who analyze the use of modal adjectives, even propose "to shift the core of deontic modality from obligation/permission to desirability" (2011: 152). Giving due credit to expressions of desirability and necessity, some linguists thus make a distinction between (illocutionary) directives, which cover the traditional notions of obligation and permission, on the one hand and (attitudinal) deontic modality on the other hand (cf. Nuyts *et al.* 2005, 2010, Van linden 2010a, 2012). Nuyts *et al.* emphasize that directive and attitudinal (qualificational) meanings should be kept apart because of their "fundamentally different nature" (2010: 32). Nokkonen tries to do justice to the directive character of some utterances by separating her data into two types of deontic meaning, grouped

according to the strength of the utterance (2012: 133). Bybee *et al.* separate speaker-oriented modality ("all [..] directives as well as utterances in which the speaker grants the addressee permission," 1994: 179) from agent-orient modality (which "reports the existence of internal and external conditions on an agent with respect to the completion of the action expressed in the main predicate," 1994: 177).[17] Bybee and Fleischman cite the possibility of capturing general "morphosyntactic trends in expression type[s]" as one of the reasons for the separation of the two categories from each other: Agent-oriented modality is usually expressed by verbs, auxiliaries, or non-bound particles, whereas speaker-oriented and epistemic modality are frequently expressed using inflections. The other reason is the relevance of these categories for the diachronic semantic development of the modal verbs (cf. Bybee and Fleischman 1995: 6).

According to Nuyts *et al.*, a directive can, however, be "'informed by' a deontic assessment" (2010: 24). In their study of modal adjectives, Van linden and Verstraete also observe that a directive may be the preferred interpretation of an expression of (attitudinal) deontic modality. Narrog stresses that "it is fair to assume that basically all modal markers of obligation can, if used under the right conditions, indicate commands […] (cf. Wunderlich 1989: 19 for German" (2016: 111). Yet with deontic expressions, the directive implicature remains cancelable. These utterances are thus more face-friendly than directive speech acts (cf. Van linden and Verstraete 2010: 725).

Nuyts (2005) and Nuyts *et al.* (2010) argue that deontic modality, unlike dynamic modality, is an attitudinal category that indicates "the degree to which the 'assessor' (typically, but not necessarily, the speaker […]) can commit him/herself to the SoA in terms of certain principles" (2010: 17). Deontic modality can then be viewed as a scalar category, which includes such meanings as:

- the weakly deontic function of "moral acceptability" (Nuyts 2008: 187, Nuyts *et al.* 2010: 32),
- advisability (e.g. when the realization of the SoA is "beneficial to the subject" (Traugott and Dasher: 2002: 106), cf. example (21) below),
- (comparative) "desirability" (Nuyts 2005: 9, cf. example (22) below),
- and (moral) "necessity" (Nuyts 2008: 187, cf. example (23) below).

(21) Mr. FENIMORE: The love is here and the concern. People have brought you into this meeting looking to help you, not to hurt you. Maybe you need to tell the family how you've been feeling lately. (1990/02/16, "Suffering from Tourette," *ABC 20/20*, COCA)

(22) You know, one of the great strengths of this president, I don't think he has a mean bone in his body […] Sam Donaldson *(Off-camera)*: He better develop a toughness. (2009/05/10, "The round-table; economic mending," *ABC This Week*, COCA)

(23) Mr. WILLIAMS: I- *crosstalk* If you- if you are concerned about homeless people tonight, you ought to take one home. (1990/03/02, *CNN Crossfire*, COCA)

[17] However, in contrast to Nuyts *et al.* 2010 and many others, Bybee *et al.* do not open up a separate category for dynamic modality.

Please note that deontic modality is not necessarily linked to morality. Although the term is frequently used in definitions by Nuyts and his collaborators (cf. Nuyts 2005: 9 and Nuyts *et al.* 2010: 18, 32), the occasional hint that a broad definition of morality needs to be adopted is found (e.g. in Nuyts 2005: 9 and in footnotes in Nuyts *et al.* 2005, 2010: 24): "[I]t need not involve societal principles, however, it can also concern strictly personal norms of the assessor" (Nuyts *et al.* 2005: 8). Van linden advocates the use of a "general definition of deontic modality in terms of desirability" that is not restricted to ethical and moral considerations (2012: 294). An analysis of the data from COCA also suggests that moral considerations are often completely irrelevant, as reflected in the following example from a TV show in which the speaker announces what she wants to do.

(24) GIFFORD: No, he wrote the lyrics... (singing) "I'm every woman." KOTB: Oh, he wrote those? GIFFORD: I need to talk to him about what he was wearing when he wrote those lyrics. I'm going to talk to him about that. (2009/01/28, "Current events, weather, entertainment discussed", *NBC Today*)

Subjective deontic statements also do not necessarily have to reflect the speakers' wishes. Speakers may consider the realization of particular SoAs necessary without having any personal attachment to the outcome. In example (25), for instance, the speaker expresses her opinion on what Sarah Palin should do. Her/his personal wishes (or moral stance) are not an issue here. I assume that the direct mention of judgments of "whether or not something is *necessary* [my emphasis], desirable, permitted or forbidden" (2006: 638-639) in Carter and McCarthy's addendum to the definition of deontic meanings constitutes a similar attempt at stressing that judgments of desirability and necessity may not always automatically coincide.

(25) KARIS: I think -- well, first of all, I think the book was great, because I think it cleared a lot of misconceptions of her life [Sarah Palin]. OK, Levi Johnston is now -- is the one that's talking about her. That's ridiculous. But I think that, after she's done with this, that she needs to go out and talk specifics: tax cuts, specifically about what she would do, bringing down taxes. (2009/12/14, *Fox Hannity*, COCA)

Applied Classification Scheme: Deontic Meanings

In the following, I will adopt a scalar view of deontic modality and distinguish subjective and objective deontic utterances. It is the speaker who expresses desirability, advice, or personal opinions of necessity in subjective deontic utterances (cf. examples (21) - (25) above). In objective deontic utterances, however, the source of the obligation is a collective decision or agreement (cf. example (26) below), a social convention, a rule (e.g. a religious one as in example (27) below), a regulation, a policy (cf. example (28) below), or a law (cf. example (29) below) etc.

(26) Mr. BENNETT: There is now a great consensus on the various steps that we need to take (1990/04/13, "Are we winning the war?" *ABC 20/20*, COCA)

(27) I am a Christian, and we are to forgive people. It's hard. (2008/08/10, "Insanity on death row," *CBS 60 Minutes*, COCA)

(28) Suddenly, President Bush had a "new new" policy. The Coast Guard would intercept all boats leaving Haiti. Petty Officer TONY LONG, U.S. Coast Guard: We're

to take them off their boat, put them on board our cutter, and they're to be returned directly to Port-au-Prince at the earliest opportunity (1992/05/25, "Bush slams door shut on Haitian refugees," *ABC Nightline*, COCA

(29) An $ 11 pizza in the United States costs $ 19 in Germany. An $ 11 pizza in the United States costs $ 25 in Japan. Pizza Hut pays full-boat medical coverage in both countries because it's the law. They're required to. (1994/07/18, "Administration generates misleading ad, suggests Pizza Hut noncontributor to employee benefits," *Independent Limbaugh*, COCA)

In some cases, such as in example (28), it is difficult to decide whether we are dealing with a fixed rule or the report of an order. Bush is commander-in-chief of the US army and can as such give specific orders, but when the application is not limited to a short period of time and to a particular situation, we can speak of a policy that stipulates codes of conduct or action.

General rulings affecting the majority of the population have similar effects as laws and are therefore considered objective deontic utterances. However, court orders that pertain to specific cases (cf. examples (30) and (31) below) are treated differently. Example (30) is classified as an utterance that functions as a directive, whereas example (31) is categorized as a reported or descriptive directive utterance. This difference between reported and unchannelled uses, which Depraetere and Verhulst disregard in their comparison of *have to* and *must* because they consider it a source of confusion (2008: 5), is mostly maintained in the following (for directive utterances as well as for subjective deontic uses) since it provides valuable information about semantic differences between various (groups of) expressions and about changes in distribution.

(30) Ms-LEVINE: They freeze his assets because, in order to pay the alimony, he starts to take it out of the joint assets. Judge said, No. You're supposed to take it out of your income. (2009/08/21, "Murder in the family; investigation into [the] murder of Maggie Locascio," *NBC Dateline*, COCA)

(31) A judges [*sic*] ruling calls on Bernard Madoff to forfeit one hundred seventy-one billion dollars in assets. The preliminary order says Madoff must give up all his property, including real estate and investments. (2009/06/27, *CBS Early*, COCA)

Utterances Functioning as Directives

Since the context of expressions of subjective deontic modality is taken into account in this study, the cases in which utterances have the illocutionary force of an order are identified and counted separately. Factors that contribute to the identification of a directive are the social status and the authority of the deontic source. As Wärnsby stresses, deontic utterances (with directive function) often have animate subjects, the time of the proposition is posterior to the time of the utterance, and the verb refers to an action "that can be controlled by the agent" (2009: 93). I will show below that directives are often uttered by presidents or experts with superior knowledge in my sample. The category 'directives' is used in full awareness of the high dependency on pragmatic factors and discourse functions for what remains a largely subjective interpretation. In the absence of sufficient information about the context of the utterance or the described situation, it is very difficult

to tell whether an utterance can definitely be classified as a directive. Therefore, a separate category of subjective deontic utterances that can possibly be interpreted as speaker directives is used where it is necessary.

The term 'directive' is solely used in reference to orders that are given by the speaker (or reported speaker), but not – as Nuyts *et al.* propose in their analysis of the Dutch modals *mogen* ('may') and *moeten* ('must') (2005: 24-26) – to utterances where the obligation results from rules, regulations, or plans. Nuyts *et al.* systematically distinguish between performative modality, associated with the full commitment of a speaker to the state of affairs, and descriptive modality, where the speaker repeats somebody else's opinion, an earlier point of view of her-/himself, or a hypothetical opinion (2005: 25, 27). In their framework, the origin of the obligation of a directive can be "the speaker him/herself or some other willful being or institution" (2005: 24), while I reserve the term 'directive' only for utterances in which the speaker imposes the obligation. A case that illustrates this difference in classification is example (32), which Nuyts *et al.* characterize as a descriptive directive use of *moeten*, but which would be considered an objective deontic use here since a general rule is explained.

(32) dus zij moeten extreem hygiënisch gekleed zijn. dus alle uurwerken ringen uit. ze moeten een hoofdkapje dragen daar nen helm bovenop.

So they have to wear extremely hygienic clothing. So no watches and rings. They must wear a head cap, and a helmet over it. (Nuyts *et al.* 2010: 28)

Note also that in contrast to Van linden, who advocates a strict distinction between illocutionary directive meanings and purely deontic meanings on the grounds that the correlation with different sets of adjectives mirrors a conceptual difference (2012: 55), I consider it possible for strong adjectives to be used directively at times. Example (33), for instance, needs to be understood as an order given by a superior.

(33) SOLDIER: When you hit the beach, no matter where you hit, drive right straight forward into any objective in front of you. Destroy all the installations there are in front of you, and it's imperative that all these defenses be reduced be reduced as quickly as possible. (1994/06/05, "Events of June 5th, 1944," *NPR ATC*, COCA)

Formulaic Meanings

A use that is often excluded from quantitative analyses (cf. Myhill 1996: 347, Tagliamonte and D'Arcy 2006: 353, Depraetere and Verhulst 2008: 18[18]), but is included here, are so-called formulaic or lexicalized meanings, obsolescing features, often "left behind in islands in the grammar as discourse 'chunks'" (2006: 355, cf. example (34) below). These verbs are also called "performative modals" (Palmer 1990: 7) or "speech act modals" because the speaker performs the action

[18] Jankowski (2004: 92) excludes *I must say* from her BrE and AmE data. *I must admit* is included in her analysis of AmE plays since, in this sense, *admit* is not exclusively used with *must*, but can also be found with *have to* and *got to.* As I will further explore in Ch. 6.2.1 and Ch. 6.2.2, formulaic uses with *say* and *admit* are also found with *have to* and *have got to.*

expressed by the main verb (Close and Aarts 2010: 174) such as *saying*, *confessing*, *admitting*, or *warning*. Lewis refers to these utterances as "discourse-marking uses" (2015: 170).

(34) MR-MacNeil: Daniel Pipes, how do you assess the military dangers at the moment?
MR-PIPES: I must say I'm much more optimistic. I really don't see where a war can take place. (1990/06/20, *PBS NewsHour*, COCA)

Yet, as Fraser points out, the meaning of these utterances, which he calls hedged performatives, is not the same as without the modal. Literally, they indicate that the speaker has an obligation to perform the action. The use of the modal implies that the subject is helpless in the face of this obligation. As it seems to suggest that an external authority is obliging her or him to bring about the desired situation, it functions as a hedge, attenuating the force of the speech act (cf. Fraser 1975: 187, 196, 2010: 18). Similarly, Radden and Dirven stress that the speaker "would prefer to be relieved from having to" perform the action (2007: 250). Additionally, they highlight that there is a metonymic relation between the meaning of *must* and the intended meaning (POTENTIALITY FOR ACTUALITY, 2007: 250). Hunston underlines that in these cases the function of the phrase is more important than the meaning of the modal itself (2011: 68). Narrog characterizes them as "pseudo-necessities." They reveal a desire "of the hearer that is potentially face-threatening to one of the speech participants and is therefore couched in terms of a necessity of obligation" (2016: 112). De Haan likewise qualifies them as "pragmatic markers of hedging" for the whole sentence (2012: 725). Since the term 'performative' is also sometimes used to characterize directive utterances (Coates, for instance, reserves the term 'performative' for directives that can be paraphrased as *I order you to x*, 1983: 33), 'formulaic' will be used here to refer to these meanings.

In Collins' data almost every third occurrence of deontic *must* with 1st person subject is formulaic (2009a: 37-38). My data show that formulaic uses are very frequent in the case of *must* (they account for 14.8% and 9.8% of all occurrences of *must* in 1990 and 2009, cf. Table 19 below as well as Fraser 1975: 193[19]), but that they are less common with *have to* (3.3% in 1990 and 1.8% in 2009, cf. Ch. 6.2.1) and *should* (cf. Ch. 6.1.2). Coates observes that these uses are particularly frequent in private spoken conversation, as they make up for nearly a third of all occurrences in the *Survey of English Usage* (SEU) (1983: 36). Evidence from the London-Lund corpus (LLC), which incorporates data from the SEU as well as data from the *Survey of Spoken English* (SSE) and ICE-GB, suggests a pronounced decline in the use of formulaic *must*. Close and Aarts show that formulaic uses account for 10.3% in LLC, but only for 5.8% in ICE-GB (N= 802, 2010: 175). In the spoken component of COCA, a similar tendency towards a decline is found (cf. Ch. 6.1.1).

Jankowski also classifies another use of *must* with *know*, here illustrated in example (35), as formulaic (2004: 92). Depraetere and Verhulst, however, argue that similar uses, such as example (36), should be classified as dynamic since "the subject referent is a 'patient' submitted to an inner

[19] By contrast, Sweetser claims that uses in which the speaker "expresses certain modalities towards the speech act being performed," such as in the example below, are "rare" (1990: 73).

(FN 2) I must tell you that your father wants you home, though I'd rather not. (Sweetser 1990: 73)

urge" (2008: 8). Yet the subjects actively decide to want to know something and ask for the information, or they want to phrase something in a particularly way and do so. There is thus an element of will, and it could be argued that we are dealing with reported directives the speaker gives to her-/himself. This type of use is very rare in AmE – only three cases with *must*, one with *have to* and one with *need to* (cf. example (37) below) were detected in the analysis in COCA.

(35) If you must know, he's been dismissed. (FFE/106, 25, quoted by Jankowski 2004: 92)

(36) If you must put it like that. (ICE-GB: S1A-068, quoted by Depraetere and Verhulst 2008: 7)

(37) MO: No, I do not use drugs either, if you need to know. (1993/11/16, "Part II, Color-blind heartbreak: Story of interracial love and cheating heart," *Independent Geraldo*, COCA)

Subjectivity vs. Objectivity

As mentioned above, a distinction will be made between subjective and objective deontic utterances. Huddleston and Pullum consider subjective modality (cf. example (38) below), i.e. uses of modals in which the speaker constitutes the source of the obligation (or permission), prototypical in English[20], but observe that objective uses (cf. example (39) below) also occur (2002: 183, cf. also Coates (1983) and Collins (2009a), who present empirical evidence that instantiations of objective deontic modality exist).[21]

(38) You must clean up this mess at once.

(39) We must make an appoint if we want to see the Dean. (both examples from Huddleston and Pullum 2002: 183)

Traugott and Dasher demonstrate that "[w]ith respect to deontics, there is a cline of subjectivity from objective (the source of obligation is universal) to subjective (the source of obligation is the speaker)" (2002: 114). Here this continuum is illustrated with examples of *ought to* and the corresponding glosses from Nordlinger and Traugott (1997: 300):

(40) There's a new book that you ought to see. → *a new book that I urge you to see* (S.6.2.37, quoted by Coates 1983: 71)

(41) On the other hand, we cannot tell American consumers that federal government is doing what it ought to be to prevent exposing them to unnecessary risks. → *doing*

[20] Narrog draws attention to the widespread practice "in the German and Japanese tradition (e.g. Helbig and Buscha 1996: 131; Lindemann 1997; Diewald 1999; Nutta 2000: 86)" to believe that epistemic modality is always subjective and deontic modality invariably objective (2012: 25; cf. also Ch. 2.2.1), but suggests himself that deontic utterances express a wider range of meanings than the primarily subjective epistemic uses of the modals (2012: 25).

[21] Verstraete, who tries to differentiate between subjective and objective deontic modality (2001: 1525), describes *ipso facto* a distinction between subjective deontic modality and circumstantial dynamic modality, which he admits himself. Examples of what he categorizes as objective deontic uses (such as the one below) are qualified as expressions of dynamic necessity by Palmer (2001: 1526, cf. also Palmer 1990: 113-132).

(FN 3) But to reach orbit an object must accelerate to a speed of about 17,500 miles per hour … (ICE-GB:W2B-035, quoted by Verstraete 2001: 1508)

> *what the force of social norms suggests it ought to be doing* (16 July 1990, UPI, quoted by Nordlinger and Traugott 1997: 300)

Depraetere and Verhulst stress that in many examples, not only one, but rather several sources can be identified (2008: 14). This view is also shared by Van linden (e.g. 2012: 272, 288). Similarly, Collins observes that "deontic *must* can sometimes be ambivalently subjective [speaker-initiated] and objective [externally-initiated], with uncertainty as to the deontic source" (2009a: 36 [28]). He considers it impossible to carry out a reliable quantification of subjective and objective deontic utterances due to the large number of indeterminate cases (2009a: 36).

(42) You should help callers assess the responsibilities and duties of the position, and offer any other relevant information. Once the position has been advertised, you must be available to accept enquiries. (ICE-AUS W2D-001 18, quoted by Collins 2009a: 36)

In example (42) it is difficult to assess whether the speaker is stating a general company rule or whether s/he, as the person in charge, is giving orders (cf. Collins 2009a: 36). This difference does not matter because the utterance results in an obligation for the addressee either way. S/he is directly addressed and singled out by the speaker as a person that has to perform the action. I would therefore lean towards a classification as a directive utterance.

Some linguists consider subjectivity to "systematically differentiate" (Collins 2009a: 28) core modals and semi-modals. Westney observes that "it is widely claimed that there is at least some correlation between the use of modals and subjectivity, and that of periphrastics and objectivity" (1995: 46). Palmer, for instance, claims that *have to* can, unlike *must*, not be used performatively or subjectively. He considers the impossibility to combine the core modals with each other proof of their performativity (1990: 10-11). Huddleston and Pullum observe that particular verbs such as *have*, *have got*, and *need* are favored over *must* when it comes to the expression of objective deontic meanings (2002: 183). Perkins states that the distinction between *need* and *need to* resembles the distinction between *must* and *have to.* In his opinion, the modal can be both objective and subjective, but the non-modal form "is restricted to an objective interpretation" (1983: 63).

The claim that there is a clear delineation along the lines of subjectivity (performativity) and objectivity between core modals and semi-modals cannot be upheld in the face of empirical studies full of counterexamples. Still, it seems legitimate to talk of tendencies towards subjectivity and objectivity, e.g. with respect to *need* vs. *need to* (cf. Collins 2009a: 57) and *must* vs. *have to* (cf. Ch. 6.2.1, and Westney 1995: 54-59 for a detailed analysis of the arguments put forward by Palmer). In the following, an attempt is made to consistently distinguish subjective and objective deontic meanings, although there are arguably a few cases of overlap. When a rule or regulation is repeated, the example is categorized as objective and deontic, regardless of the presence or absence of the speaker's endorsement. As will be shown in Ch. 2.2.2.3, more difficulties in classification are encountered when (circumstantial) dynamic and subjective deontic uses need to be disentangled.

Mental focus

Finally, let us look at a type of utterance that is occasionally found in the COCA data, i.e. mental focus uses, which constitute a subcategory of speaker-related uses in Van linden's (2012) classification scheme. In various studies of extraposition constructions with adjectives (e.g. 2010a: 725-726, 2012: 273), Van linden separates uses relating to the real world (SoA-related, cf. examples (43) and (44) below) from speaker-related uses, which refer to the speaker's argumentative goals (cf. example (45) below).[22] There is no correlation between these two uses and complementation patterns. While the majority of deontic speaker-related constructions contain *to*-infinitives (cf. Van linden 2012: 27, 284), as in example (44), the number of uses of *that*- and *to*-infinitives with strong adjectives is almost equal (with the exception of *necessary* and *vital*, cf. Van linden 2012: 295).

(43) Salvadoreans generally take great pride in their personal hygiene. […] Believe me, nobody will even give you a second glance. But it's essential that you follow their customs when you bathe, otherwise you'll offend them." (CB, ukbooks, quoted by Van linden 2012: 273)

(44) … Mr La Muniere said that the Angolan government had realised that the assistance provided to Angolan suffering because of the war and the drought was failing to reach a large number of their people who were living in areas controlled by Unita, that this was not right and that it would be necessary to devise means of reaching all the people of Angola. (CB, bbc, quoted by Van linden 2010a: 724)

Van linden further divides speaker-related uses into text-building uses, which express comments on the structure of the text (cf. example (45) below), and mental focus uses[23], which invite the reader or hearer "to focus mentally on a particular propositional content" (2010a: 276), often in a secondary *that*-clause following a *to*-infinitive (cf. Van linden 2012: 279, cf. example (46) below). Coates qualifies the latter as pseudo-exhortations and considers them "weak in their imperative force." They can be paraphrased using *It is important that…* (1983: 35)

(45) This chapter is primarily concerned with underdevelopment theory but, as with modernization theory, it is necessary to say something about its historical antecedents. (CB, ukbooks, quoted by Van linden 2010a: 725)

(46) The problem of normal masculinity. It is necessary to recognize that part of abolishing men's violence to young people is the transformation of our relationship to each other... (CB, ukbooks, quoted by Van linden 2012: 280)

Text-building uses exclusively occur in books and magazines (cf. Van linden 2012: 277) and are

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[22] A similar distinction between *knowledge deontics*, i.e. expressions of obligation that have "to do with carrying out research" (cf. example 4 below), and *field deontics*, i.e. expressions of obligation relating to "carrying out actions in the world" (cf. example 5) is made by Giltrow (2005: 177).

(FN 4) the long term must be taken into account, refinements should be made, parameters have to be identified (all examples from journals of forestry)

(FN 5) Selection of interchange sites should take account of Arab potential, highway should serve (all examples from journals of urban geography quoted from Giltrow 2005: 178)

[23] Please note that Van linden also draws attention to the existence of a non-modal evaluative mental focus use. She believes it has developed later than the deontic use (2012: 279). Here the SoA is represented as a fact and the speaker or writer draws attention to this SoA rather than to her / his own assessment (Van linden 2012: 244-245).

thus not found in the present data sample from the spoken language section of COCA. Deontic mental focus uses do, however, occur in a greater variety of text types, including spoken language (cf. Van linden 2010a: 726, 733, 2012: 279). Infinitives that are potentially used in this sense are *bear in mind*, *note*, *notice*, *realize*, *recognize*, *remember* etc. (cf. Van linden 2012: 287). My data reveal that these uses are not only found with modal adjectives, but also with (semi-)modal verbs like *need to* (cf. example (47) below), *have to*, and *must* (cf. example (48) below). A similar case with *should* is example (49), where the paraphrase *We should remember that he is a murderer* is appropriate. Note also that in example (48) *that* seems to have been omitted as the head of the secondary clause. More information on mental focuses uses is given in the respective chapters on the analyzed expressions.

(47) JANET-MURGUIA-PRE: […] And I think that I agree that there is a lot of symbollism, but we need to recognize that electing an African-American president is very symbolic and an important milestone. (2009/04/28, "Republican senator switches sides," *CNN Brown*, COCA)

(48) PRESIDENT-MENGISTU: What any one must realize is the unity and the social security of the country is paramount. This is one of the most ancient countries in the World you know that. (1990/04/27, PBS *NewsHour*, COCA)

(49) I think in the case of the Belgium the fellow that they want out we should remember is a murderer. […] He killed innocent people. (1990/04/11, *PBS NewsHour*, COCA)

2.2.2.3. Dynamic Modality

Palmer (1990)[24], Huddleston and Pullum (2002), Collins (2009a), and Van linden (2012), among others, use a tripartite scheme in which deontic modality is separated from dynamic modality. The term *dynamic* seems to have been first used by von Wright (called "the pioneer of all *linguistic* categorizations on modality" by Facchinetti (2009: 56)) with reference to "abilities and dispositions" (1951: 28, cf. example (50)). A discussion of the validity of the category can be found in Ch. 2.5.2.

Palmer distinguishes two subtypes of dynamic modality: The first one, subject-oriented dynamic modality, is "concerned with ability and volition of the subject of the sentence" (1990: 7, cf. example (50) below[25]). Palmer also discusses the possibility of extending the notion of subject-oriented (internal) necessity to *must* (such as in example (53), 1990: 129-131).

(50) Jones can speak German. (von Wright 1951: 28)

(51) John can and will help a friend. (Palmer 1990: 37)

(52) Would he not agree that recent congressional hearings have shown the length to which some American aircraft manufacturers will go to promote and defend the rights of their companies. (S.11.4.82, quoted by Palmer 1990: 134)

(53) Protoplasm, the living substance of all plants, contains nitrogen and the rose tree must absorb this nitrogen in the form of nitrates. (W.10.3.3, quoted by Palmer 1990: 129-130)

(54) Boris needs to sleep ten hours every night for him to function properly. (van der Auwera and Plungian 1998: 80)

Van der Auwera and Plungian (1998), who divide non-epistemic necessity into participant-external and participant-internal necessity, categorize such internal abilities and needs of the subject as participant-internal possibilities and necessities. The need to sleep in example (54) originates in the subject and can thus be classified as an internally motivated obligation, i.e. "a compulsion which comes from *within*" (Perkins 1983: 62). Perkins stresses that it is a property of the subject that is "still explicitly objective" and comes "from a part of the speaker over which s/he has no conscious control" (1983: 62). Depraetere and Verhulst, who propose a division into discourse-internal and discourse-external non-epistemic necessity, argue that in cases of what is often termed internal necessity, the "subject referent is a 'patient' submitted to an inner urge." They consider these instances of "subject-driven necessity" to belong to a subcategory of circumstantial discourse-external necessity (2008: 8).

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[24] Note that this tripartite classification "roughly corresponds to an earlier distinction made in Palmer (1974: 100-103) [in]to epistemic, discourse-oriented and subject-oriented modals" (1990: 36). In his 1986 book, however, dynamic modality is explicitly excluded (cf. p. 12). In 2001 Palmer considers deontic and dynamic modality subcategories of event modality (which is "concerned with the speaker's attitude towards a potential future event") as opposed to propositional modality, which is a cover term for epistemic and evidential modality (2001: 8-9).

[25] Palmer stresses how difficult it is to find examples with clearly volitional meaning (as opposed to futurity) in affirmative clauses, whereas negated examples such as the one below are easier to find. This is attributed to the fact that the use of volition always implies that the state of affairs will be actualized in the future (cf. Palmer 1990: 135).

(FN 6) "But she loves him and she won't leave him; so she sells herself." (W.16.2.99-2, quoted by Palmer 1990: 134)

The second type distinguished by Palmer is neutral (or circumstantial) dynamic modality. It refers to "what is possible or necessary in the circumstances" (Palmer 1990: 37, cf. example (55) below). Similarly, van der Auwera and Plungian stress that participant-external modality originates in "circumstances that are external to the participant, if any, engaged in the state of affairs and that make this state of affairs either possible or necessary" (1998: 80, cf. example (56)). Huddleston and Pullum observe that circumstantial necessity is less central to the dynamic meaning than internal needs (2002: 185). Moreover, cases such as example (57), which Nuyts considers to embody situational modality (i.e. "a potential or a necessity/ inevitability inherent in the situation described in the clause as a whole" (2006: 4), are classified as dynamic here. As we will see in Ch. 2.4, these uses are crucial in the development of epistemic meaning (cf. Nuyts 2016: 35).

(55) I know the place. You can get all sorts of things here. (S.I.8.62 quoted by Palmer 1990: 37)

(56) To get to the station, you can / have to take bus 66. (van der Auwera and Plungian 1998: 80).

(57) We all have to die someday. (quoted from Nuyts 2006: 4)

In contradistinction to Palmer (1990)[26] and Van linden (2012)[27], references to rules, regulations, laws (such as in example (56), where the obligation results from a law that imposes the possession of an immigrant visa on foreigners), collective decisions, and self-imposed systems (an example Van linden provides refers to an airport security policy) are not considered cases of dynamic modality here, but are classified as instantiations of (objective) deontic modality. Note that Palmer also adopts a wider definition of deontic modality, which includes rules and laws, while "typically and frequently the authority is the actual speaker" (2001: 10), and a narrow definition of dynamic modality only covering ability and willingness (2001: 76-80) in 2001.

(58) I must have an immigrant's visa. Otherwise they're likely to kick me out. (S.I.5.71, quoted by Palmer 1990: 37)

As will be shown in the following, the distinction between subjective deontic meanings and dynamic meanings is not always easy to make. The described two types of dynamic meanings, obligations originating in internal needs and in the circumstances of a situation as a whole, are both categorized as instantiations of dynamic meanings.

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[26] In turn, deontic modals were, in his opinion, restricted to performative uses (Palmer 1990: 7, 81).

[27] Van linden also puts utterances in which the speaker merely seeks to present something as the natural consequence of external circumstances into the category of dynamic modality (2012: 295). The following example, where an attitudinal source is clearly present, is a pertinent illustration. (Note that elsewhere (2012: 289) Van linden considers the presence of an attitudinal source the decisive criterion for deontic modality.) Such expressions of personal opinions of what is necessary in a particular situation are not recognized as instantiations of dynamic modality here.

(FN 7) Thus the great American archeologist William Foxwell Albright justified the slaughter of the indigenous Canaanites by the incoming Israelites in almost neo-fascist terms: "From the impartial standpoint of the philosopher of history, it often seems necessary that a people of markedly inferior type should vanish before a people of superior potentialities, since there is a point beyond which racial mixture cannot go without disaster." (CB, times quoted by Van linden 2012: 295)

The Distinction between (Subjective) Deontic and Dynamic Meanings

Some authors admit that the distinction between deontic and dynamic modality is "somewhat fuzzy" (Huddleston and Pullum 2002: 179) and not always sharply distinct (cf. e.g. Collins when referring to *must*, 2009a: 41). Van linden stresses that it "is not as hard and fast as represented in the literature" (2012: 288). The data from COCA equally show a close link between assessments that the realization of a certain SoA is necessary and reports of external circumstances upon which the judgments are based. Various proposals to define a clear dividing line between deontic and dynamic modality have been made, often along the lines of human volition and speaker involvement.

Larreya, for example, highlights that the existence of external volition (external to the subject of the sentence) distinguishes deontic from physical (i.e. dynamic) modality. Comparing *must* and *have to*, he claims that in example (59) somebody or some principle requires (wants) John to leave, whereas no such external volition exists in example (60) (2009: 18).

(59) John must leave.

(60) John had to stop: a huge snowdrift was blocking the road.

Two comments about Larreya's examples need to be made. First, please note that a sentence with a more clearly directive character might have constituted a better choice than example (59) because no context is provided and a circumstantial meaning would theoretically be possible. It also needs to be added that *must* and *have to* are not systematically separated along the lines of deontic and dynamic modality. Curme already observed that *have to* can express the will of a person, even though it used to be an expression of circumstantial necessity (1931: 395). The differences between *have to* and *must* are further discussed in Ch. 6.2.1 below.

For Collins, who observes that circumstantial necessity with animate human subjects is often difficult to distinguish from deontic modality, it is the existence of uses without any human involvement that legitimizes the distinction of a separate category of dynamic modality. Deontic necessity is associated with "the realm of human involvement," regardless of whether the utterance is a piece of advice or refers to an official position (2009a: 35-36, cf. example (61) below). Conversely, "there is no element of meaning that could plausibly be associated with speaker involvement" in dynamic uses of *must* (cf. example (62)).

(61) A complaint procedure must therefore ensure that both parties are given the opportunity to be heard in a fair and impartial way by a person who is sensitive to the issues and primarily concerned with the effective resolution of the problem. (ICE-AUS W2D-004 75, quoted by Collins 2009a: 34)

(62) Axon sprouting occurs from the proximal nerve and must penetrate the fibrous tissue present at the nerve interface. (ICE-GB W2A-026 126, quoted by Collins 2009a: 41)

When the external circumstances are clearly the source of the requirement and the speaker's belief of what is the best course of action is irrelevant, as in the following example adduced by Collins, a classification as dynamic is adequate. Collins claims it is possible but unlikely that the origin of

the obligation in example (63) is somebody who wants the activity to occur (2009a: 41). Occurrences of this type were classified as dynamic in my data – as in Collins' study – since the speaker is considered to report facts and not to merely make a personal assessment.

(63) To get there we must negotiate some of the stormiest oceans in the world deadly icebergs and several hundred kilometres of pack ice (ICE-AUS S2B-035 58, quoted by Collins 2009a: 41)

Van linden highlights that unlike in dynamic uses, where the necessity originates in the situation itself, an attitudinal source "estimat[ing] the necessity of the SoA on the basis of SoA-external grounds" is present in deontic uses (2012: 289). However, the absence of an attitudinal source is often very difficult to assess. According to Van linden, a criterion that can be used to facilitate this process is the existence of conditional-goal constructions (2012: 291). Depraetere and Verhulst (2008) consider conditions a subtype of discourse-external necessities (cf. also Huddleston and Pullum 2002: 185 and Larreya's (1982) category of *modalité implicative*[28]). They notice that the aim or purpose can be expressed by adverbial subclauses (such as in example (63) above), *if*-clauses, or implicit conditional clauses / adverbial subclauses of purpose (cf. Depraetere and Verhulst 2008: 8).[29] Van linden stresses that goal and condition receive the same attention when dynamic modality is expressed, whereas the goal is not always indicated and sometimes difficult to deduce from the context in deontic utterances, where the focus lies on the attitudinal source. Example (64) is provided by Van linden herself. She believes that here "the goal can only vaguely be paraphrased as 'what the attitudinal source considers as morally good in general' or 'to make the world a better place'" (2012: 291); hence the utterance is best described as deontic.

(64) Herbert Daniels, the group's founder, believes that it is essential to overcome the social stigma of Aids, which often means that people with the virus lose their homes, jobs and families, and are effectively condemned to death by society. (CB, bbc, quoted by Van linden 2012: 291)

Van linden underlines that difficulties arise when, in a third intermediate category, both a goal-structure and an attitudinal source are present (cf. 2012: 291-292 and example (65)). Depraetere and Verhulst opt for placing utterances such as example (66), which can be interpreted as a combination of the speaker's opinion and external circumstances (2008: 14), in a separate category of

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[28] Interestingly, Larreya considers implicative modality to be a subtype of epistemic modality in his recent publications (2003: 170, 2009: 13-16). However, in my data such purposive clauses rarely express epistemic meanings.

[29] Cf. also Nuyts, who distinguishes cases in which external factors are explicitly mentioned (cf. example 8 and cases in which the conditioning external factors are "implicit in the situation" (2006: 3, cf. example 9). The latter example, in which I believe the speaker's willingness to continue to work on the letter to be decisive, would not be characterized as dynamic in my study.

(FN 8) To get to into the garden you must pass through the patio. (Nuyts 2016: 35)

(FN 9) I'll come down for dinner soon, darling, but I need to finish this letter first. (Nuyts 2016: 35)

(FN 10) These plants must have plenty of water if they are to survive. (Huddleston and Pullum 2002: 185)

Huddleston and Pullum (2002: 185) observe that the boundary between deontic and dynamic modality is difficult to draw in explicit or implicit conditional constructions that can function as directives. Unless contextual clues signal without ambiguity that the speaker wants to impose her/his will on somebody else (or voices a personal opinion based on external circumstances), I would argue in favor of a dynamic interpretation of the last example.

'mixed sources,' which accounts for 2.5% (ICE-GB) of all uses of *have to* (2008: 20, *mc*). Van linden argues that world knowledge and pragmatic factors such as the speaker's communicative purpose need to be taken into account to classify these uses. Ultimately, the researcher decides whether the personal desires of the speaker outweigh "the circumstantial element" (Van linden 2012: 293).

(65) Ant [*sic*] injured animal will be shocked, frightened and in pain to some degree. […] It is therefore absolutely vital you approach the animal as calmly and reassuringly as possible. The initial approach and control are best carried out together with the owner if possible, as even the most frightened animal will usually heed a person whom it knows. (CB, ukephem, quoted by Van linden 2012: 293)

(66) We have to put pressure on not just the president, but the Congress and even, the court, in order for us achieve equality. (2009/10/12, *PBS NewsHour*, COCA)

(67) I think we all have to be careful with the fabric cos there's so much of it. (ICE-GB S1A-086, quoted by Depraetere and Verhulst 2008: 14)

In the case of example (65) – in which the implied aim is to treat the injured animal – Van linden choose a classification as a deontic utterance, since the speaker seems to give advice on how to best deal with injured animals (2012: 293). When coding my data, I classified examples in which the speaker's opinion seems to be foregrounded (such as example (64) above) as instances of subjective deontic modality and would have made the same choice as Van linden when faced with example (65). In (66) the aim is made explicit ("to achieve equality"), but the focus lies on the speaker's opinion on the best way to reach this goal. Therefore, I would consider this utterance with a purposive clause (which is called teleological[30] – from Old Greek τέλος 'aim' – here), an instantiation of subjective deontic modality. Similarly, my understanding of the situation in example (67), from the limited context that we are given, is that the necessity for the speaker and her/his colleagues (?) to act carefully does not arise from external circumstances (i.e. the existence of the great amount of fabric), but should rather be seen as a personal opinion of the speaker. If we ask whether it is a fact that this group of people has to be careful, I believe the answer to be no.

The difficulty that lies in defining a borderline between subjective deontic and dynamic uses is also evident in Palmer's monograph (1990). Palmer stresses that the speaker in example (68) is neither in a position to impose her/his will nor to report the existence of compelling external circumstances, but expresses her/his opinion of "what he thinks is rational in the extreme – 'it is utterly unreasonable for the government not to act'" (1990: 107). He calls this sense, which "does not seem to be either deontic or strictly dynamic," 'rational modality' (1990: 107, cf. also p. 32).

[30] Narrog (2012: 8-9) uses the term when propositions are "marked as a necessity or possibility with respect to someone's goals" (cf. example 11). This type of meaning is closely related to preferential modality (cf. example 12), which Narrog (2012: 288) places on a par with Portner's bouletic necessity (2009) and Bybee *et al.*'s obligation / intention (1994).

(FN 11) (Given your musical taste) You must have this CD. (Narrog 2012: 8)

(FN 12) (In order to stay in shape) You should exercise at least 20 minutes a day. (Narrog 2012: 9)

(68) The government must act. It must make up its mind about priorities – offices or housing estates or luxury buildings. (W.15.1.48-3, quoted by Palmer 1990: 32)[31]

Analyzing example (69), however, Palmer observes that *must* refers to "what is an inevitable result of the nature of some other event being considered" (1990: 130). Similarly, he also interprets example (70), where the origin of the necessity seems to be an essential characteristic of scientific results, as a case of subject-oriented dynamic necessity (1990: 130). This use, so Palmer, "suggests the meaning 'always' or perhaps 'inevitably'" (1990: 32).

(69) I think both these are extremely dangerous, because I think they will and must strike, in fact, at the roots of the independence of universities. (S.11.2.69, quoted by Palmer 1990: 130)

(70) All scientific results must depend on a rather specialized form of history. (W.9.3.4-1, quoted by Palmer 1990: 32)

While the meaning that can be attributed to *must* in example (70) is arguably more objective than those in examples (68) and (69), it seems more difficult to justify a distinction between the latter. Is the strike in example (69) really inevitable? Can we accept it as a fact that it is the only possible resolution of the situation? Speakers may consider something inevitable, but this may merely be their own personal opinion and not correspond to reality. Indeed, I believe that in examples (68) and (69) the speaker makes an assessment of what s/he considers necessary in light of the external circumstances and I would like to argue that these are cases of subjective deontic necessity.

The categorization of similar utterances often proved to be difficult in COCA, particularly when world knowledge was insufficient and detailed information about the described situation was required. In example (71) we must ask ourselves if we accept the premise that the interest of potential soccer enthusiast can only be aroused and maintained by professional teams with stars, the World Cup, and the "shoulders of America's use." Theoretically, the interest in soccer could also be kindled by other measures (e.g. by a strong presence of foreign league games in the media).

(71) WALKER *voice-over* Without pro soccer teams to watch, or soccer stars to idolize, the sport here must rely on the appeal of World Cup competition and on the shoulders of America's youth. (1990/07/05, "World Cup soccer fever," *ABC Nightline*, COCA)

Thus, in a number of cases where external circumstances can be considered the basis of the speaker's judgment of the necessity, this personal assessment is identified as the (main) deontic source. Naturally, this type of judgment is frequent in a corpus of broadcast transcripts that often contain commentary on reportworthy situations and feature experts who voice their opinions. In turn, in this study external circumstances are less often recognized as the source of the obligation or necessity than in other studies (cf. also Ch. 2.2.2.3 below).

[31] Van linden considers this to be an example corresponding to Nuyts *et al.*'s definition of deontic modality and praises Palmer's recognition of a special category for this type of usage as "one of the first attempts to separate deontic modality from directive meaning" (2012: 40).

2.3. Refinements and Alternative Classifications

Various proposals to refine the classification of the modals have been made, particularly in recent years. In this chapter, a closer look will be taken at the scope, the sources, and the strength of modality. A short overview of force dynamics will also be given.

In their analysis of *ought to*, Nordlinger and Traugott stress that a third factor besides subjectivity and the distinction into deontic and epistemic meaning needs to be considered: scope. In uses with a narrow scope, the focus lies on the agent, in this case the subject of the sentence, who is to realize the state of affairs. This can be seen in example (72), where the group of people that includes the speaker ("we"), which functions as the subject of the clause, is supposed to find out what the situation is. Here the modal verb "is part of the propositional content of the clause" and only has scope over the verb phrase (Nordlinger and Traugott 1997: 301-302).

(72) The message is not that we have an epidemic. It's that the rate of increase is so significant we ought to find out what's going on here. (Nordlinger and Traugott 1997: 301)

In wide-scope uses, however, the entire proposition is within the scope of the modal. If the modal expresses epistemicity, the truth of the proposition as a whole is commented on. In example (73) the assertion is that stains ought to have occurred (and thus should be there) if the incident happened as described. If the modal has deontic meaning here, an unexpressed agent is expected to realize the state of affairs that is described in the proposition as a whole. In example (74) not the subject, as in example (72) above, but the unnamed legislators, whose identity can be derived from the contexts, are meant to realize the state of affairs. Whereas epistemic meanings always correlate with wide scope, deontic uses can have either narrow or wide scope. Typically, (clear examples of) wide-scope uses have inanimate subjects (cf. Nordlinger and Traugott 1997: 303).

(73) The Connecticut doctor, in order to demonstrate such stains ought to have occurred if the incident happened as the woman described it …

(74) Mothers who have been raped, mothers who are victims of incest, by God, have rights too. And the bill ought to say that → *those responsible for the bill have a more responsibility to ensure that it says that* (both examples and the corresponding explication from Nordlinger and Traugott 1997: 302)

Nordlinger and Traugott (1997: 315) as well as Traugott and Dasher (2002: 132) demonstrate the relevance of the distinctions between narrow- and wide-scope modality and weak vs. strong subjectivity for the diachronic development of *ought to* and *must*: Deontic uses of *ought to* with a narrow scope precede wide-scope uses by more than 150 years. In the first more subjective deontic utterances, which appear in Early Modern English, "the speaker is identifying with these [external] values, and is presenting him [*sic*] or herself rather than society as the force behind the obligation," even if s/he refers to seemingly external values (1997: 311). Nordlinger and Traugott also see a progression from less to more subjective epistemic meanings in the history of *ought to* (cf. also Traugott and Dasher 2002: 137ff.).

The importance of scope is also emphasized in a recent publication by Depraetere (2014). She proposes a classification of non-epistemic necessity modals according to their scope (wide vs. narrow) and the source (internal vs. external, cf. Table 5). The distinction between narrow and wide external necessity (or general situational necessity) thus cuts across the categories of circumstantial (dynamic) necessity and deontic modality. The somewhat fuzzy boundary between deontic and dynamic modality, to which Depraetere draws attention (2014: 161), thus becomes irrelevant, which is to be commended. Instead, with scope, a seemingly more objective criterion is brought to the fore. The distinction between external and internal sources[32] provides a refinement for the analysis of other modal expressions. For the moment, the practical advantage of this approach remains to be demonstrated in further empirical studies.

	Scope	Source	Examples (from ICE-GB)
Narrow scope internal necessity	narrow	internal	If you must put it like that.
Narrow scope external necessity	narrow	external	The city has no river and must bear the heavy cost of pumping water in and sewage out over the … mountains. However, the important thing is that we are having a house warming party and you must come.
General situation necessity (GSN)	wide	external	Many of the technical problems posed have been resolved, but some major developments must still be made Sanctions must go.

Table 5 Taxonomy of non-epistemic necessity (adapted from Depraetere 2014: 172)

A study in which new criteria for classification are directly put to use is Verhulst *et al.*'s analysis of *should*, *ought to*, and *be supposed to* (2013). The authors adopt Depraetere and Verhulst's taxonomy of discourse-internal and discourse-external sources (2008: 5), including their notion of mixed sources, and correlate them with subjective, objective, and intersubjective modality (2013: 214-217). They propose a further subclassification of discourse-internal (subjective) sources according to the beneficiary of the fulfillment of the action, which can be the discourse-internal source (Type A), one or several other person(s) (Type B), or no one in particular (Type C). Indeed, different patterns of distribution of the three analyzed verbs emerge: While discourse-internal meanings of *should* are fairly equally divided across all three categories, uses with *ought* primarily benefit somebody other than the speaker, whereas *be supposed to* mainly serves the interests of the speaker (but note that n=35). This subdivision of discourse-internal sources can thus be considered a valuable refinement of the traditional classification scheme.

The final parameter, strength, is determined by the gravity of non-compliance (cf. Depraetere and Verhulst 2008: 15, Verhulst *et al.* 2013: 219): It is strong when not realizing the SoA is completely out of question or when one's health, safety, or finances are affected when the SoA is not realized, and weak when other factors (e.g. personal issues) are concerned. Verhulst *et al.* (2013:

[32] Please note that this distinction was not warranted in Nordlinger and Traugott's study because *ought to* is not used for the expression of dynamic necessity (cf. Collins 2009a: 52-57 as well as Ch. 6.1.5).

221) speak of intermediate strength when the (reported) speaker is "in a hierarchically superior position" or when the necessity is subject-oriented. The results of their analysis show that – as expected – *should*, *ought to*, and *be supposed to* all primarily express weak strength, with differences of at most 24%. *Ought to* can thus be classified as the weakest modal (62%), followed by *should* (70%), and *be supposed to* (86%). The variation in strong uses is even less marked, ranging from 12% in the case of *be supposed to* to 11% with *should* and only 7% with *ought to.* Verhulst *et al.* stress that this method allows them to capture these subtle differences and they recommend applying it in an analysis of strong necessity modals (such as *must*, *have (got) to*, and *need to*, 2013: 211). Yet it needs to be kept in mind that the identified differences are minimal and may not mirror robust contrasts.[33]

The parameter strength, operationalized as the severity of the consequences of non-compliance, may have its merits when it comes to disentangling slight differences between close competitors, but loses its significance when expressions of different degrees of strength, for example *ought to* and *must*, are compared. It can thus (only) function as a supplement to a thorough analysis of other factors (such as the deontic source).

Force Dynamics

Finally, no discussion of classifications of modality should be complete without reference to Talmy's insights into the nature of the force oppositions lying "at the core" of the meanings of the modals (1988: 77), which can be characterized as "recurrent Gestalt-like configurations" (Lampert and Lampert 2000: 202). His approach has been praised as a "major breakthrough" since the concept is based on experience and clearly departs from modal logic (Furmaniak 2010: 23). Talmy considers modality, like linguistic structure in general, a reflection of the structure of cognition (cf. Lampert and Lampert 2000: 202-203). "In their basic ('deontic') usage," the modals have "core force-dynamic reference" (Talmy 1988: 77). This is illustrated in example (75). Here one tendency toward action is blocked by another force. Furthermore, Talmy accords "honorary modal status" to *have to*, *be supposed to*, *be to*, and *get to* (2000: 441).

(75) John <u>can / may / must / should / ought / would /need / dare / had better</u> not leave the house. (Talmy 1988: 79, 2000: 441)

In their basic usage, the modals generally refer to a sentient agonist in a psychosocial (rather than physical) interaction. Physical reference is restricted to *can (not)* and *will not* as well as, to a lesser extent, to *must* and *have to* (Talmy 1988: 79, 2000: 441-442). The extension "from physical force interactions to psychological ones, in particular to intrapsychological force interactions within sentient entities [… and further to] *inter*psycholocial force interactions *between* sentient entities" is a

[33] The residual values of a chi-square test suggests that only the values for weak and intermediate *ought to* and *should* differ significantly from what we would expect.

metaphorical analogy (Talmy 2000: 438, cf. also Johnson 1987 48-57).[34] Negated *must* and *had better* imply that there is "an active social *pressure* acting against the subject to maintain him in place" (Talmy 1988: 79). Sweetser, who partially draws on Talmy's concept of barriers and forces, explains that *must* restricts the choice of the interlocutor to one particular alternative. The attention of the speaker is then "fixed not on the excluded alternatives but on the realization of the chosen alternative" (1990: 52). *Should* and *ought* "pit the speaker's values against what is good and his beliefs as to what is beneficial against the contrary behavior of the subject" (Talmy 1988: 79). With reference to *need to*, Sweetser observes that the obligation derives from "something internal to the doer" (1990: 53). This internal force, manifested in a desire, lack, or compulsion, creates the modality of *need.* Sweetser has reservations about Talmy's treatment of *have to*, *need to*, and *ought to* in terms of barriers, preferring to view them as "different *kinds* of forces" (Sweetser 1990: 54).

The agonist can be backgrounded in a process called agonist demotion, which is exemplified in (76), where the subject is nonsentient. As Lampert and Lampert explain, agonist demotion can be "understood as a strategic exploitation of the principle of conceptual alternativity, involving a transfer of responsibility to a patient (which 'actually' cannot assume responsibility at all)" (2000: 227). It allows the speaker to "hide" behind the seemingly objective nonsentient subject.

(76) The cake can / may / must / should / need not / had better stay in the box. (Talmy 1988: 79, 2000: 442)→ *People / You must make / let / have the cake stay in the box.*

In some cases, as Talmy puts it, the "psyche of the Agonist is the experiential arena for force-dynamic opposition" between his/her own wishes vs. those of the antagonist. In other cases, when the speaker and the person that is meant to realize the SoA are identical, as in example (77), "the self is then conceived as divided, with a central part representing the inner desires and peripheral part representing the self's sense of responsibility" (2000: 449).

(77) (I think) I should leave. (Talmy 2000: 449)

Like root modality, epistemic modality also allows the use of non-sentient subjects. The modals then refer to "beliefs within an inference matrix" (cf. example (78), Talmy 2000: 443). As Johnson explains, *must*, for example, "denotes an irresistible force that drives me to a conclusion" (1987: 55). Whether the original image-schematic structure is kept intact remains a matter of debate (cf. Lampert and Lampert 2000: 252). Sweetser explains that there is no counterpart to the "usual *reluctance* which is assumed to exist in the compelled person" because there are no mental obstacles to overcome (1990: 61). However, Johnson cites findings from Western philosophy that suggest the existence of a permission-granter, i.e. "a universal voice that grants permission to move from

[34] Furmaniak proposes a separation of Talmy's script into a 4-stage model (cf. 2010: 22). He stresses that the inversion of strengths needs to be accounted for and suggests that intrapsychological forces are at play in the agonist's divided psyche (basic desires vs. internalized social values). At first, the agonist is unwilling to comply with the request, but then (reluctantly) accepts to do so (cf. Furmaniak 2010: 24-29).

premises to validly derived conclusions," which may or may not exist (1987: 53-54).[35] The process involved in the transition to epistemic meanings (as described by Talmy, Sweetser, and Langacker) will be discussed in more detail in the next chapter.

(78) The pear could / may / must / should / needn't be ripe by now. (Talmy 1988: 80, 2000: 443)

Before concluding this rough sketch of Talmy's framework, a few remarks about the status of expressions of modal meanings besides the core modal verbs need to be added. Talmy stresses that *make*, *let*, *have*, and *help* constitute a clearly definably syntactic group (as they are used with the bare infinitive) that forms, together with the modals, the "greater modal system" (1988: 81, 2000: 443). While both groups of verbs reflect force-dynamic relations, the main difference between them lies in the fact that the modals take the agonist as subject, whereas *make*, *let*, *have*, and *help* take the antagonist as subject. Additionally, Talmy explains that open-class lexical forms, such as *make possible for sb.*, *preclude*, *permit*, *forbid*, and *require* express many of the same meanings as the modals (2000: 446). The subject of clauses with these verbs is generally the antagonist, while the agonist is usually the direct object (Talmy 2000: 444, cf. example (79) and Ch. 6.3).

(79) You have to stay in the house. I require you to stay in the house. (Talmy 2000: 447)

A merit of this approach is, again, the recognition of the close relationship to verbs that can be used to express similar situations as the modals.

modals characterized by certain syntactic and morphological properties (part of the Greater Modal System)	**honorary modals** ("meaning and usage so close to those of real modals that they […] may be accorded 'honorary' modal status)	"a syntactic category […] correspond[ing], in part, to the semantic category" of force dynamics (part of the Greater Modal System)	**open-cass lexical forms** (classified as such on account of their semantics as they express many of the same notions as the modals)
can, *could*, *may*, *might* *must* – – *ought* *shall*, *should*, *will*, *would* *need* *dare (durst)* *had better*	*have to* *be supposed to* *be to* *get to*	*make sb. do sth.* *let sb. do sth.* *have sb. do sth.* *help (sb.) do sth.*	*make possible - preclude* *permit – forbid* *require*
agonist = subject (exceptions: agonist demotion and nonsentient subjects in epistemic clauses)	agonist = subject	antagonist = subject	antagonist = subject (generally) + expression of the agonist (usually direct object)

Table 6 The classification of modal expressions in Talmy's force-dynamic accounts (1988, 2000)

Force-dynamic frameworks have rarely been applied in empirical studies of modal verbs. One recent example of an analysis of the modal verbs *need*, *behove*, and *cómpre* is Loureiro-Porto (2013).

[35] Note that there is also a difference in the scope of attention between root and epistemic modality (cf. Lampert and Lampert 2000: 232-233). In root modality, the antagonist is sometimes omitted, whereas in sentences with epistemic modality both the agonist and the antagonist are backgrounded.

Here a distinction is made between forces that "originate inside or outside the experiencer undergoing the necessity" and those which have "an ambiguous general origin […] exerted by a 'nebulous, generalized authority' (Langacker 1999: 308)[36], which may sometimes refer to general circumstances" (Loureiro-Porto 2013: 178). Loureiro-Porto's differentiation between internal, general, external, and logical necessity effectively corresponds to the more widespread classification of modal meanings into internal and circumstantial dynamic, deontic, and epistemic modality. As explained above, I adopted the latter terminology in the interest of making comparisons to other studies easier although it certainly has to be kept it mind that even when the same labels are used, classification practices often differ from one researcher to another.

[36] Cf. also Talmy's comment on the absence of an external authority and the existence of "worldly exigencies" (2000: 450) in the following example:

(FN 13) I had to get to the bank before 3:00 (or have no cash for the evening). (Talmy 2000: 450)

2.4. Grammaticalization and Subjectification

The majority of linguists believe that the expression of the concept of (physical) obligation forms the basis for the development of deductions about the state of affairs in the world, be it in ontogenesis (cf. Halliday 2014: 138[37] and Lampert and Lampert's discussion of Mandler 1992, 2000: 272ff.) or in diachrony (cf. Traugott 1989 and Traugott and Dasher 2002). In the following, various proposals to explain this change are reviewed: metaphorical mapping and metonymic change as well as subjectification and shifts in attention.

Metaphorical Mapping and Metonymic Change

Sweetser claims the transfer from the "real (sociophysical) world to the epistemic world" is a result of the "conventionalization […] of a metaphorical mapping between domains" (1990: 64).[38] Similarly, Bybee and Pagliuca speak of a "metaphorical extension of obligation to apply to the truth of a proposition" (1985: 73, cf. also Bybee *et al.* 1994: 196-197, 201). However, this approach is criticized as representing too much of a conceptual leap across domains (cf. Heine 1995: 37-41, Diewald 1999: 45, Mortelmans 2007: 876). Dirven observes that a "non-contiguous relationship as found in metaphors usually means a major associative leap" as opposed to the "minor process" of metonymic changes (1985: 98) – an observation that is quoted, in part, by Traugott (1988: 411) and by Hopper and Traugott (1993: 82) as evidence that metonymical change has been underestimated. Traugott specifies that metaphorical mapping may be one of various processes involved in other stages of grammaticalization (1989: 50).[39] She considers conceptual metonymy and metaphor to be interdependent: "Much of what looks like metaphorical change can actually be seen to be the result of metonymic change when contexts for the change are taken into account" (2010: 54). Hopper and Traugott argue that the transition to epistemic meanings is not based on analogy but on reanalysis, i.e. on conceptual metonymic change (1993: 80-81). It is the result of a gradual process (cf. Diewald 1999: 45), a conventionalization of conversational implicatures (cf. Traugott 1988: 411, 1989: 50-51).

A specific type of use that Traugott and Dasher identify as a key meaning in diachronic change is wide scope generalized deontic necessity (cf. also Nuyts' description of situational dynamic modality, 2016: 35). These uses, so Traugott and Dasher, can also be understood as epistemic

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[37] Children master the concept of exchanges of goods and services, to use Halliday's own terminology, prior to understanding how information is exchanged (2014: 138).

[38] The extension from physical to psychosocial domain is already a metaphorical analogy for Talmy (1988: 75), whereas Sweetser "prefer[s] to view modality as basically referring to intentional, directed forces and barriers" (1990: 52, cf. also Lampert and Lampert 2000: 248 and de Mulder 2007: 305). Sweetser herself explains that she, like Talmy, feels that "[w]within the domain of intentional causality, […] direct physical manipulation of the environment is more prototypical causality" (1990: 52).

[39] Grammaticalization is generally defined as "the change whereby lexical items and constructions come in certain linguistic contexts to serve grammatical functions, and once grammaticalized, continue to develop new grammatical functions" (Traugott and Hopper 2003: 18).

(2002: 130). They "invoke general sources, both social and cognitive" (2002: 127). Examples (80) and (81) are pertinent illustrations.

(80) Ealle we moton sweltan. (?8th century Exodus, 12.33)
All we must die. ("We must all die.") → *It is necessary for us all to die*
→ *The Egyptians force the Jews to leave Egypt*, *saying: if you Jews do not leave Egypt*, *we Egyptians will all necessarily die* (Warner 1993: 162)

(81) <A> and conversation. Went like this. This sort of conversation (m- have you noticed president #. That. (m – the boiled eggs # at Sunday *breakfast* - always <b> * (laughs)* <A> The simple truth is that if you're going to boil eggs communally they must be hard. (S.1.3.46, quoted by Coates 1983: 42, Warner 1993: 14, Traugott and Dasher 2002: 111, expanded context given in Goossens 1999: 198)
→ *If eggs are boiled communally*, *it is necessarily the case that they will be hard.* (Coates 1983: 42)
→ *It is necessary for the cook to boil eggs hard*. (Traugott and Dasher 2002: 111)

Warner, who observes that example (80) is "open to interpretation in terms of the less clearly epistemic area of inevitable or expected futurity," favors an epistemic reading of this example, i.e. "'it is necessarily the case that we will die' […] rather than 'it will be necessary for us to die'" (1993: 162). Coates and Warner also classify example (81) as a case of objective (logical) epistemic necessity (1983: 42, 1993: 14), whereas Traugott and Dasher refer to the same example as a case of non-prototypical deontic necessity with a general objective meaning and discuss it under the heading "generalized deontic and epistemic necessity and possibility" (2002: 111-112). According to them, a case of generalized epistemic *must* is example (82).[40]

(82) All scientific results must depend on a rather specialized form of history. (W.9.3.4-1, quoted by Palmer 1990: 130)
→ *Scientific results can't not depend.* (Traugott and Dasher 2002: 111)

Characterized by indeterminacy[41], these examples can be seen as illustrations of a process that led to development of epistemic meanings. According to Traugott and Dasher (2002: 130),

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[40] This example is treated (a bit tentatively, as the question mark in its header "subject-oriented necessity?" suggests) as an expression of subject-oriented dynamic necessity by Palmer. He observes that *must* here signifies "that what is said is true of all the things being referred to; but at the same time it has an implication that this results from an essential characteristic" (1990: 130). He considers it to be comparable to the existential meaning of *can* and to imply "the meaning 'always' or perhaps 'inevitably'" (1990: 32).
However, Palmer believes that examples 14 and 15 "could [also] be interpreted epistemically" (1990: 130). Example 14, here presented in an expanded context, can be paraphrased as follows: *It is a characteristic of a metaphor that the resulting expression is complex*. Alternatively, the mention of causal links (*since*, *because*) can be interpreted as evidence for the speakers' "conclusions from the circumstances." Palmer favors a subject-oriented dynamic reading. He specifies that instead of making an epistemic assessment, the speakers "seem rather to be giving reasons why things must be so, not why they believe they are so" (1990: 132). He concludes that the distinction between a "'characteristic' interpretation" and epistemicity is not easy to draw (1990: 130).

(FN 14) In a metaphor, the usual syntactical frame of a sentence is at some point filled up with a figurative word or phrase. The resulting expression must be complex, since two sentences are implied. […] (Nowottny 1962: 57, only the sentence with *must* is quoted from W.9.4.57-2 by Palmer 1990: 130)

(FN 15) For the English historian it must have a particular importance because of the possible light it throws on Melpham. (W.16.6.168.7, quoted by Palmer 1990: 130)

[41] Quirk *et al*. also state that "there is a gradient" between intrinsic and extrinsic modality (1985: 219).

the generalized source of authority as well as the tendency to use generalized subjects invited the inference that what is necessarily obliged to happen in the future is also obliged to happen in the present.

Traugott and Dasher thus reject the validity of a metaphorical account as proposed by Bybee *et al.* (1994: 201). Similarly, Goossens argues "against a purely metaphorical shift hypothesis" (1999: 208). He considers example (81) a transitional use, underlining that "the context permits the interpretation to go either way" (1999: 196, 198). A contemporary instantiation of this meaning that he cites is example (83), which can be paraphrased by "*I want you to remember* (deontic), but also by *I'm sure you will remember* (subjective epistemic)" (1999: 198). Goossens claims that "[u]ses like these could be regarded as the metonymic bridge we have been looking for" (1999: 199). In his diachronic comparison, he cites a number of general deontic/necessity meanings of *must (needs)* without a clear source of authority that he considers to contain an "inferential ingredient, be it to varying degrees." These meanings, illustrated in (84) and (85), "offer a natural transition" and "provide us with stepping stones from '(deontic)/necessity' to 'inferable necessity'" (1999: 205, 204).

(83) Well, I cannot say that I approve. You must remember that I am taking your aunt's hospitality, and, if your plans go right, on entirely false pretenses [...] (LOB, quoted by Goossens 1999: 198)

(84) All that is so, long must last & holde together, as it is one, but must needs perish & decay, whan so it leaves to be (CEBOETH2, 304-308, EMOE 2 (1770-1640))

(85) But now a very acute and scholastical man that would argue that God must needs have done whatever he fancies convenient for the world should be done, might [...] (CESERMA3A, 565-569, from EMOE3 (1640-1710), both examples quoted by Goossens 1999: 204)

Heine explains that contextual factors play a decisive role for the distinction between epistemic and non-epistemic modality: Agent-oriented modality is usually performed by a controlling agent, it is strongly associated with dynamic events (that "involve[ ] the manipulation of a situation and [ ] typically [ ] lead[ ] to a change of state"), and the realization of the SoA will be "later than reference time" (Heine 1995: 29). Nonetheless, an epistemic reading in clauses with human subjects and dynamic main verbs is still possible if the contextual frame "discourages an agent-oriented orientation" (Heine 1995: 47). Yet Heine points out that a force characterized by what Jespersen calls "an element of will" (1924: 320-321, cf. footnote 42) is the only criterion that truly distinguishes agent-orient modality from epistemic modality in German (1995: 35). He suggests that the development from agent-oriented[42] to epistemic modality can also be considered a process of "se-

[42] 'Agent-oriented modality' is a term that Heine seems to borrow from Bybee and Pagliuca's classification scheme of modal meanings. There it refers to "modalities that predicate conditions of either an internal or external nature on a willful agent: these are the notions of ability, obligation, desire and intention" (Bybee and Pagliuca 1985: 63, cf. also Bybee *et al.* (1991: 23), who include root possibility and permission as well). However, Bybee equates agent-oriented modality with root modality in 1986 (p. 18). Furthermore, Bybee *et al.* include necessities resulting from "physical conditions" (cf. the following example) in their list of agent-oriented meanings (1994: 177):

(FN 16) I need to hear a good loud alarm in the mornings to wake up. (Bybee *et al.* 1994: 177)

mantic bleaching […] that involves the 'bleaching out' of the property F, i.e. Jespersen's 'element of will'" (Heine 1995: 42), and that the development of new senses is characterized by a "strengthening of focus on knowledge, belief, and the speaker's attitude toward the proposition" (Traugott 1989: 49, quoted by Heine 1995: 42).

Heine *et al.* (1991 cited in Heine 1995: 40) argue that both a context-induced reinterpretation (i.e. a "strengthening of conversational implicatures" in Traugott and König's terminology, 1991: 209) on the micro-level and a metaphorical interpretation on the macro-level are involved. The accumulation of micro-level changes amounts to a macro-level conceptual shift between cognitive domains (cf. Heine 1995: 40). In 1995 Heine stresses that the transition between the two kinds of modality is marked by elements of discontinuity[43] and continuity and can thus be explained by "both the metaphor model and the context model of grammaticalization" (p. 47).

Subjectification and a Shift in Attention

Langacker uses the notion of potency, defined as a "physical or mental force that, when unleashed, tends to bring about an occurrence of […] a process" (1991: 270), to describe the meaning of the root modals. He stresses that in some cases, the locus and the nature of this potency cannot be identified precisely, and can be as diffuse as "some aspect of the physical world" (such as in example (86), 1991: 272). Langacker concludes that in the face of this indeterminacy, the researcher should focus on the mere existence and strength of the potency rather than on the determination of the exact source (1991: 272). Circumstantial meanings are thus included in Langacker's framework as a subcategory of root meanings.

(86) This noise must cease immediately or there will be an avalanche! (Langacker 2001: 272)

Langacker characterizes the diachronic development of the modals from main verbs via root modals to epistemic modals "as a matter of the locus of this potency becoming progressively less salient and well-defined." Initially, the locus of potency is the subject, "an objectively construed participant accorded maximal salience." However, with increasing subjectification, it becomes "less prominent" (Langacker 1991: 272). With epistemic meanings, the locus of potency is extremely vague and "in effect equated with the world and its evolution" (Langacker 1991: 273).

Neither of these definitions (completely) conforms with Jespersen's categorization, which divides notional moods with an element of will (such as obligative (*he ought to* | *we should go*) or advisory (*you should go*)) from notional moods without such an element of will (e.g. dubitative (*he may be (is perhaps) rich*), potential (*he can speak*), Jespersen 1924: 320-321). Heine, whose aim was to contrast epistemic and non-epistemic uses, seems to have had only deontic meanings in the narrow sense in mind. Solely purely deontic meanings and some dynamic meanings (volition, but not ability and internal and circumstantial necessity) can be said to express an element of will. In Ch.2.2.2.3, it was shown that elements of will can serve as the dividing line between deontic and dynamic necessity (cf. also Narrog 2012: 47). Any classification that focuses on the (non-)existence of volition (often on the part of the speaker) must deny circumstantial necessity its place as a subtype of root necessity. (The same applies to internal necessity if the participant is viewed as simply being subjected to an inner force.)

[43] In some contexts the two kinds of modalities can be clearly distinguished (discontinuity), in others a disambiguation is not necessary "because the information value remains essentially the same" (Heine 1995: 42).

According to Langacker (2001: 273), the realization of the "designated process" is not stimulated by any particular force, but by a

> generalized force consisting in the fact that the world has a certain structure and reality is unfolding in a particular way. An epistemic modal offers an assessment of whether this evolutionary "momentum" will carry reality far enough along the appropriate path to "reach" the process in question.

Lampert and Lampert stress that a merit of Langacker's approach is that the "commonality of all these different senses of the instantiations of modality pertains to their schematically evoking the dynamic evolutionary Cognitive Model" (2000: 267). Langacker himself emphasizes the compatibility between his analysis and Sweetser's approach. The main difference lies in the fact that he does not consider the subject the entity that is forced to draw conclusions, but believes that "reality […] is seen as being carried in the direction of a particular outcome" (1991: 274; cf. also Lampert and Lampert 2000: 256-267 for a detailed analysis of Langacker's conceptualization of modality).

In 2013 Langacker presents a link between root and epistemic modality that goes beyond the tie created by increasing subjectification (p. 13-16; cf. also 1991: 273). He argues that effective modals (i.e. root modals) have an epistemic component because the profiled SoA is not real at the moment of utterance (2013: 13-16). This is true for the obligation sense as well as for the ability sense of *can* (where the realization of the SoA is solely potential, cf. Langacker 2013: 16). Langacker (2013: 16) explains the difference between effective and epistemic modality as follows:

> The difference, then, is whether the force inheres solely in C's [the conceptualizer's] epistemic assessment, affecting only what C knows, or whether it also operates outside this realm, with the potential to influence what happens in the world. Epistemic modality is therefore imminent in effective modality, being what remains when all vestiges of effective control fade away.

Similarly, an "attention-based reconceptualization of epistemic modality" (Lampert and Lampert 2013: 70) is outlined by Lampert and Lampert (2000, 2013). Non-epistemic meanings can be considered as instantiations of force dynamics (cf. Talmy 1988: 77ff., 2000: 440ff.), but as Lampert and Lampert stress, the proposed metaphorical mapping between root and epistemic modality poses "serious problems" (2013: 71), which may explain why Talmy merely reports Sweetser's suggestions (1988: 80). If the idea of considering epistemic modality as belonging to the schematic system of force dynamics is abandoned and a conceptualization as a subcategory of Cognitive State[44] is envisaged, these "meta-theoretical pitfalls" can be bypassed (Lampert 2013: 70).[45]

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[44] Talmy (1996: 259) explains that

> […] a further set of categories at the abstract level of palpability that can be evoked by closed-class forms pertains to the cognitive state of some sentient entity […]. Thus a conceptual category that can be termed *speaker's knowledge status*, represented by linguistic forms called "evidentials," particularizes the state of the speaker's knowledge of the event she is referring to.

[45] Stressing that there are different scopes of attention (2013: 69), Lampert and Lampert argue that "a more complex mapping process" would be needed to account for these differences (2013: 68). Example 17 below "would have to be considered an instantiation of Talmy's (2000, 2: 216) event integration," i.e. a

Furmaniak (2011), drawing on Lampert and Lampert (2000) as well as on Nuyts (2001), stresses that the hypothesis of an implicit expression of the speaker's stance in an embedded clause can be traced back to Austin (1962) and Ross (1970). He also describes the development of episte-mic meanings as the result of a process of a gradual shift of attention from a force-dynamic situation with the implicit, but inferable component of epistemic meaning "I KNOW THAT," which indicates the highest degree of certainty on a scale of epistemic evaluation, to "the state of affairs proper," where the speaker's attitude towards the SoA is foregrounded ("I EXPECT / BELIEVE THAT," Furmaniak 2011: 59, 62, 69). The inferential process described by Traugott and Dasher (2002) and Goossens (1999), for instance, is thereby effectively "translated" into a cognitive semantics framework. Using a corpus of 17th to 19th century BrE plays, Furmaniak demonstrates that the transition to epistemic meanings is facilitated by the inevitability sense, which is particularly frequent in the 17th century and decreases parallel to the increase of the epistemic meanings (2011: 55-56). Inevitability means that the SoA will take place automatically because "it is part of the normal course of events". Its occurrence is beyond human control and the driving force behind it is as diffuse as "fate, circumstances or natural laws" (Furmaniak 2011: 53). The "speaker's knowledge of the existence of the necessity (i.e. the force-dynamic situation) can serve as the evidential source for the epistemic judgement on the state affairs." This relationship can be paraphrased by "*I believe that the state of affairs holds because I know that it is inevitable*" (Furmaniak 2011: 63). The following instantiations of this sense can be found in Furmaniak's study:[46]

(87) A few hours more, and she will be lost to me for ever. And shall I remain to witness the happiness which must destroy mine? No, no – my determination is fixed. This letter to my old Colonel will secure Frederick promotion. I will dispatch it, and depart without again seeing Cecilia. (Beazley (1821), quoted by Furmaniak 2011: 53)

(88) My daugther is at present engag'd in a way, that to her must be more agreeable than entertaining either you or me. (Cobb (1788), quoted by Furmaniak 2011: 63)

The antagonist is then "equated with the world at a given time while the agonist corresponds to evolving reality at some subsequent time, which is constrained into conforming to the situation denoted by the proposition" (Furmaniak 2011: 54). Furmaniak considers this sense to be analogous to Goossens' objective inference ("the context contains the necessary information for the hearer to arrive at the inference presented by the speaker"; 1999: 196). If both senses refer to the same type

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general cognitive process [...] whereby an event that under a more analytic conceptualization would be understood as complex and represented by a multi-clause syntactic structure can alternatively be conceptualized as simplex and represented by a single clause. (Talmy 1991: 481, 2000, 2: 216)

This conflation would lead to a backgrounding of "the evidence and the inference," which is not the case with root modality (Lampert 2013: 68; cf. also Lampert and Lampert 2000: 233).

(FN 17) You must have struck the ball really well today because it's playing long. (Lampert and Lampert 2013: 68)

[46] The following example is discussed in the context of inevitability meanings as "a construction that is known to be highly compatible with the epistemic reading of the modal" (Furmaniak 2011: 55):

(FN 18) Pray, tell me, Sir! You must have lost your wits or all sense of shame. How could you think of giving Lucetta such a sum? A thousand pounds! (King (1763), quoted by Furmaniak 2011: 55)

of meanings (it might be argued that there is a difference between knowledge about the normal course of events in the world and the existence of relevant information for an inference in the context of the utterance), the main difference between the two approaches lies in the interpretation of this sense: Whereas Goossens considers it clearly epistemic, Furmaniak stresses that there is a difference between epistemic necessity and inevitability.

Furmaniak wants to "challenge" Langacker's opinion (2002: 336) that example (89) and example (87) above, which, he assumes, would be analyzed by Langacker in the same way, express epistemic meaning. He claims that they "are essentially about a force-dynamic situation holding in the socio-physical world, which […] is a defining feature of root modality" (2011: 54).

(89) The way things are going, we should finish by noon. (Langacker 2002: 336, quoted by Furmaniak 2011: 55)

Interestingly, he does not reject the claim that the SoA is "under the scope of an epistemic judgement" in both examples: Example (89) is a clear estimate of the likelihood of the situation being true. The speaker's assumption in example (87) also carries with it an element of conclusion: *It is necessarily the case that their happiness will destroy mine*. This example is thus a very interesting case of "conclusive" *must*, as it has future time reference (even though epistemic *must* is generally assumed to only refer to the past or the present, relative to the time of the utterance, cf. Ch. 2.2.1 above). Furmaniak claims that in contrast to obligation and necessity meanings, the situation described by the inevitability sense is not deemed desirable (2011: 53). While it can safely be assumed that this is the case in example (87), I would seem to be going out on a limb if I were to believe that the group of people denoted by *we* in example (89) has little interest in finishing soon. This might be the reason why paraphrasing example (89) with reference to inevitability seems less natural than in example (87), where the sense of inevitability is clearly palpable.

When we compare this view of the shift to epistemic meanings to Traugott and Dasher's as well as Goossens' or Heine's view, we can say that while the processes considered to be at work are different ones (subjectification, a shift in attention, metonymic and metaphorical change), the key meaning allowing for a transition to epistemic meanings is the same, whether it is characterized as generalized deontic necessity, as subject-internal necessity (Palmer 1990), or as epistemic (Coates 1983, Warner 2993, cf. also Ch. 2.2.2.3).

2.5. At the Margins of Modality

In the following, some of the topics of debate only touched upon in the previous chapter will be discussed in more detail: directivity (2.5.1), dynamic modality (2.5.2), volition (2.5.3), and evaluation (2.5.4). For comments on futurity and modality see Coates (1983: 180-181), Palmer (1990: 163), Langacker (1991: 278), Dietrich (1992: 93), Collins (2009a: 127-130).

2.5.1. Directivity

Some scholars suggest that deontic modality is a pragmatic rather than a semantic phenomenon and stress the close relationship between illocutionary force and modal verbs. Referring to Boyd and Thorne (1969), Calbert observes that modal verbs indicate their own "illocutionary potential" (1975: 10). Carter and McCarthy state that modal expressions such as *must* and *ought to* "often function as directives" (2006: 684). Perkins observes that the directive element arises from the cotext of the verb or the context of the utterance (1983: 63). Radden and Dirven underline that the modal in example (90) is "less imposing" than the corresponding imperative (2007: 236).

(90) Stand up! / You must stand up. (Stand up! Radden and Dirven 2007: 236)

Frawley stresses that the semantic nature of "deontics" cannot be ignored and that expressions of deontic modality "still have an arguable truth value" (1992: 420). In example (91), for instance, it is "possible to *deny*" that Ron must be an accountant, which would be impossible if we were dealing with a "purely pragmatic form," such as a command (which does not have a truth-value, Frawley 1992: 421). Narrog also highlights that illocutionary force is unrelated to the factuality status of a proposition (2005a: 680). Portner considers the capacity to express both performative and descriptive meanings the key characteristic of modality (2007: 366).

(91) A: Ron must be an accountant!
B: Not true (he can be whatever he wants).
(cf. Be an accountant! ?? Not true.) (Frawley 1992: 421)

Kiefer demands that modality and imperatives be kept separate since deontic necessity and possibility "belong to semantics (and, if propositional, are describable in terms of formal logic)" whereas the actions of "issuing of an order (imposing an obligation) and granting a permission […] are part of speech act theory and must thus be treated in pragmatics" (2009: 185). Depraetere underlines that "illocutionary force is a pragmatic phenomenon that does not in itself justify the creation of a taxonomic class" as there is no additional meaning that could be captured (2014: 173).

However, a comprehensive view of both semantic and pragmatic factors is essential to describe modal meanings adequately since it cannot be associated with particular linguistic expressions alone, but derives from an interpretation of the context of the utterance, such as "conventional indirectness, metaphorical mapping, enrichment procedures, non-demonstrative inference or other context-bound mechanisms" (Klinge and Müller 2005: 1). Facchinetti (2009: 63) uses an apt metaphor to argue against a strict separation of pragmatics and semantics:

> Dealing with modality on a purely semantic level would be like getting into a wood with one's eyes fixed on a botanical book: just reading out how many diversified types of trees exist, without actually looking around, does not add much to knowing and experiencing the actual wood itself, which has grown and developed according to the laws of nature and also according to its environmental background, in the same way as language is the result of communicative needs in life.

Modality cannot be seen in isolation. In order to determine the modal character of an utterance, it is imperative to reconstruct implicit information and the communicative function of the utterance (cf. Lampert 1993: 16). For example, when a situation or a state of affairs is qualified as "important," the addressee can conclude that s/he needs to take action (cf. Lampert 1993: 17). These inferences play an important role. Lampert thus uses the term 'implicit modality,' stressing that communicative purpose cannot be deduced from the lexemes alone, but that there are a number of additional, implicit factors that need to be taken into account. A semantic analysis of the sentence is not sufficient (cf. Lampert 1993: 203); more context has to be considered, ideally the whole text or discourse as a functional unit that is governed by communicative efficiency and economy as well as marked by variation and textual progression and is directed at a particular audience (cf. Lampert 1993: 18, 206). This is a difficult endeavor when only the clause in which a modal expression appears is analyzed – admittedly, a major disadvantage of corpus studies in which only separate portions of text are read by the encoding researcher. Here an effort was made to look at least at a context of 180 to 200 words (cf. Ch. 4.1). An entire discourse analysis was not possible in light of the large amount of data that was considered and the purpose to identify changes over time. The creation of a separate category of utterances that likely function as directives helps shed light on different usage patterns of the analyzed expressions and on possible changes in the last centuries.

2.5.2. Dynamic modality

Palmer himself admits that dynamic modality "is not, perhaps, strictly modality at all" (1990: 7). Nuyts argues that unlike deontic and epistemic modality, dynamic modality is not an attitudinal category and is best characterized as belonging to the category of quantificational aspect [frequency], which "simply describ[es] a fact" (Nuyts 2008: 191), an "'appearance' of the state of affairs in the world." He believes (reported) speakers do not commit to the state of affairs (cf. 2009: 191) as they do when deontic and epistemic modality and evidentiality are expressed (cf. Nuyts 2005: 20, 23). Whereas deontic and epistemic modality are scalar categories, dynamic modality is "essentially binary, it only features the 'values' of ability or potential and need or inevitability" (Nuyts 2008: 188). Like other quantificational aspect notions, which also have participant-external uses, it refers to the first-argument participant (cf. Nuyts 2005: 20-21), expressing abilities and necessities inherent in the participant or in the general circumstances of a situation (cf. Nuyts *et al.* 2010: 17). By contrast, deontic and epistemic modality refer to the SoA as a whole (cf. Nuyts 2008: 188). Another notable difference is the existence of descriptive uses of evidentiality (as in sentence (92)a below), epistemic (cf. (92)b) and deontic modality (cf. (92)c), and boulomaic attitude ((92)d),

in which the speaker merely voices somebody else's stance, an earlier point of view of her/-himself, or a hypothetical stance to which s/he is not committed. By contrast, dynamic modal expressions would have to be introduced by a reportative clause (e.g. *John says*…) (cf. Nuyts 2005: 25).[47]

(92) a. In those days it seemed obvious that there would be eternal economic growth.
b. John doubts that this will happen.
c. John insists that you drop the plan.
d. John absolutely hates the idea that he'll have to do the dishes.

Whereas Nuyts believes that dynamic modality is "an aspectual dimension" and argues in favor of an abandonment of the label "modality" (2008: 192), other researchers believe dynamic meanings should be considered modal. One argument is its status as a significant stage in the diachronic development of the modals (cf. Ch. 2.4 below) and in ontogenesis (cf. the references to Stephany 1986, 1993 and Shepard 1993 in Nuyts 2005: 14). Moreover, dynamic modality is, like deontic and epistemic modality, always non-factual (cf. e.g. Narrog 2005b: 184-185, cf. also Ch. 2.2 above). Van linden (2012: 65) explains:

> In general, dynamic expressions merely indicate abilities/possibilities or needs/necessities inherent in participants of actions or situations; the SoAs involved are never positively or negatively factual.

Narrog (2005b: 186) underlines that "[i]n the second sentence [in example (93)], the state-of-affairs 'she does it' is marked as non-factual by the modal *can*" (2005b: 186). It may be a fact that she has the ability to realize the SoA, (and, as Narrog points out, "the whole sentence 'she can do it' is being asserted"), but she does not do it (yet). Likewise, in (93), where the speaker voices what s/he believes should happen, the SoA is undetermined with respect to its factuality status.

(93) She has the time and the energy. She can do it. (Narrog 2005b: 186).

(94) I'm an internationalist. I really do believe that we must break down barriers, everyone must be treated the same. On the other hand, we must tell our people where it's coming from. (CB, ukmags, quoted by Van linden 2012: 64) (*modal*; *deontic*)

Another argument is brought forward by Depraetere who uses the identity-of-sense test (cf. Lakoff 1970, Zwicky and Sadock 1975) to determine whether modals are monosemous or polysemous. She observes that "[i]t is inadvisable to use fuzziness or the fact that it is difficult to assign certain examples to a specific category as an argument against polysemy" (2014: 166). In a similar vein, Van linden stresses that the "lack of formal means to definitely distinguish between dynamic and deontic extraposition constructions does not invalidate the distinction between the two modal categories" (2012: 290). Depraetere demonstrates with the help of the anaphoric construction in (95) that "the different non-epistemic meanings [ability and permission, internal and external necessity] […] are indicative of the polysemy of modals" (2014: 164). In (95) Depraetere differentiates between internal (dynamic) necessity and subjective deontic necessity, to which she simply refers as

[47] Note also that Narrog considers this distinction (between event-orientation and speech act orientation in his terminology) not to be binary, but gradient (2012: 54).

external necessity. The same test result can also obtained if circumstantial (dynamic) necessity and deontic necessity are compared (as in example (96) below).

(95) Jennifer must have that dress
((a) internal necessity '*she insists*,' (b) external necessity *'I insist'*)
→ Jennifer must have that dress and so must Cathy. (Depraetere 2014: 163)

(96) Jenny must take the bus
((a) circumstantial necessity, (b) deontic/external necessity '*I insist'*)
→ Jenny must take the bus and so must Cathy.

There are thus formal grounds that justify the recognition of two distinct senses. Hence, dynamic necessity will be considered a separate category (of modal meaning) in the ensuing analysis. Information about the frequency of internal and external dynamic meanings will be given whenever there are noteworthy findings (e.g. dominance of one sense over the other, the absence of notable differences in distribution).

2.5.3. Volition

As mentioned in Ch. 2.2.2.3, volition is sometimes considered a dynamic modal meaning, but also often excluded from modality. The desire to include volition generally stems from a wish for congruence between formal characteristics of the core modals and modal semantics. Van der Auwera and Plungian give an overview of the state of classification in major works on modality (1998: 85) which can (at least partially) be supplemented by Table 7:

Source	Comment
Quirk *et al.* (1985)	Volition is one of the meanings that belong to the category of intrinsic modality (219).
Palmer (1990)	To Palmer distinguishing dynamic modality from deontic modality "seem[s] perfectly valid" (8). He considers dynamic meanings modal, but frequently also refers to the possibility to exclude volition, futurity and ability (*can*) because they do not seem to be strictly matters of modality at all; for ability and volition refer to characteristics of the subject of the sentence rather than the speaker, while future would be a matter of tense. Yet it can be shown that they have something in common with the more strictly 'modal' meaning of the verbs, if a third kind of modality ('dynamic') is admitted, and if one way of referring to the future can be considered to be modal." (2) Elsewhere, he observes that [i]t could well be argued that […] dynamic modality is not strictly a kind of modality at all" (36) because of the contrast between the speaker-/ discourse-oriented nature of deontic modals and the subject-orientation of dynamic modality. Like most other verbs, *can* and *will*[48] are used to make objective statements about the subject of the sentence. […] However, in the study of the English modal verbs, it is obviously essential to discuss them, whatever their theoretical status" (36).

[48] It is also interesting to note that Palmer recognizes a deontic use of *will* beside the dynamic one. In examples 19 and 20 below Palmer sees two possible explanations for the speaker's promise to act as announced: a volitional use or a deontic use. As Palmer observes, both explanations can be valid at the same time because "it is perfectly reasonable to argue that WILL is basically volitional, but that with *I* and *we* it acquires the deontic meaning through implication and so fills a gap left by SHALL" (1990: 135).

(FN 19) Hang on a minute and I'll try and find it. (S.8.4g.3, quoted by Palmer 1990: 134)

(FN 20) I'll have it lined up for you, dear. (S.1.9.55, quoted by Palmer 1990: 134)

Palmer (2001)	*Will* is identified as a dynamic expression of volition (76-78). *Want to* is only mentioned in translations in connection with the subjunctive (e.g. 134), but it is not used to exemplify dynamic (volitional) meaning. Palmer argues that expressing what one wants "is often a direction for action" (135).
Biber *et al.* (1999)	*Will* is grouped among the modals of volition and prediction (485).
Huddleston and Pullum (2002)	"In general, *will* covers a lower degree of modal meaning" than the other modal auxiliaries (111). Huddleston and Pullum argue with reference to *will* that "[v]olition is better regarded as an implicature overlaid upon futurity – an implicature deriving from the assumption that the subject-referent is in control" (193). The volitional meaning can be "heightened" when the modal is strongly stressed, in closed interrogatives and in the protasis of conditional sentences (193).
Halliday (2014)	Halliday considers inclination one of the four types of modality (besides probability, usuality, and obligation, cf. 691 and Ch. 2.2 above)

Table 7 The status of *will* (and *want to*) in influential studies of modality

While *will* is generally considered to belong to the group of modal auxiliaries (cf. Table 7), *WANT to* is less often treated as a (semi-)modal. Krug (2000) is one of the first authors to grant *WANT to* a place among the (emerging) modals. (Another notable study where *want to* is included is Collins 2009a.) He stresses that *WANT to* seems to be undergoing a process of modalization (2000: 118) and therefore includes *want to* in his category of emerging modals (after *BE going to* and *GOT to* in his prototypicality ranking of emerging modals, cf. 2000: 232, 235), thus giving it a prominent place among expressions that have long been recognized as modal-like (e.g. *HAVE (got) to*, *BE going to*). Krug hypothesizes that the lack of attention with regard to *want to* is due to the fact that since the grammaticalization of the *will*-future, which started in Middle English, 'desire' is no longer the central meaning of any core modal. Only some traces of volition can be found with *will* and *would* (cf. Krug 2000: 117). The idea is also taken up by Verplaetse who observes that at the time modality started to be studied extensively, the modal auxiliaries – which were seen as a clearly delimitable class of verbs – were mostly taken as the starting point for investigation. Volition was considered only one of the meanings of *will* (and *would*, 2008: 9).

Leech *et al.* observe that *want to* and *need to* are "the most convincing of the remaining candidates for semi-modal status" (2009: 96). They consider the fact that both verbs are used as main verbs with *to*-infinitives a case of layering, a state that is often found with grammaticalizing items. Layering thus should not be used an argument against auxiliary status (cf. Leech 2009: 96). The following attributes of these verbs are viewed as signs of grammaticalization: phonetic reduction (*wanna*) and coalescence of the pronunciation (in the case of *need to*, as described by Krug, to["[ni:tə] and [ni:rə]"; 2000: 211), drastic increase in frequency between 1961 and 1991/2, and meaning extensions (in the case of *want to* from volitional to deontic meaning, in the case of *need to*, from a basic inherent necessity meaning to an unmarked necessity meaning, 2009: 97, 111). As Verplaetse states, "[t]he phonetic, orthographic and morphological properties of this univerbation liken WANNA to the core modal auxiliaries, and constitute the most obvious argument in favour of a consideration of the form in terms of an incipient modal auxiliary" (2009: 472).

Another observation that "tie[s] in with an auxiliarization hypothesis" is that *WANT to* develops more modal meanings, such as deonticity (i.e. obligation/advice, Krug 2000: 147, cf. also example (97)). Desagulier believes that *wanna* should only be treated as an emerging modal in this deontic use (cf. 2005a 455; cf. also Verplaetse 2009: 471). He contends that *want to* shows undeniably more and more signs of auxiliarization (2005: 406-407), behaving, for example, like *should* in (97).

(97) You wanna've seen your face, you didn't know what had hit you, you just wait. Oh dear (BNC). (Desagulier 2005: 409)

Cross-linguistic comparisons[49] have provided support for a comprehensive view of modality that includes volitional *will* and ability *can*. As Bybee and Fleischman observe, a narrow understanding of deontic meanings does not encompass the categories that we find in other languages (1995: 4-5). Larreya also stresses that the German modal system, for example, includes a modal auxiliary that mainly expresses volition (*wollen*), but he expresses doubts that this language-specific particularity allows us to place volition on the same par with possibility and necessity (2009: 17).

Krug argues that the meaning of the term 'deontic' itself justifies the inclusion of volition because the middle form of Greek "δεω, i.e. δεομαι" has a 'desire' reading (2000: 41). Historically, the notions of necessity and desire are strongly connected in English (and cross-linguistically, cf. e.g. Heine 1993: 28, 47, Bybee *et al.* 1994: 182, 240 Krug 2000: 118). The verb *want*, which probably comes from Old Norse *vanta* and entered the English language at the beginning of the 12th century, had a meaning of 'lack' ("*want*, *v.*" I1a, OED). From the 16th century on, it was used in the sense of 'need' (Krug 2002: 135-6, cf. example (98) below). The 'desire' sense (cf. example (99) below) appeared in the 18th century (Frawley 1992: 178).

(98) I wanted monaye, *argent me fault.* (Palsgrave (1530) *Lesclarissement*, 771/1, "*want*, v." 4a, OED)

(99) If either want to be separated during the term limited, there must be a Commutation of Money paid by the separating Party to the other, according as they can agree. (Hamilton, A (1727) *New Acct. E. Indies* I. v. 52, "*want*, v." 5a, OED)

(100) Said Mr. Fitzwater today, "There is no war. We want to do everything to avoid it. We want a peaceful resolution and we want consultations with the Congress all through this process." (1990/11/13, "Debating a debate," *ABC Nightline*, COCA)

In late 20th century English, 'desire' is still the dominant sense (cf. Krug 2002: 138, example (100), and Ch. 6.2.5), while intentional meanings and obligative meanings exist. Pointing to older meanings of the noun ('lack,' 'need'), to the adjective *wanting*, and to the intransitive verb ('need'), Krug stresses that this very process of a "semantic extension from volitional to obligative modality" is "a revival of older senses in a different syntactic environment" (2000: 149).

[49] Desagulier, referring to Palmer (2001: 4), underlines the claim some linguists make that volition is more closely linked to mood than to modality in Romance languages like French and Spanish. He considers this an argument against Krug's suggestion to consider *want to* a (deontic?) modal (2005: 408). Palmer, however, who argues for a separation of the modal system and mood within the "overall category of modality," does not make such a strong claim. If we were to accept this argument, the same might be argued for *need*, which is also used with the subjunctive in Spanish (cf. example ii in Palmer 2001: 3).

It has also been argued that the 'volition' sense is implicit in the meaning of necessity (e.g. by Larreya 2009: 17). A statement that is generally considered to provide an argument in favor of the inclusion of volition under the umbrella of deontic modality (e.g. by Verplaetse 2003: 153) is Lyons' claim (1977: 826) that

> [t]he origin of deontic modality [...] is to be sought in the desiderative and instrumental function of language: that is to say, in the use of language, on the one hand to express or indicate wants and desires and, on the other hand, to get things done by imposing one's will on other agents. It seems clear that these two functions are ontogenetically basic, in the sense that they are associated with language from the very earliest stage of its development in the child. It is equally clear that they are very closely connected. [...] The so-be-it component [...] is intended to have an instrumental meaning, but it may be assumed to have developed out of, and to include, an ontogenetically prior desiderative. To issue a directive that one does not want to be carried out is to be insincere in the performance of one's illocutionary act: *Open the door*, *but I don't want you to* is anomalous.

Lampert, however, points out that Lyons talks about to two distinct functions: "wants and desires" and "to get things done." He argues the paraphrase *B wants A to pay his debts* for (101) is problematic, if not even incorrect, as there is no correlation between volition and necessity (1993: 129).

(101) B says: A must pay his debts. (adapted from Lampert 1993: 129)

(102) A must cross the river to get to Manhattan.

Let us look at example (101) in more detail. Three different scenarios can be distinguished:
1) B is merely reporting an obligation imposed by somebody other than herself (i.e. C) on A without endorsing it (in which case B's volition is clearly not given). C's volition has led C to impose the obligation (assuming that C is not subject to other external influences). If A wants to avoid the presumably (negative) consequences of a non-compliance with C's will, he must pay his debts.
2) If, however, the obligation reported by B were to result from the general circumstances of a situation, such as in example (102), no human agent could be considered the cause of the necessity. It is the location of Manhattan at the other side of the Hudson that makes it necessary for A to cross the river. Only A's volition to reach this aim would cause him to contemplate this necessity. Thus, in cases of dynamic necessity, the subject's volition is foregrounded.
3) If B imposes the obligation or endorses C's directive, her will to see the state of affairs realized can be taken for granted. A's volition can, however, not always be assumed to exist. If A wants to avoid the (presumably negative) consequences of a non-compliance with C's will in (101), he must pay his debts. Yet it is also conceivable that A does not care about these consequences.

Larreya underlines that there is some external volition in such cases (here B's or C's), but that subjects will also at some point "have *decided*" to comply, "although perhaps reluctantly" (2009: 18). Hence, in cases of root necessity, both external and internal volition are given, but in simple cases of volition, there is only an internal volition of the subject. Lampert observes that the person defining the aim and the person realizing it are identical in cases of volition, whereas they are two different people when necessity or possibility are expressed (1993: 129-130).

Lampert is correct in pointing out that a necessity can exist even if there is no human wanting the realization of the SoA. We have seen in Ch. 2.2.2.2 that, although it is frequently the case, there does not necessarily have to be any overlap between what is deemed necessary and what is considered desirable. In fact, the very absence of volition has led researchers to conclude that circumstantial (participant-external) and participant-internal dynamic necessity should not be considered modal at all (cf. Ch. 2.5.2).[50] In this study, which focuses on the semantic concepts of obligation and necessity, circumstantial necessity is included because it is non-factual (cf. e.g. Narrog 2005b: 187-188, Van linden 2012: 65) and expresses that the realization of a SoA is deemed necessary. Volition is viewed as closely related to obligation and necessity. It is listed separately in the ensuing semantic analysis, but in light of the focus of this study, it is only marginally relevant and comments about volition are largely confined to Ch. 6.2.5 on *want to*.

Finally, let us consider Nuyts' (2016: 43) doubts that volition can be considered a scalar category like epistemic and deontic modality ("can one desire something very strongly vs very weakly?").[51] Nuyts claims that volition can have "many different qualificational 'flavors'": deontic (moral considerations), boulomaic ((emotional) dis-/liking), dynamic (practical considerations) etc., but "sometimes [it] doesn't have a clear flavor at all – beyond the element of wishing as such" and can therefore not "be 'reduced' to any of these flavors" (Nuyts 2008: 198-199). Nuyts argues that epistemic modality and deontic modality, for instance, are part of the central conceptual system, "which is responsible for the subject's storage of and reasoning with information about the world" (2008: 199-200). Once the subject has decided that action is needed, it uses one or both of the cognitive action systems, one responsible for communicative action and one for motor action to take physical or communicative action. Volition and intention constitute cognitive stages that are situated between the conceptual analysis and the concrete action. When speakers want something, they have decided or concluded that something should be done, but that does not mean that an action plan has been formed yet or will be formed. According to Nuyts, volition "is a necessary but not a sufficient element for action" (2008: 200-202). Directive utterances are thus different from deontic and epistemic modality, and volition is a prerequisite of the decision to utter a directive (and hence a distinction of two separate categories 'deontic modality' and 'directives,' as advocated in Ch. 2.2.2.2, would be perfectly valid). Developing volition is a step that follows dynamic or deontic considerations, but not a factor that plays a role at the conceptual level (cf. Nuyts 2008: 200). It is thus closely akin to both deontic and dynamic modality and cannot be denied a place in studies of modal verbs as expressions of deontic modality.

[50] It could be argued that considering volition a determining factor of deontic / root modality while at the same time denying volition the status of a modal meaning is contradictory.

[51] cf. Narrog's claim that there is a basic distinction between volitive and non-volitive modality, "with degrees of gradience between the two poles" (2005a: 684).

2.5.4. Evaluation

A few final remarks need to be made about the particular semantics of the modal adjectives of obligation and necessity. Like the modals, they can be characterized as polysemous, expressing desiderative / deontic or evaluative attitudinal meaning (cf. Van linden and Verstraete 2011: 154).[52] However, unlike the modals, they are not used to evaluate the truth-value of a SoA (epistemic modality), but can function as means to evaluate the importance or necessity of a particular situation that is presupposed to be true. Van linden, referring back to McGregor's (1997) distinction between desiderative and evaluative attitudinal modification, stresses the importance of using the criterion of factuality to distinguish deontic meanings, where the realization of the SoA is potential (cf. example (103) below), from evaluations of situations that have already been actualized, are being actualized, or will certainly be actualized ("presupposed realization," cf. (104) below). Consequently, dynamic, deontic, and epistemic modality are, in the terminology proposed by Narrog (2005b: 184) and adopted by Van linden (2012: 64), never positively or negatively factual, whereas evaluative expressions may be positively or negatively factual (cf. also Van linden 2012: 66).

(103) When talking about life elsewhere in the universe, I think it really is necessary to think as broadly as possible and to avoid very narrow definitions of life. In fact, what I favor is to define life only to the extent that you gain some useful information with which to mount a search….. (2007/02/16, "Scientists weigh the livability of Mars," *NPR Talk of the Nation*, COCA)

(104) What I am suggesting is that we reverse our ordinary procedure of teaching - that is, method first and conclusions afterward. Instead we must teach the conclusions first. When Bacon inaugurated the scientific project, it was indeed necessary to discard all of the classical conclusions about why the world worked the way it did, for they were not true in practice. (Turner, F. W. (1986) "Design for a new academy: An end to division by department." *Harpers* 09: 47-53, COHA)

Van linden identifies five subcategories of non-modal evaluative meaning (cf. Figure 1 below). General evaluative meanings allow the speaker / writer to comment on the SoA "on the basis of SoA-external, e.g. moral, grounds" (Van linden 2012: 248, cf. example (105) below). In specialized uses, a particular historical context or characteristics of the persons involved in the SoA or the location or the time of the utterance constitute the ground against which the appropriateness or usefulness of the propositional content is measured (cf. example (106) below). In locative uses, the speaker evaluates the spatio-temporal location. Van linden also distinguishes uses in which the knowledge or acquisition of knowledge (KAK) is (positively) evaluated (cf. example (107) below).

(105) The village was marginally bigger than the last one […] She thought it fitting that Michelle should have been brought there. (CB, ukbooks, quoted by Van linden 2012: 249)

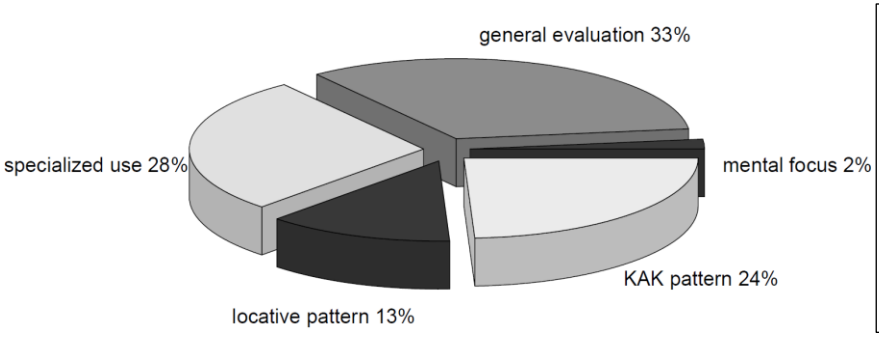
[52] Biber *et al.* (1999: 975-975) and Biber (2004a: 114, 135) consider expressions of attitudinal stance markers of personal feelings. The group of attitudinal stance markers comprises nouns (e.g. *fear*, *hope*, *reason*) and adjectives and adverbs (e.g. *amazing(ly)*, *fortunate(ly)*, *surprising(ly)*, cf. Biber 2004a: 133-134).

(106) Born in the Wisconsin prairies and spending nearly half of her 99-year life in the desert of New Mexico, O'Keeffee was not scared of space. […] It's appropriate, therefore, that the O'Keeffee retrospective shares the Hayward with the work of another American artist who has a similarly epic view of the landscape. (CB, ukmags, quoted by Van linden 2012: 251)

(107) It is important *to see* UK base financial markets on a world basis following the recent spread of 'global' or 'round the clock' trading from foreign exchange to securities… (CB, ukephem, quoted by Van linden 2012: 258)

The last meaning that Van linden singles out, the (evaluative) mental focus type (cf. Ch. 2.2.2.2 above for deontic mental focus uses), can – in her own opinion – "hardly be considered" an expression of non-modal evaluation. The specific pragmatic effect (cf. 2012: 211) that such an utterance has is to direct the hearer's attention to the proposition. In example (108), for instance, it is more significant for the speaker to make the listener notice her intention than to present this intention as important (cf. Van linden 2012: 245-246).

(108) I'm not into just designing for those people with money. I mean I think it's really important that I want to reach as broad a field as possible… (CB, ukspok, quoted by Van linden 2012: 246)



Share of evaluative meanings		
appropriate	26.3%	N = 133
convenient	3.0%	N = 33
fitting	83.3%	N = 37
good	61.5%	n = 200
important	3.0%	n = 200
proper	12.0%	N = 25
crucial	3.8%	N = 52
essential	0.5%	N = 200

Figure 1 Relative frequency of evaluative meanings in CB (Van linden 2012: 247, 250, *mc*)

Van linden assumes that extraposition constructions with this meaning derive from mandative (deontic) meanings: "What seems to have happened is that the mandative cognition or verbalization predicate was dropped from the combined pattern, while still being implied in some sense" (2012: 225). Van linden notices that not only the weak adjective *important*, but also the strong adjectives *crucial* and *essential* are used in this sense (2012: 245-246). Yet she maintains her claim that weak adjectives (e.g. *appropriate*, *desirable*, *expedient*, *fit*, *fitting*, *good*) only express deontic or evaluative meanings, whereas adjectives with a strong degree of desirability (such as *critical*, *crucial*, *essential*, *indispensable*, *necessary*, *needful*, and *vital*) exclusively have deontic or (circumstantial) dynamic meaning (cf. example (109) below, Van linden 2012: 68, 314, cf. also Van linden and Verstraete 2011: 154 and Van linden 2010a: 726-727). She illustrates this distinction in a conceptual map based on the analysis of historical and of PDE English data. Van linden stresses that the use of *crucial* and *essential* with evaluative meaning (mental focus type only) should not be considered

evidence against the validity of the overall tendency (2012: 310) because of the particular pragmatic value of these utterances. "[A]t least pragmatically, the lexical boundaries in the conceptual map [thus] remain intact" (2012: 234).

(109) We had a problem of maintaining our computers, especially our CPUs. Every time they were [*sic*] getting broken […]. VAN MARSH (*on camera*): Now, while it is still necessary to call the technicians every once in a while, the owners say that the main component, the PIC, is virtually problem free. (2005/09/17, "Technology and ecology around the world," *CNN Global*, COCA)

As will be demonstrated in Ch. 6.4, dynamic and a few evaluative uses are found in the analyzed data from the spoken language section of COCA. None of the evaluative uses are of the mental focus or the KAK type. Deontic assessments dominate by far – which is also due to the fact that all past tense uses were excluded (cf. Ch. 4.7). The adjectives that will play a major role in the ensuing analysis occur in extraposition constructions that function as heads of *that*- and *to*-clauses.

3. Previous Studies and the Need for Further Research

Numerous studies describe the meanings of the modal auxiliaries, i.e. the instantiations of modality that have received the most attention in publications focusing on English, at various points of time. Many of them have already been mentioned above (monographs by Coates (1983), Palmer (1990, 2001), Westney (1995), Collins (2009a) etc. as well as smaller-scale studies by Depraetere and Verhulst (2008), Nuyts *et al.* (2010), to name just a few). An overview of corpus studies dealing with core modals and semi-modals, in which all analyzed expressions are listed, is given by Seggewiß (2013: 32-41). In the following, I will review previous findings about changes in the use of the core modals and semi-modals, with special emphasis on the field of obligation and necessity (Ch. 3.1), and examine studies on the use of adjectives, lexical verbs, and nouns as expressions of modal meaning (Ch. 3.2) before discussing related changes in language and society (Ch. 3.3). There are still gaps in our knowledge of this modal field, and I will point out which of the remaining questions will be answered in this study.

3.1. Modals and Semi-Modals

Studies by Biber that include data from the 20th century[53] give us information that is highly relevant for my purposes, but he also examines languages samples from as far back as the 17th century. The development of the modal verbs *can*, *could*, *may*, *might*, *must*, *should*, *shall*, *will*, and *would* between 1650-99 and 1950-90 in the written texts of ARCHER (BrE) shows that the overall frequency of the modal verbs remains relatively stable in the 17th and 18th centuries, particularly in newspapers and medical prose (cf. Biber 2004a). Biber notices a particularly marked decline in the use of the modal verbs between 1900-49 and 1950-90. They remain most frequent in drama and letters, but they are rarely used in medical prose (cf. Biber 2004a: 117-118). Information about the development of the core modals in AmE is not given by Biber (2004a, 2004b). The use of the semi-modal verbs *have to*, *got to*, *ought to*, *better*, and *be going to* increases in both BrE and AmE, primarily in drama and letters (Biber 2004a: 118-119). Krug's analysis of ARCHER shows that *want to* equally undergoes a drastic increase in drama and fiction (2000: 133).

Biber and Gray confirm previous findings in a study of texts from the CHF fiction corpus, i.e. a newspaper corpus with articles from the *New York Times* and academic texts from *The Philosophical Transactions of the Royal Society* published between 1800 and 1985 (2012: 316). Table 8 shows the Pearson correlation coefficient (which indicates, on a scale of 0 to +/-1.0, the strength of the positive / negative correlation between frequency and time).

[53] Retracing the history of the modal verbs from their origins as main verbs in Old English to their status as a formally distinct group of auxiliary verbs (cf. Lightfoot 1974; Warner 1993: 92-109) is a task leading us too far afield from the focus of this study. For a comprehensive overview, the interested reader is referred to Plank (1984), Denison (1993: 292-339), Fischer (2003), Traugott and Dasher (2002: 105-151) or Ziegeler (2016).

1800-1985	Fiction	Newspaper	Science Prose
semi-modals (all)	+ 0.69	+ 0.10	+ 0.15
core modals	- 0.19	- 0.12	+ 0.04

Table 8 Pearson correlation coefficients for the historical development of semi-modals and core modals in CHF (adapted from Biber and Gray 2012: 315)

Zooming in on the domain of obligation and necessity, Biber, Conrad, and Reppen retrace the development of modal and semi-modal verbs from the 17th to the 20th centuries in ARCHER (1998: 205-210). Their research shows that frequencies vary in accordance with the text type: The core modals *must* and *should* are most common in drama. Their use remains relatively stable in the 17th and 18th centuries, but decreases again after a peak in the 19th century. In fiction both verbs are less common. A similar tendency towards decline can be found from the 18th century on. Only in newspapers does the use of the modals continually increase until the 20th century. The semi-modals *have to*, *got to*, *need to*, *ought to*, and *supposed to* are rare in the 17th, 18th, and 19th centuries, but then gain more prominence in fiction and drama, i.e. in registers that share similarities with spoken language. They even exceed the use of the core modals in drama (cf. Biber *et al.* 1998: 207-208).

Changes in the 20th Century

Just like the evidence from ARCHER, the data from the Brown family of corpora show an overall decline in the use of most of the core modals in the second half of the 20th century in BrE and AmE. Since the compilation of FLOB and Frown, many studies have reported on the changes in the use of modal auxiliaries in these varieties between 1961 and 1991/2. Particularly Leech has commented on the decrease in the use of most of the core modals and the increase in the use of semi-modals in various publications (2003, 2004, Mair and Leech 2006, Leech and Smith 2009, Leech *et al.* 2009).

Millar, however, challenges Leech's claim that the decline of the modals is "a general and long lasting trend" (2003: 96). Looking at the use of the core modals and semi-modal verbs in the TIME corpus, which, according to Millar might be expect[ed] … to reflect changes in the language as a whole as they happen" (2009: 206) because of the particular receptivity of news writing to change (cf. Hundt and Mair 1999), he detects an overall increase in the use of both groups of verbs (2009: 199, 204). The substantial increase in the use of *can*, *could*, and *may* and the small increase of *will* in the TIME corpus (1920s-2000s) provide a notable contrast to the decrease of the core modals between 1961 and 1991/2 in Brown and Frown (cf. Leech 2003: 228, cf. Table 9 below).[54] *Might*, *should*, and *would* seem to fluctuate in the TIME corpus (cf. Millar 2009: 205).

Millar also discovers an overall trend towards a decrease in the press sub-corpora of Brown and Frown that is at odds with the increase of the core modals in the TIME corpus. The difference is most notable in the case of *may* (-39% | + 54%). Millar concludes that "text type is therefore not wholly satisfactory as an explanation for the observed discrepancies" (2009: 207). However,

[54] Only the decline of *can*, *might*, and *needn't* is not statistically significant (cf. Leech 2003: 228).

the small size of the press sub-corpus (less than 180,000 words) makes Millar question the validity of generalizations drawn from this sample (2009: 208).

	British English				American English			
verb	LOB	F-LOB	Diff (%)	Log likhd	Brown	Frown	Diff (%)	Log likhd
would	3,028	2,694	-11.0	**20.4**	3,053	2,868	-6.1	**5.6**
can	1,997	2,041	+2.2	0.4	2,193	2,160	+1.5	0.2
could	1,740	1,782	+2.4	2.4	1,776	1,655	+6.8	**4.1**
may	1,333	1,101	-17.4	**22.8**	1,298	878	-32.4	**81.1**
might	777	660	-15.1	**9.9**	635	635	+4.5	0.7
will	2,798	2,723	-2.7	1.2	2,702	2,402	-11.1	**17.3**
shall	355	200	-43.7	**44.3**	267	150	-43.8	**33.1**
should	1,301	1,147	-11.8	**10.1**	910	787	-13.5	**8.8**
must	1,147	814	-29	**57.7**	1,018	668	-34.4	**72.8**
ought (to)	104	58	-44.2	**13.4**	70	49	-30	**3.7**
need(n't)	87	52	-40.2	**9.0**	40	35	-12.5	0.3
total	14,667	13,272	-9.5	**73.5**	13,962	12,287	-12.2	**68**

Table 9 The core modals in LOB, FLOB, Brown, and Frown (adapted from Leech 2003: 228, Mair and Leech 2006: 327)[55]

In his reply to Millar, Leech emphasizes that the TIME corpus cannot be considered representative of changes in the English language in general or even of news writing because of the distinctive style of the *Time* magazine (2011: 549). He supposes that the main difference in the use of *may* might be due to a trend towards more speculation, which could be particularly marked in the weekly news magazine focusing on interpretative commentary. Leech therefore stresses the importance of exact control of genre variability to minimize the influence of texts with unusual features (2011: 559). This control is not easily maintained in large corpora like COHA and COCA, where the compilers often had to include different publications for different periods (cf. Ch. 4.1).

Leech uses the now extended British Brown family of corpora to demonstrate that modal usage has indeed decreased in Britain. The start of the overall decline can be situated in the middle of the 20th century (cf. Leech 2011: 551, Leech and Smith 2009: 187). Leech shows that all core modals except *would*, *can*, and *could* become less frequent between 1931 and 2006 (2011: 551). In COHA a general trend towards a decline in the use of the core modals can be observed between the 1920s and the 2000s – exceptions are again *would*, *can*, and *could* (cf. Ch. 5 below). Leech also detects an overall decrease of 7.4% in the use of the core modals between 1990-94 and 2005-10 in COCA. Statistically significant changes occur in the case of *would*, *will*, *should*, *must*, and *ought to* (cf. Leech 2011: 554).

[55] The log-likelihood scores indicates how (un-)likely the difference between both values is if it was the result of mere chance. Values higher than |3.83| signal a probability of less than 5% (|6.64| p <0.01, |10.83| p <0.001, cf. McEnery *et al*. 2006: 55) and are marked in bold print.

Leech highlights that frequent modals hold their ground while infrequent ones struggle even more as time progresses (2011: 55). While this claim has some validity when we consider the data from LOB and FLOB in particular (cf. Table 9), it is striking that without exception all core modals of obligation and necessity are affected.

The semi-modals present a mixed picture (cf. also Leech 2003: 235). Leech's analysis of the Brown corpora shows that the use of *be to*[56] decreases significantly between 1961 and 1991/2 in both BrE and AmE (cf. Table 10). The decline in the use of *(had) better* is below the 5% level of statistical significance. The use of *need to* and *want to* increases significantly in both varieties. However, it is likely that the observed slight changes in the use of *(have) got to* (decrease in BrE, increase in AmE), *have to* (increase in both varieties), *be supposed to* in AmE, and *used to* in BrE are solely the product of chance (Leech 2003: 229, Mair and Leech 2006: 328).

	British English				American English			
verb	LOB	F-LOB	Diff (%)	Log likhd	Brown	Frown	Diff (%)	Log likhd
WANT to (wanna)	357	423	+18.5	**5.4**	323	552	+70.9	**60.9**
BE going to (gonna)	248	245	-1.2	0	219	332	+51.6	**23.5**
used to	86	97	+12.8	0.6	51	74	+45.1	**4.3**
BE to	454	376	-17.2	**7.6**	349	209	-40.1	**35.5**
(had) better	50	37	-25.0	2	41	34	-17.1	0.7
(HAVE) got to (gotta)	41	27	-34.1	2.9	45	52	+15.6	0.5
HAVE to	757	825	+9.0	2.7	627	643	+1.1	0.1
NEED to	54	198	+259.1	**83**	69	154	+123.2	**33.3**
BE supposed to	22	47	+113.6	**9.2**	48	51	+6.3	0.1
total	2,069	2,275	+10.0	**9.2**	1,772	2,101	+18.6	**28.4**

Table 10 Semi-modals in (F)LOB, Brown, Frown (adapted from Mair and Leech 2006: 328)

The Relationship Between the Decrease of the Modals and the Increase of the Semi-Modals

The question as to whether the increase in the use of (some of) the semi-modals compensates for the decline in the use of the core modals is discussed with caution. Biber calls the developments "at least partially independent" (2004a: 118), whereas Mair and Leech stress the difficulty of sustaining the argument that the "semi-modals are increasing *at the expense of* the core modals" in light of the much lower overall frequency of the semi-modals as opposed to the core modals (2006: 327). Looking at their written language data, Leech *et al.* underline that there is "little mileage […] in the supposition that the decline of the modals is (solely or mainly) due to the increasing competition of the semi-modals in the same semantic space" (2009: 98). However, Mair and Leech also draw attention to evidence for "at least some link" between the two developments: The even "steeper fall" in the use of the core modals and the more pronounced increase of the semi-modals

[56] Note that *be to* no longer figures in Leech's list of emergent modals in 2013 because, in contrast to other verbs in this category, its use declines and because it is considered a (core) modal by Declerck (2010), cf. Leech 2013: 95).

in spoken AmE "places the encroachment of semi-modals on the territory of the modals in AmE speech, in frequency terms, beyond doubt" (2006: 328). Having studied the use of *must*, *have got to*, and *have to* in DCPSE, Close and Aarts carefully propose that "there may be a link between core modal decline and semi-modal increase" (2010: 177).

In a recent publication on the topic (2013), Leech discusses various hypotheses that could explain this decrease. He introduces the term "modality deficit" (2013: 110), which refers to the overall decline of the combined frequency of the core modals and the group of verbs that he calls emergent modals, namely *BE able to*, *Be going to*, *HAVE to*, *HAVE got to*, *WANT to*, *NEED to*, *BE supposed to*, *had better*, and their reduced forms.[57] The difference in the frequency of the core modals and emergent modals in LOB and FLOB is highly significant ($p<0.00001$), but a comparison of the spoken mini-corpora DSEU and DICE does not show any significant results (cf. Leech 2013: 106). This leads Leech to the conclusion "the case for a 'modality deficit' in spoken data (particularly given the small size of the mini-corpora being compared) is unproven" (2013: 106).

Two notes of caution are in order here. First, Leech compares lemmas of the emerging modals, which can, however, also be used in other contexts than the core modals. Second, the term "modality deficit" (Leech 2013: 110) can be misleading as it implies that from a (somewhat arbitrary) point of time on, a language community's need to express modal meanings should remain absolutely stable. Smith and Leech admit themselves that "the meaning potential for modality" may vary in the time period that is studied (2013: 77). The deficit may simply be due to the existence of fewer opportunities to use modal expressions (cf. Leech 2013: 108). As will be discussed in the following chapter, it may also reflect a trend towards other expressions of modal meanings – expressions that are rarely covered in previous studies.

Changes in Spoken English

Various studies have shown that the modals are more frequent in speech than in writing, whereas the situation is reverse in the case of the semi-modals (cf. e.g. Biber *et al.* 1999: 486, Müller 2008: 4, Leech *et al.* 2009: 99-100; Close and Aarts 2010 for *have to* vs. *must*, Jäger 2009 for *need to*). Collins highlights that the quasi-modals outnumber the core modals only in the field of obligation and necessity, but not in the areas of possibility/permission/ability or prediction/volition (2009a: 33). In Biber *et al.*'s sample of contemporary spoken BrE (1990), the semi-modals *have to*, *got to*, *need to*, *ought to*, and *be supposed to* are more frequent than the core modals *must* and *should*. Whereas *ought to* and *need to* have, according to Biber *et al.*, "remained relatively rare" in all periods of time, *have to* is now used more often than *must* in conversation (1998: 208). In Leech's analysis of LCSAE (AmE), the three most common emergent modals *BE going to*, *HAVE to*, and *WANT to* have overtaken the core modals *can*, *will*, and *would* in frequency. In the semantic field of obligation and necessity, *HAVE to*, *NEED to*, and *HAVE to* are more common than *must.* Yet

[57] Leech explains that the term *emergent modals* is "partly modeled on Krug's (2000) term *emerging modals.*" The change in labels allows him to refer to a different "set of idioms in this rather ill-defined category" (2013: 95).

overall, the core modals are still more frequent than the group of modals that Leech qualifies as emergent modals (2013: 111-112).

Information about the meanings of the modal verbs in spoken American English is rare. Examining the use of *must*, *should*, *have to*, and *need to* in the *Longman Spoken and Written English Corpus*, Biber (2004b: 194) observes that intrinsic-obligation meanings (or personal obligation meanings) dominate in conversation, whereas expressions relating to "the assessment of likelihood" (Biber 1999: 485) are more frequent in academic writing (2004b: 194). Only *must* patterns differently, being mainly used in the logical necessity sense in spoken registers. Collins' (2009a) analysis of the meanings of 22 (semi-)modals (in dialogs and monologs) in spoken English and (in (non-)printed material) in written English (i.e. parts of *The Santa Barbara Corpus of Spoken American English* (SBC, 2000-2005) and Frown) show that deontic meanings are more frequent than epistemic meanings in spoken AmE as well. Only *must* constitutes an exception.

The *Diachronic Corpus of Spoken English* (DCPSE), which comprises data from the London Lund Corpus (1958-77) and ICE-GB (1990-92), has also often served as a database for studies of the core modals and the semi-modals. Müller (2008) is an extract of the information later provided by Seggewiß (2013), who analyzes the use of the core modals and semi-modals in ARCHER, DCPSE, and the Santa Barbara corpus. Seggewiß compares the frequencies of the (semi-)modals at various points of time, looking at developments in the 20th century as well as at long-term trends. Due to the built-in segmentation of the corpus data, she can only look at spans of 50 years (1750-99, 1850-1899, 1950-1999); the data from COHA allow for a much more fine-grained analysis, showing developments in the course of the 20th century. Seggewiß also carries out semantic analyses of *must*, *should*, *have (got) to*, and *need to* in LCSAE, but little information is to be gained here:[58] Only three senses are distinguished, namely root, epistemic, and formulaic uses. The root meaning dominates by far in the case of *have to*, *have got to*, and *need to*, while ~ 1/5 of all uses of *should* are epistemic. *Must* is as frequent in its epistemic sense as it is in its root sense. The Excel graph illustrating these findings (p. 129) is not labeled so that I am not sure whether we are dealing with the absolute numbers or normalized frequencies. Additionally, Seggewiß performs a series of multivariate analyses to find differences between *must*, *have to*, *have got to*, and *need to.* The results can quickly be summarized as follows: *Must* is "favoured with definitive subjects and mainly used with stative verbs" (2013: 151, cf. also Tagliamonte 2004: 49), whereas generic subjects dominate in the case of *have to. Have got to* is associated with colloquial registers and 2nd person subjects. The changes in frequency that this type of analysis confirms are the same as identified in other corpora.

[58] Seggewiß also identifies the meaning of samples of a maximum of 100 occurrences of the core modals and semi-modals of necessity and obligation (including *be supposed to*, *ought to*, and *'d better*, but not *be to*) in DCPSE. An overview of the results is given on page 197: There is a significant increase in the use of root *need to* and root *be supposed to*, but root *ought to* and epistemic *be supposed to* decline.

Bowie *et al.*'s study highlights the importance of registers in such analyses. Determining the changes in the frequencies of the core modals in various registers of spoken BrE (DCSPE), Bowie *et al.* notice that the decline in the use of modal verbs is particularly pronounced in broadcast interviews and discussions, telephone conversations, and parliamentary language (2013: 71, 73). The number of occurrences of *must* per tensed verb phrases (cf. Ch. 4.2 for an explanation of this method to measure frequencies) declines by 54.1% in broadcast discussions and by 57.0% in broadcast interviews ($p<0.05$, cf. Bowie *et al.* 2013: 79). *Must* also decreases in relation to the entire frequency of all modals in face-to-face conversations, spontaneous commentary, and prepared speech (Bowie *et al.* 2013: 80). *Should* also undergoes a relative decline in formal face-to-face conversations and prepared speech ($p<0.05$, cf. Bowie *et al.* 2013: 80).

With broadcast discussions and interviews as well as formal and informal face-to-face conversations, similar genres will be examined in the spoken language section of COCA in this study. A semantic analysis will allow us to do a comparison with a previous study centering on BrE. The focus will not only lie on the (semi-)modals, but also on modal adjectives, lexical verbs, and nouns that express obligation.

3.2. Lexical Expressions of Modal Meaning

It has also been suggested that the preferences of English writers may be changing, for example in favor of unmodalized clauses (cf. Leech 2013: 108). Writers may also be increasingly inclined to use lexical expressions of modal meanings (or "modal-like expressions" in Hunston's deliberately "non-technical" terminology, 2011: 68) instead of the core modals. Smith and Leech (2013: 77) liken these developments to processes in nature:

> The ecological metaphor which suggests itself for conceptualizing the obligation / necessity field is that of an uncultivated plot of land as plant habitat. Over the years plant distributions change. Certain plants flourish or get a foothold, others wane or die out, some find a niche in the shade, others in the sunshine. Some find a home in marshy terrain, others in dry stony terrain – and so on.

Smith and Leech observe that lexical expressions of modality, i.e. lexical verbs, adverbs, adjectives, and nouns[59], can also express obligation and necessity. They seem to be rather infrequent (cf. Smith and Leech 2013: 76). Leech (2013) puts this hypothesis to a test in the extended Brown family of corpora. He determines the frequency of 38 lexical expressions of modal meanings (cf. Table 11), admitting that the number of possible competitors of the modal verbs is so high that it is hardly possible to examine them all. Overall, he detects a general decline of 11.9% in the use of these expressions. This development seems to intensify rather than to counterbalance the "modality deficit" (2013: 108-110). Table 11 lists his data, here sorted into two semantic fields (roughly corresponding to epistemic modality and deontic modality).

While there is a pronounced decrease in semantic field 1 (logical necessity and possibility) between 1931 and 2006 (-14%), we witness a considerable rise in the use of the verbs, nouns, and adjectives in semantic field 2 (obligation and necessity) between 1931 and 1991 (+ 31%), followed by a period of decline until 2006 (-11%). The use of the latter group of expressions can thus be considered a success story that warrants further investigation. A close look at Leech's data reveals that the increase is mainly due to the changes in the use of the nouns *need* and *requirement.* The case of the verb *need(n't)* is more complicated, as Leech has combined the frequencies of non-assertive *needn't*, which has elsewhere been shown to decline (cf. e.g. Leech 2003: 228-230, Smith 2003: 248), and *NEED (≠ NEED to)*, which rises considerably in use in BrE. Leech also establishes a link between declining formal expressions such as *BE necessary (to)* and passive forms and the process of colloquialization (2013: 108). Interestingly, though, the passive form *BE required to* actually rises in frequency. It remains to be seen if the same developments also take place in COHA.

[59] Note that in Smith and Leech's classification scheme *be supposed to* is – like *BE bound to*, *(had) better*, *NEED to*, and *HAVE (got) to* – classified as an emergent modal, *BE to* like *must*, *need(n't)*, *shall*, *ought to*, and *should* as a core modal (2014: 76). In this scheme, the core modals are situated at the core, emergent modals in the middle, and lexical expressions in the outer circle of modality.

Semantic Field 1: logical necessity and possibility					Semantic Field 2: obligation and necessity				
Year	**1931**	**1961**	**1991**	**2006**	**Year**	**1931**	**1961**	**1991**	**2006**
BE bound to	33	26	22	11	*BE compelled to*	18	9	3	4
BE (im)possible	223	176	114	102	*BE essential*	24	34	29	21
BE (im)probable	21	12	1	2	*BE forced to*	24	16	29	31
BE (un)certain	37	34	32	19	*BE obliged to*	10	17	15	10
BE (un)sure	83	89	106	78	*BE required to*	21	31	47	30
definitely	85	22	29	41	*BE (un)necessary*	110	124	76	40
doubtless	29	19	13	9	*compulsion*	6	5	5	2
doubt (n., v.)	245	248	181	116	*compulsory*	10	31	17	16
guess (I)	9	8	12	12	*necessity*	67	37	33	44
know	1,518	1,632	1,430	1,502	*need* (n.)	176	262	264	235
likelihood	6	5	7	26	*need(n't)* (v.)	239	303	366	376
(un)likely	149	237	310	324	*obligation(s)*	37	39	29	16
maybe	27	85	101	166	*obligatory*	0	1	5	2
necessarily	61	59	65	44	*requirement*	40	58	107	86
no doubt (adv.)	97	1	45	30					
perhaps	377	407	389	240					
(im)possibility	83	92	76	86					
possibly	98	93	103	84					
probably	242	279	239	193					
seem	829	934	762	647					
surely	110	126	75	61					
think (I / we)	227	196	192	162					
undoubtedly	53	46	38	20					
Total:	4,642	4,826	4,342	3,975	Total:	782	967	1,025	913
Changes in %:	+4%	-10%	-8%		Changes in %:	+24%	+6%	-11%	
Total (semantic field 1 and semantic field 2):						5,676	6,028	5,569	4,999
Total loss of frequency 1931-2006 in %:									-11.9%

The blue shading indicates an increase in frequency compared to the previous period.

Table 11 (Approx.) Frequency of selected lexical modal expressions in BLOB, LOB, FLOB, and BE06 (adapted from Leech 2013: 109)

Unfortunately, information about the distribution of epistemic and root uses of the core modals and semi-modals from the same corpora is limited and so far mainly restricted to the domain of epistemic necessity. Kranich and Gast (2015: 10) document that epistemic modals increase considerably between 1961 and 1991/2 in both BrE and AmE (which is what would have to be expected as grammaticalization progresses), whereas lexical expressions of epistemic modality are less frequent in 1991/2 than in 1961. They assume that the trend towards a decline in the use of modal verbs is restricted to the domain of root modality (2015: 16). Yet we only know very little about the number of root meanings of the core modals and semi-modals even though there are numerous publications by Leech, Smith, and co-authors in which the easily identifiable overall frequencies are indicated many times (but not the meanings of these verbs). Semantic analyses by Leech (2003) and Smith (2003) show that root *must*, *should*, and *HAVE to* decrease from 2,127 occurrences to

2,008 (LOB, FLOB).[60] In the same time span, we find an increase of roughly the same size in the use of lexical expressions of obligation in the same corpora (from 843 to 948 occurrences). Hence, it does not seem unlikely that a decrease in the use of modals in this semantic field might be counterbalanced by an increase in the use of lexical expressions.

Before I comment on other developments mentioned in previous studies that are relevant here, a few comments on the treatment of the examined lexical expressions are in order. I start by examining the sparse information on the lexical verbs of obligation and necessity (Ch. 3.2.1) before coming to modal adjectives (Ch. 3.2.2), which have received more attention, particularly in recent years. The last group in focus will be nouns of obligation (Ch. 3.2.3).

3.2.1. Lexical Verbs

The boundary between passive forms of lexical verbs, such as *urge* or *require*, and expressions that have been characterized as semi-auxiliaries or lexico-modals (*be obliged to*, *be due to)* seems fluent and merely determined by convention or individual preferences of the categorizer. While some expressions almost always make it into the list (e.g. *be obliged to*), others with the same characteristics are sometimes excluded (e.g. *be meant to*, cf. Table 1 and Table 2 in Ch. 2.1). Perkins lists many forms that are generally not included (e.g. *be advised / commanded / ordered / requested / urged to*, 1983: 83). To my knowledge, none of these expressions are examined in any comprehensive study on modal expressions of obligation and necessity that deals with changes in frequency or subjects a representative amount of corpus examples to a close semantic analysis. One of the aims of this study is to remedy this situation.

3.2.2. Modal Adjectives

Whereas adjectives and adverbs with epistemic meanings have found their way into studies of modality in the last decades (cf. e.g. Hoye 1997, Nuyts 2001, Kranich and Gast 2015), adjectives signaling that something is necessary or desirable (e.g. *necessary* and *essential*) have largely been neglected and only fairly recently received well-deserved attention as carriers of modal meanings. Perkins (1983: 81) enumerates adjectival expressions of epistemic and deontic modality (e.g. *BE imperative / obligatory etc. to/that*, cf. Table 2 in Ch. 2.1), but makes no comments about their frequency of use. In connection with the mandative subjunctive, Övergaard (1995) studies, among other adjectives, *advisable*, *desirable*, *desirous*, *essential*, *fitting*, *imperative*, *important*, *of ... importance*, *necessary*, and *vital*. Her numbers are very low and should thus be interpreted with caution. There is no clear overall rise in the use of these adjectives. Övergaard finds an increase in the

[60] Information about *should* comes from Leech (2003: 233). However, since he only analyzes 1/3 of all occurrences of *must*, the numbers for *must* and *have to* are taken from Smith's exhaustive examination of both verbs (2003: 257). Leech's analysis is more fine-grained and there may be differences in classification. Contrary to what we might expect, there is a decline in the use of epistemic *must* and *should* (449 to 368 occurrences), but not of root *have to* (8 to 26 occurrences).

use of the ("morphological") subjunctive with these adjectives[61], yet she does not only put clear cases (3rd person singular, backshifts, or forms of *be*) into this category, but also ambiguous forms. Some modal adjectives are included in studies by Biber (e.g. *important*, *necessary*, cf. Biber 2004: 114 and Biber *et al.* 1999); however, since they are not examined separately but with other evaluative adjectives, there is not much specific information to be gained about their use. In various recent publications, Van linden emphasizes that modal adjectives have the capacity to express root meanings (cf. Van linden *et al.* 2008, Van linden 2010a, Van linden and Verstraete 2011; cf. also Ch. 2.2.2.2) and evaluative meanings (cf. Ch. 2.5.4 above). Her monograph *Modal Adjectives* focuses on the diachronic development (until 1920) and the current use of 22 of adjectives in the British subcorpora of the Collins COBUILD corpus (CB), which comprise both written and spoken material from 1990-1995 (2012: 84). Again, there is a lack of information about American English.

3.2.3. Nouns

Some nouns with modal meaning have been studied as expressions of modality or as triggers of the mandative subjunctive. In this context Perkins (1983) and Övergaard (1995) need to be mentioned, but recent studies by Kanté (2010) and Inoue (2014) also deserve comment.[62] Perkins points to the close semantic relationship between the modal auxiliary verbs and non-auxiliary modal expressions like nouns. Yet he only lists them with a brief comment on their core meaning.[63] As for adjectives, Övergaard's data suggest that the 1940s were a period of infrequent use of deontic nouns (10, 9, 4, 9, 12 occurrences in the 1900s, 1920s, 1940s, 1960s, and 1990s). However, her database is very small. Kanté studies "lexical modality" in finite noun complement clauses in the BNC (and the French corpus Frantext), observing that deontic nouns favor the subjunctive over the indicative (2010: 281). Hunston also identifies *the importance / necessity / need of* + V-ing as "modal-like expressions" (2011: 78). None of these studies, however, deal with changes in frequency or empirically analyze subcategories of root meanings expressed by these nouns.

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[61] There are 11, 9, 5, 14, 11 occurrences of these adjectives in the 1900s, 1920s, 1940s, 1960s, and 1990s (*mc*, 1995: 117-121). Her analysis also covers other emotion adjectives such as *anxious*, *appropriate*, *concerned*, *convenient*, *determined*, *faire*, *proper*, *preferable*, *undesirable*, and *wise* (cf. 1995: 117-121 and Table 12 on page 33).

[62] Inoue's study of noun conversions of the core modal verbs in the BNC, WordBanksOnline, and COCA is exceptional. *Should*, *shall*, and *ought* are generally used in the sense of 'obligation.' Clauses with nominalized *must*, which is most often used in the phrase *it's/is/was a must*, can often easily be rephrased with one or several of the verbal, adjectival, and participial expressions that are discussed in this study (cf. example 21). In COHA, the first occurrences of nominalized *must* can be found in 1934 and 1943, one of *ought* even earlier (cf. example 22). The combined frequency of clauses with nominalized *must*, *shall*, *should*, and *ought to* increases towards the beginning of the 21st century ($\tau = 0.60$***), but overall these uses are very rare (average frequency in the 2000s: 2.1 w/m).

(FN 21) When she opens the refrigerator door, rubber-soled shoes are a must. (Kluger, J. (2001/04/02) "Fear not!" *Time Magazine*, COHA) → e.g. *she has to / it is necessary to wear rubber-soled shoes*

(FN 22) (3) […] I was what he thought I ought to be, rather than what, through and through, he wanted me to be. In the shuffle of the years the "oughts" lost their flavor, the "wants" remained unsatisfied. (1929/09/, "It paid to be a bargain wife." Harpers: 486-494, COHA)

[63] deontic act: "a scale from K(C entails X) to K(C does not preclude X)," deontic state: "K(C entails X)/K(C does not preclude X)/K(C precludes X)", "(i) K = social laws/C=a deontic source; (ii) C is objective" (Perkins 1983: 86)

Perkins (1983: 86)		Övergaard (1995)	Kanté (2010)
referring to a deontic act:	referring to a deontic state:	in her lists of triggers of the subjunctive:	deontic nouns:
call, *command*, *demand*, *directive*, *exhortation*, *instruction*, *invitation*, *order*, *request*, *suggestion*, *supplication*, *warning*	*compulsion*, *exemption*, *obligation*, *prohibition*	*demand*, *instruction*, *mandate*, *request*, *rule*, *ruling*, weaker: *desire*, *proposal*, *proposition*, *recommendation*, *suggestion*, *wish*	*constraint*, *demand*, *request*, *requirement*

Table 12 Deontic nouns identified in previous studies

Information about the use of nouns of obligation and necessity is thus particularly scarce, while lexical verbs of obligation and necessity and modal adjectives have at least received some well-deserved attention. Examining the use of these expressions in present-day American English can provide further insights into their semantics and their function in the modal system.

3.3. Modal Verbs and Changes in Language and Society

Changes in the use of modal expressions of obligation and necessity are also often linked to various developments in society and to a general shift towards more informal language. A brief summary of the most important and the latest remarks on the topic will follow.

3.3.1. Colloquialization and Informalization

The term 'colloquialization' was first introduced by Mair in 1997. He explains (2006: 187) that it refers to a

> stylistic shift [...] away from a written norm which is elaborated to maximal distance from speech and towards a written norm that is closer to spoken usage, [and] away from a written norm which cultivates formality towards a norm which is tolerant of informality and even allows for anti-formality as a rhetorical strategy.

Sometimes a distinction between colloquialization as the "adoption of speech-like habits" (Leech *et al.* 2009: 239) and informalization as "the reduction of the distance between the addresser and the addressee" (Farrelly and Seoane 2012: 395) is made.[64] Farrelly and Seoane argue in favor of a clear separation of the two processes because they consider them linked to different processes: Changes in the use of phrasal verbs, the progressive, contractions, and *get*-passives have been linked to colloquialization (a comprehensive list of colloquial features and changes in their use between 1961 and 1991/2 is given by Leech *et al.* 2009: 171), whereas the increased use of imperatives and questions, shorter sentences, and fewer subordinate clauses (identified by Westin 2002: 165) is taken a a sign of informalization (cf. Farrelly and Seoane 2012: 395). The decline of the *be*-passive could be interpreted as a consequence of both developments, but it is, according to Farrelly and Seoane, more likely due to a wish to avoid formality (2012: 396). They claim that academic writing "is undergoing a process of informalization but not colloquialization" (2012: 396).

The importance of the receptivity of different genres to changes has already been highlighted by Hundt and Mair (1999) and is stressed in various subsequent publications. Biber and Gray (2012), for instance, suggest that the use of colloquial features has considerably increased in fiction, whereas newspapers have not followed the trend to the same extent. Scientific writing has been shaped by the pressure to condense information, which is mirrored in an increased use of nouns as NP pre-modifiers, of *in*- and *for*-phrases as NP post-modifiers, and of *that*-relative clauses (cf. Biber and Gray 2012: 323). Newspaper writing, which is subject to both trends, having to appeal to large audiences while trying to convey as much information as possible in limited space, shows more signs of adoption of economy features than of colloquial features (cf. Biber and Gray 2012: 326-327 as well as Štajner and Mitkow (2011: 84) for changes in average sentence length, lexical density, lexical richness, and automated readability in the Brown family of corpora).

[64] Leech *et al.* (2009: 239) acknowledge that a distinction can be made in principle, yet they focus on colloquialization.

The frequency of the semi-modals also differs depending on the text type in which they occur. Ehrman, who published one of the earliest important studies of *The Meanings of the Modals in Present-Day American English* (cf. Hermerén 1978: 22), already reported finding "most of the catenatives [...] in narrative or dialogue" and only three of four modal uses in technical texts (1966: 72). Nokkonen argues that *need to* is more likely to be used in informal contexts. Its increased use can hence be considered indicative of a "trend towards increased informality" (2006: 30). The rise of semi-modal usage is considered one of many signs of colloquialization (cf. e.g. Biber and Gray 2012, Millar 2009: 210). Millar considers the (relative) increase in the use of negative contractions of the core modals in the TIME corpus further evidence for colloquialization (2009: 201-211). Jäger shows that the decline of *need not* in COCA is more drastic than the one of the contracted form (2009: 73) and a similar tendency can be found for COHA (1900- 2009, cf. Ch. 6.1.4).

3.3.2. Democratization

For Fairclough, the democratization of discourse involves the removal of "inequalities and asymmetries in the discursive and linguistic rights, obligations and prestige of groups of people" and the reduction of "overt markers of power asymmetry" (1992: 98). Leech *et al.* define this process as the "reflection, through language, of changing norms in personal relations" (2009: 259). Myhill (1995: 157, 160) identifies a group of "old modals" (i.e. *must*, *should*, *may*, *shall)*

> associated with hierarchical social relationships, with people controlling the actions of other people, and with absolute judgements based upon social decorum, principle, and rules about societal expectations of certain types of people. [...] On the other hand, the new types of modality functions presuppose more or less equal power relationships between people and focus on interactive factors such as mutual cooperation.

Myhill detects this change primarily in the aftermath of the American Civil War, but contends that it was "not totally regular," as "obligation *must* [for example] continued with some frequency (albeit much lower) until World War II" (1995: 196). During the war, the need for clear rhetorics and the "focus on a common goal of victory" seems to have led to an increase in the use of strong expressions of obligation and to a short-term reversal in the decline of *must* (Millar 2009: 213, cf. example (110) below).

> (110) There will <u>have to</u> be many more incidents such as that which took place in the Battle of Midway [...]. For in this second phase the U.S. <u>must</u> take the initiative, must drive the invaders back over their bloody roads of conquest. (1942/06/22, War II, Phase II, TIME Magazine corpus)

It is very likely that this international crisis also boosted the rise of *have to.* The semantic overlap between *must* and *have to* is discussed in numerous studies (cf. e.g. Jacobsson 1979, Smith 2003, Jankowski 2004, Tagliamonte 2004, Close and Aarts 2008, Depraetere and Verhulst 2008, cf. also Ch. 6.2.1). Differences are seen in the formality of the two expressions, the implication of speaker authority (cf. Quirk *et al.* 1985: 226, Nokkonen 2006: 37), the deontic source (cf. Curme 1931: 395, Jacobsson 1979: 311, Palmer 1990: 131, Westney 1995: 151), the objectivity (cf. Huddleston

and Pullum 2002: 205, Leech 2004: 83, Collins 2009a: 60) and / or neutrality (cf. Coates 1983: 55) of the two verbs, the relation to general societal expectations and feelings of other people (cf. Myhill 1996: 349-250), and the ability to express habitual obligation (cf. Jacobsson 1979: 310).

Politeness is another highly relevant factor in communication, as it causes speakers to refrain from choosing the most efficient and rational expressions to reach their communicative goal(s) and opt for a more face-saving strategy (cf. Lampert 1993: 202). *Need to* is often presented as an even weaker (cf. Jacobsson 1974: 59) and more face-flattering alternative to *must* (cf. Smith 2003: 249, Leech *et al.* 2009: 110) than *have to*. According to Leech, the meaning of *need to* is situated between that of *must* and *ought to* on a scale from most to least categorical meaning: The meaning is less certain than that of *must*, but the speaker is less doubtful than when using *ought to* (2004: 102). Other particularly face-friendly expressions are constructions with extraposed adjectives such as *it's essential to* (cf. Hunston 2011: 86).[65]

Need to implies that the necessity is simply the result of the situation in which the subject of the sentence finds itself (cf. Bortoluzzi 1991: 58). It thus allows speakers to distance themselves from the directive force of the utterance (cf. Perkins 1983: 63), disguising their involvement "under a kind of 'objective' statement about the situation" (Bortoluzzi 1991: 58). Leech *et al.* similarly stress that the "strategic value [lies] in 'camouflaging an imposed obligation as being in the obligatee's best interest," as the "mitigating implication [is] 'I'm telling you this for your own good'" (2009: 110). If *we* is the subject, the directive is mitigated twice: (1) The obligation is in the best interest of the speaker and the addressee(s) and (2) it is collective, imposed on a group of people including the speaker and the addressee(s) (cf. Leech *et al.* 2009: 111). It is thus not surprising that Johansson finds an increasing use of *we need you to* + verb and *I need you to* + verb, whose "strategic value" he underlines, in COCA (2013: 377-379). He cites a few interesting comments made by the American journalist Yagoda who notices the frequent use of *need to* "in the currently very popular tense[66] [… he calls the] kindergarten imperative." Yagoda already pronounces the "rhetorically brilliant" verb *need to* victorious over its rivals *have to*, *must*, and *should* (2006). While this popular perception may not be accurate (yet), the increase of *need to* is certainly connected to its particular semantics. Its rise may be attributed to a growing interest in the individual and its personal interests, to a "general tendency to avoid the face threatening force of expressions with an obligation meaning" (Biber *et al.* 1999: 489). As traditional concepts of lifestyle, family, religion, and morality are discarded and individualization in society becomes more important, individuals, who constantly aspire to self-realization, place greater emphasis on their personal needs.

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[65] Myhill detects a trend towards "more 'interactive'" modal functions in 19th and 20th century AmE, but he associates *better*, *should*, *ought to*, and the emotional *got to* (1995: 205, 194-195), thus a group of verbs that can no longer all be called new by current standards (cf. Ch.6.1.4), with these "newer functions."

[66] This misuse of the term 'tense' corroborates Pullum's opinion on the deplorable state of "general public's education" (made in reference to the passive voice), "even when we consider people like professional writers, journalists, and authors of usage guides" (2014: 67).

Fairclough also detects a link between formality of style and democratization. “It is in the more formal types of situations that asymmetries of power and status are sharpest.” An increasing use of informal, more conversational discourse (1992: 294) blurs the division between speech and writing and can help to break up old structures of power. Yet, as Fairclough stresses, covert forms are often used instead of the authoritative modals (2013: 65). The change seems to be merely cosmetic in some cases (1989: 195; Fairclough speaks of a “veil of equality beneath which the real inequalities of capitalist society can carry on”). He draws attention to conversationalization, a process that leads, for instance, to the increased use of simulated dialog, particular vocabulary, elliptical questions, and synthetic personalization. The latter is defined as a “compensatory tendency to give the impression of treating each of the people 'handled' en masse as an individual” (1989: 62, cf. also p. 205), to create the illusion of a private discourse in the mass media (2013: 65). Synthetic personalization is also particularly relevant for my data from COCA, in which it is very common in direct addresses and in imperatives directed at members of the audience (cf. example (111) below).

(111) VAN-SUSTEREN: Up next, we have a new jailhouse tape of Casey Anthony, and it is explosive. Something happens that gets the mother of the murdered Caylee furious with her own parents. You need to see this. Plus, we are live at the scene of today's plane accident with the latest breaking news as we get it. Stay right here. (2009/01/15, “All on board survive plane landing on NYC’s Hudson river,” *Fox Susteren*, COCA)

Fairclough observes that the nature of this new, modified discourse is ambivalent. It can be indicative of a real change towards more democratic processes, but it can also be the product of skillful manufacturing (1994: 265). Smith and Leech believe that if there is indeed such a process as democratization, “the need to express strong deontic modality has lessened” (2013: 77). Close and Aarts similarly propose that a general decline in the use of expressions of strong commitment is responsible for the decline in the use of (root and epistemic) *must*, *should*, and *ought to* (2010: 178). We will see below which explanations best account for the changes observed in the data analyzed here.

4. Data and Methodology

What follows is a presentation of the corpora that served as databases (Ch. 4.1) and an introduction to the methods used in this study that is structured as follows: first, I will discuss various approaches to measuring frequencies and explain the choice made here (Ch. 4.2). Then, I will analyze different methods to detect trends using correlation coefficients (Ch. 4.3) and ways to group data based on their frequency (Ch.4.4). Distinctive collexeme analysis (Ch. 4.5) and other methods to determine statistical significance (Ch. 4.6) are presented. Finally, I will identify competing variants in the semantic field of obligation and define the contexts in which their use will be examined in this study (Ch. 4.7).

4.1. Databases

For the analysis of the use of modal expressions in AmE, two different corpora were accessed, both of which are freely available online via the corpus website of their creator Mark Davies: *The Corpus of Historical American English* (COHA, Davies 2010-) and *The Corpus of Contemporary American English* (COCA, Davies 2008-). These two were among the first English language corpora compiled at Brigham Young University (BYU) and released online, preceded only by the TIME magazine corpus (Davies 2007-). For the present study, COHA and COCA were chosen because unlike the TIME magazine corpus, which already forms the basis of studies on the core modals (such as Millar 2009), they do not only contain newspaper texts, but also fictional texts and scientific writing. Both COHA and COCA are genre-balanced and well structured (cf. Jäger forthcoming, which provides a comparison of the use of the core modals in COHA and Google Books, as well as Pechenick *et al.* 2015).

The Corpus of Historical American English (COHA)

The Corpus of Historical American English, which contains more than 400 million words in more than 100,000 texts from 1810 to 2009, was used to gain information about the use of modal expressions in the course of the 20th century. The corpus, released in September 2010, is composed of texts from four broad registers (Davies himself speaks of "genres," 2015: 305, 2012: 123, 2010b: 453): fiction (48-55% per decade), magazine (22-27% per decade), non-fiction books (11-18% per decade), and, from the 1860s on, newspapers (6-14% per decade, cf. Table A.1 in Appendix A.1). According to Davies, the lack of newspaper texts is due to the difficulty to "find large amounts of 'clean'" data and it is counterbalanced by the inclusion of magazine articles that share similarities with newspapers (2012: 124). From the 1860s on, the corpus "is balanced across decades for genres, and for sub-genres, and domains as well" so that researchers can be "reasonably certain that they are examining 'real word' changes, and that any change they observe is not an artifact of differences in genre balance" (Davies 2012: 123-124). It is important to be aware of the fact that texts from fictional sources dominate if you compare COHA to other corpora (between 48% and 55%).

Since COHA does not contain any data from newspapers published prior to the 1860s, none of the results reported here date further back. The year 1900 was chosen as the starting point for most of the research because of major changes in corpus composition that occur around 1900. Unless indicated otherwise, all figures based on COHA refer to the time span between 1900 and 2009. There are also some important changes after the 1910s (such as an enormous increase in the amount of included newspaper texts) as well as in the 1990s and 2000s (when data from COCA was incorporated, cf. Tables A.2-A.3 in Appendix A.1).

For legal reasons it is not possible to access the full text in both COHA and *The Corpus of Contemporary American English* (cf. Davies 2010a, which is a defense against the criticism that having only restricted access to the data is like "looking through a peephole in a wall," p. 412). The web interface allows searches for up to 10 words left or right of the node word. The key words are displayed in a context of 40 to 60 words. If a particular key word is selected, between 180 and 200 words of context can be seen (cf. Davies 2010a: 414). This expanded context was enough for the analysis of most of the occurrences. A second search for a string of words appearing at the beginning of this context only had to be made in a small number of cases.

The Corpus of Contemporary American English (COCA)

The Corpus of Contemporary American English (henceforth COCA) currently comprises more than 570 million words from fictional texts, magazines, newspapers, academic writing, and spoken language. Its structure was meant to be similar to that of the BNC (cf. Davies 2009: 161). The corpus was released with roughly 385 million words in early 2008 (cf. Davies 2009: 159) and is regularly updated, the last time in December 2017 (prior to that in May 2016, June 2012, April 2011, August 2010, August 2009, October 2008). A large share of the work for this study was done prior to the last updates when only data until 2009 was available. Today the corpus also encompasses texts and transcripts from 2017 (cf. Table A.4. in Appendix A.4). The search syntax was equally simplified in May 2016. Nonetheless, the old one, which contained many square brackets and full stops and which was used here (cf. Appendix A.3), can still be applied.

To analyze the use of modal expressions in American English, the spoken language section was chosen because spoken AmE has only very rarely been used as a source of data in similar studies (cf. Ch. 3 above). The spoken language section comprises transcripts from television and radio broadcasts (such as *Science* (*NPR*), *Meet the Press* (*NBC*), *NewsHour* (*PBS*) etc.). The most important sources (from largest to smallest contributors of words) are listed below in Table 13. A spreadsheet with additional information can be downloaded from the corpus website.

In light of the impossibility to analyze all occurrences of a single phenomenon and the necessity to reduce large amounts of data to representative samples, only data for the years 1990-1994 and 2005-2009 were exploited for the semantic analysis. (When the first investigations into the use of modal verbs were made, the latter period was the most recent one for which data was

available.) In the case of very frequent verbs, the analysis was restricted to the years 1990 and 2009. For the analysis of *should*, *ought to*, *have to*, and *want to* the only four programs from which data from both 1990 and 2009 was available, PBS *NewsHour* (1,307,867 words), *ABC Nightline* (1,080,560 words), *ABC 20/20* (358,094), and *ABC Primetime* (312,971 words), were selected. Unfortunately, the 1990 subsection is much bigger than its 2009 counterpart (496,464 vs. 174,601 words, cf. Table A.5 in Appendix A.1 for details). However, an argument in favor of these news-magazines is that they cover a variety of topics.

> 1,000,000 words	*PBS NewsHour*, *ABC Nightline*, *CNN King*, *NPR Talk of the Nation*, *NBC Today*, *NPR ATC/W (All Things Considered)*, *CBS Morning*, *NBC Dateline*, *ABC 20/20*, *ABC GMA (Good Morning America)*, *CBS Sixty*, *NPR Morning*, *CBS 48Hours*, *ABC Brinkley*, *Independent Geraldo*, *CNN Crossfire*, *NPR Science*, *ABC Primetime*, *NPR Fresh Air*, *CBS Early*, *NPR Weekend*, *NPR Saturday*, *NPR Sunday*, *Independent Limbaugh*, *ABC This Week*, *CBS Face of the Nation*, *CBS Sunday Morning*

Table 13 TV programs constituting sources of the spoken language section of COCA

The programs in the spoken language section of COCA, which feature political discussions, news interviews, and news reports, have institutionalized generic structures (cf. O'Keeffe 2006: 20) with some formulaic sentences, particularly at the beginning and the end of a segment, but according to the information available on the website until 2016, an estimated 95% of the material is unscripted conversation. This number seems higher than expected. Speakers are aware that they take part in a television or radio show and may therefore alter their language, e.g. to avoid profane language, dialect, or certain pronunciations, but many characteristics of "natural conversation" are still met: Speakers frequently repeat, correct, and interrupt themselves or others or finish each other's sentences (cf. Biber *et al.* 1999: 1038-1107). Davies indicates that the spoken language section contains "almost completely spontaneous" speech and represents non-media English [well]" (2009: 162).

O'Keeffe (2006: 20) draws attention to the fact that the interactions of the participants in TV shows take place within the framework of a particular "institutional generic structure ([…] imposed on radio or television programmes by the broadcasting institutions)" that

> dictate[s] its structural character in terms of length of interactions, the time at which these interactions take place, the duration of the show, the sequence and range of topics, the number of commercial breaks, the sequencing of events, and so on.

Hence, you find a considerable number of references to time constraints. The obligation to comply with the program's structure gives rise to the use of many objective deontic expressions, such as in the following example.

(112) "[…] we'll do it next segment, because <u>we have to take a break now</u>, because next on CAPITAL GANG, the U.S. wins at the U.N." (2002/11/09, "Gephardt steps down as house minority leader," *CNN Cap Gang*, COCA)

Many of the programs feature experts who talk about news events and give recommendations about the best course of action, making this type of corpus data particularly prone to containing statements of personal opinions. Van linden makes a similar observation about deontic constructions

enabling the speaker to advocate the realization of a certain state of affairs in the real world. She notes that they are particularly frequent in newspapers and radio broadcasts "in which the (reported) speaker ventilates his/her opinion about a specific state or event" (2010a: 728). This very specific nature of the corpus should be kept in mind when the findings presented in this study are discussed.

Note also that the transcripts are made by companies like Factiva or Lexisnexis and not by linguists for linguistic purposes. Therefore, different standards and conventions apply. This will become relevant when it comes to the analysis of forms that are stigmatized and considered characteristic of oral speech (such as *hafta*, *gotta*, *wanna*, or *needta*) and are consequently not transcribed as they are pronounced (cf. Ch. 6.2.2 and Ch. 6.2.5).

Difficulties in Data Extraction

Inevitably, as Elsness put it, "the linguist [is] at the mercy of his [or her] corpus" (2009: 231), and unfortunately, working with COHA and COCA posed certain problems. As mentioned in a discussion about the (dis-)advantages of large and small corpora in *The Oxford Handbook of the History of English* (cf. Davies 2012 and Hundt and Leech 2012: 178-179), an argument in favor of small corpora is the existence of accurate, manually corrected part-of-speech tagging – something that is impossible to achieve in mega corpora like COHA (without user participation). Davies reports that manual checks of approximately 100,000 types that were three times as frequent in COHA as in COCA (2012a: 125) were carried out by students to ensure a good quality of the part-of-speech tagging (which was done with Paul Rayson's CLAWS tagger as in the BNC), but some errors remain. The sum of all tagged words identifiable online does not add up to 100% (cf. Figure A.1 in Appendix A.1). There are two periods during which the discrepancy to 1,000 words per million is particularly high, i.e. between 1923 and 1928, when the frequency drops to 978.4 in 1924, and from 1991 on, with a peak of 1014.7 w/m in 2008. The frequencies that can be derived from the spreadsheet on the corpus website also deviate from those used for calculations on the web interface.[67] The differences are particularly high in the 1920s (cf. Figure A.2 in Appendix A.1), which is why the numbers in this decade should be considered with some caution.

On the web interface the number of incorrectly tagged words was often not noticeable. However, in manual analyses of the context of the examined expressions in COCA (and in the case of *need (to)* in COHA), high numbers of mistagged occurrences (e.g. 33% of all the occurrences in the case of *need* such as "we need lower taxes" in *PBS NewsHour*, 1997, COCA) were sometimes identified and discounted. The few existing spelling errors and word fusions (e.g. "abandonedthe"

[67] The automatically displayed frequencies pmw were not correctly calculated when the search was restricted to a particular corpus section or period of time (since the total number of words in the whole corpus was used for the calculation). The mishap is also apparent in Davies (2012: 142). In personal correspondence in May 2013, Davies stated that he had not gotten around to fixing this "bug" yet. The problem persisted until the analysis of the data for this study was completed. Since May 2016 the frequency of a search string in a particular corpus section can no longer be compared automatically over time unless a virtual corpus is created or the results are extracted.

tagged as a the base form of lexical verb), accounting for about 0.15% of the data[68], did not cause any troubles worth mentioning.

In personal correspondence Davies recommended the n-gram dataset: "Because of limits via the web interface, this [the web interface] won't give you full results." Yet, according to Davies, for simple searches "like *could* / *have to* (and 99% of other queries), the web interface is fine" (2013/03/05). Since November 2011 the 1-, 2-, 3-, and 4-grams that occur at least three times in COCA can be downloaded without cost. The data from COHA can also be purchased. Had the aim only been to determine frequencies, this would have been very useful. Since it was essential to be able to read the context of a modal expression to identify its meaning, using n-grams was not an option.[69]

The existence of duplicates in the corpus data, which were generally automatically eliminated with the 'remove duplicates' function in Microsoft Excel when the keywords in context were extracted from the corpus[70], is a bigger problem. The number of duplicates varies greatly in both COHA and the spoken language section of COCA. Duplicates accounted for as much as 18% in a sample of about 11,000 occurrences of affirmative *need/s to* in COHA, but only for 0.2% in 20,000 sentences obtained in the same type of search in COCA, and there were no duplicates in 427 occurrences of *need* + infinitive in COCA. When data for a collexeme analysis were extracted, only 1% of 11,175 occurrences of *should* + infinitive, but 17.% of all 15,854 occurrences of *have to* + infinitive and even 27.9% of 15,739 occurrences of *need to* + infinitive were duplicates. The existence of such a high number of duplicates may partially be explained by the fact that snippets of information are often reprised by various TV channels in the corpus data. In a large number of cases, particularly in searches in the spoken language section of COCA, duplicates were removed. For COHA this was only done whenever manual editing of the data was necessary, i.e. for *need* and *need to*, *be to*, and the nouns. Copying all the data from COHA would not have been possible. We have to assume, then, that there is either a considerable number of duplicate texts in the corpus or that there is a problem with the mechanism responsible for retrieving the data and displaying the concordance lines. The frequencies reported here would thus only be absolutely correct if all the data were manually post-edited. They are a little too high when the frequencies are simply copied from the corpus.

In spite of these problems, both corpora are very valuable tools for linguistic analysis, offering access to large quantities of data. COHA and COCA are huge compared to the 3.3 million words of ARCHER 2 or to the one-million-word corpora of the Brown family or of the ICE family. COHA

[68] Cf. <http://www.ngrams.info/download_coha.asp> (2016/10/12).

[69] A downloadable full-text version of COCA was available only from March 2014 on, thus too late for use in this study. For copyright reasons, only 95% of the data can be seen (every 200 words, ten words are removed).

[70] This function is now also available online (2017/07/30).

and COCA are even more than four times bigger than the BNC. This has the advantage that researchers find more examples of a particular phenomenon and thus have a more robust database, less likely to be distorted by particularities found in certain idiolects, text types, or by unusual events reflected in writing or speech. Additionally, even low-frequency items, such as progressive *need to* or modal adjectives like *critical* and *crucial*, which are rare or even nonexistent in smaller corpora, can be found in these large text archives. Meaningful conclusions can still be drawn then.

Both corpora have the advantage that the frequencies for all years can be determined. While there is, of course, some variation and a certain number of outliers can be found, trends are easier to spot than in other corpora where texts are grouped into larger periods of time (e.g. ARCHER) without any possibility for the researcher to divide the data into other, more meaningful units than those built into the corpora. A method to group the data based on their frequency, variability-based neighbor clustering, is presented in Ch. 4.4.

In favor of COHA and COHA, it should also be stressed that the BYU corpora are accessible online and free of any charge.[71] In contrast to that, using most other corpora requires a license, which effectively reduces the number of researchers to the privileged few who work at the institutions where the corpora were originally compiled or whose universities have the funds to grant them access, or to the handful of individuals who have the financial means to afford paying considerable sums. This also entails that the results of studies based on these corpora can only be replicated and that the steps can only be retraced by the very same group of people. Freely accessible corpora, however, can easily be used by all language enthusiasts, by experienced professionals as well as by novices in the field learning to recreate, refine, and eventually expand previous studies. They allow researchers whose interest has been aroused, i.e. by a colleague's study in which only a limited number of examples could be given for reasons of space, or by some fascinating observation made in everyday life, to satisfy their curiosity and to dive into the corpus data themselves. The BYU corpora thus give everybody the opportunity to check results and to make new discoveries, thereby contributing to a sort of democratization of linguistic research.

[71] However, the number of queries that can be made and keywords in context that can be accessed per day is restricted, depending on the status as a researcher, semi-researcher, non-researcher, or unregistered user. Since 2015, holders of a so-called "premium account," who make financial contributions, have been given more privileges. This recent "push for contributions" is aimed at generating income for the BYU corpora for the period after Mark Davies' retirement (Davies 2016).

4.2. Measuring Frequencies

In this study the frequencies of the analyzed expressions will be normalized per million words as is the standard practice in most studies of modal verbs (a noteworthy exception being the Brown corpora where raw numbers are given) to enable comparisons between different corpora or corpus sections (cf. Smith and Leech 2013: 70-75).

Another way of measuring changes that is often deemed more reliable and "linguistically […] better" (Smith and Leech 2013: 72), the direct comparison of one variant to competing variants or opportunities to occur (cf. Ball 1994: 297-299, Nelson *et al.* 2002: 260-261), will also be discussed here because it has some relevance for this study. Bowie *et al.* argue that it is impossible to determine whether a change in the use of modal verbs is simply a result of variation in the number of (tensed) verb phrases (2013: 67). Hence they and Aarts *et al.* (2013) propose measuring changes in frequency per tensed verb phrases because "modals cannot occur in non-tensed VPs (e.g. **He wants to can drive to work*, cf. *He wants to be able to drive to work*)" (Bowie *et al.* 2013: 65). The use of tensed verb phrases (tVP) makes it possible to "eliminate[ ] as much extraneous variation as possible" (Bowie *et al.* 2013: 65). Changes are then measured in simple swing (p_2-p_1) or in percentage swing, i.e. with the formula (p_2-p_1) / $p1$, where p_1 and p_2 are the proportions of use (per tVPs) from the first and second subset of data (cf. Bowie *et al.* 2013: 69).

With regard to DCSPE Bowie *et al.* (2013: 66) observe that there is no noteworthy discrepancy in the overall number of tVPs, whereas there is much more variation in the number of tVPs in the different text categories. Interestingly, both methods allow them to identify a decrease in broadcast discussions, telephone conversations, and broadcast interviews, but each method indicates substantial changes in three other categories as well. In COHA (cf. the approximation[72] to tVPs in Figure 2 below) there is a highly significant correlation between time and frequency (expressed by the τ-value, cf. Ch. 4.3 for an explanation of the method) and a small increase of 7 tVPs per year on average (indicated by the slope of the linear function in Figure 2; the extreme values in the 1920s may be due to incorrect word counts, cf. Appendix A.1).

When these tVPs are taken as a baseline for the calculation of the frequencies of the core modals, the frequencies of the verb *must* indicated by blue dots in Figure 3, measured in percentage of tVPs (y-axis label on the right side), are obtained. The frequencies per million words are shown

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[72] The term 'approximation' is used here because the part-of-speech tagging is not 100% reliable. Various searches were performed: The number of modal verbs [vm*], past tense forms ([v?d*], and present tense forms was determined ([v?z*] and [vbr*] and, to be on the safe side and exclude cases where the verb form is preceded by *to* (such as *to popularize* and *to make* in example 23), –to [v?o*]). The results may, however, include such cases as *sell* in example 23 and past participles of lexical verbs or *have* [vv/hn*] in-correctly tagged as past tense forms [vv/hd*].

(FN 23) The problem was not so much to popularize travel or sell individual tours as to make rail-riding look attractive once more. (1935/06/10, "Rail romance." *Time Magazine*, COHA)

The number of tVPs in the spoken language section of COCA could not be determined since a search for all base forms of lexical verbs that are not preceded by *to* (-to [vv0*]) could not be made (both items in the two slots of the search occur more than 10,000,000 times in the corpus). No information about the year of utterance is given in the list of n-grams that can be used instead of the web interface.

in red color (y-axis label on the left side). In both cases there is a highly significant correlation between time and frequency. The trend line for *must* declines by 764 words per million or by 1.7% of all tVPs a year between 1900 and 2009. Interestingly, the relative loss in frequency is higher when measured per tVPs (-81%) than when it is indicated per million words (-64%), yet the decline of the verb *must* is evident in both cases, regardless of the chosen measure of frequency.

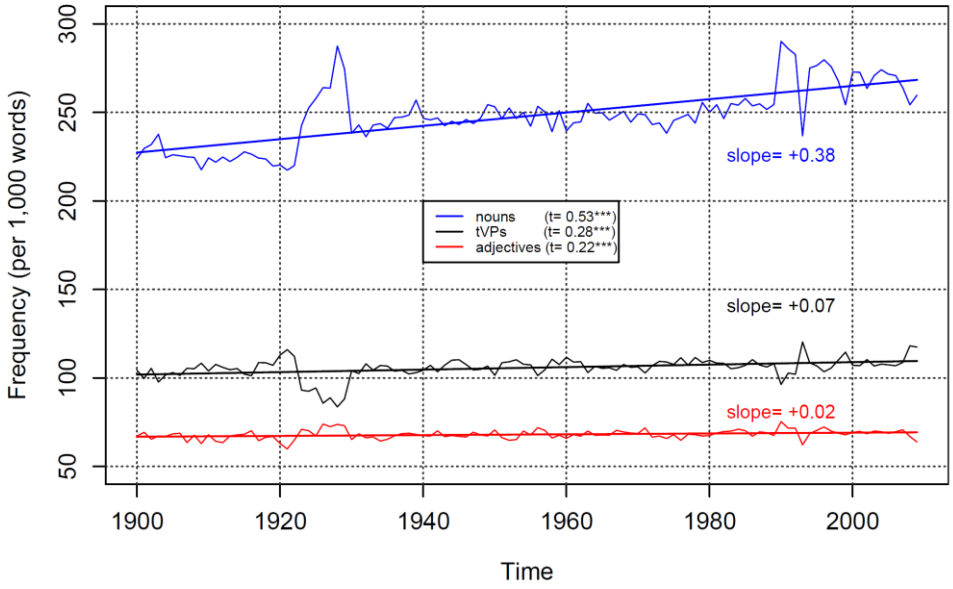

Figure 2 The frequencies of nouns, tensed VPs, and adjectives in COHA

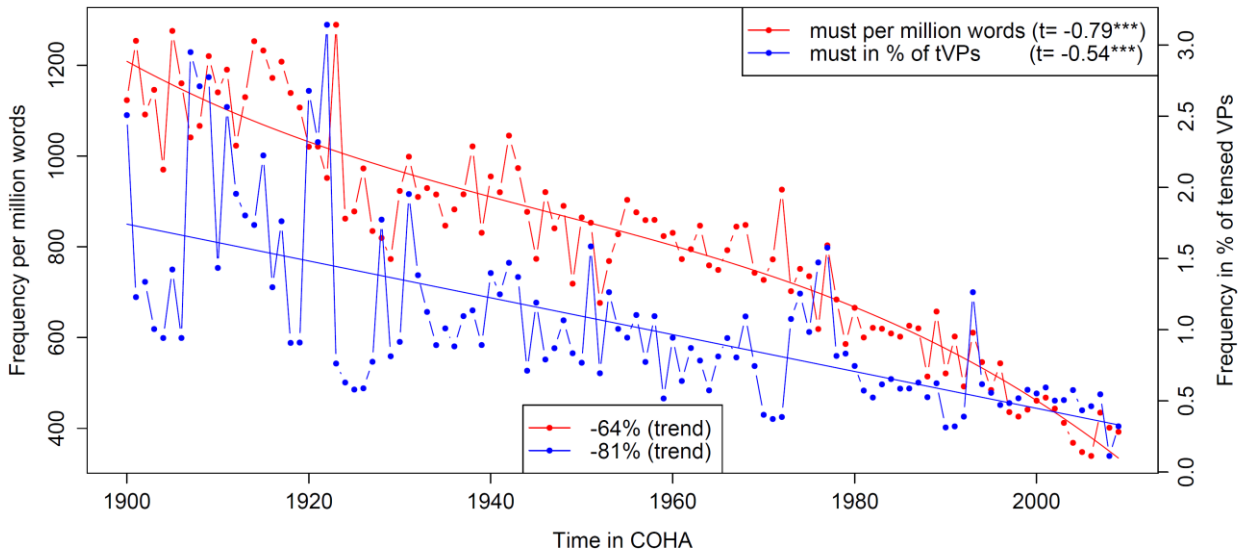

Figure 3 The frequency of *must* (verb) per million words and per tensed VPs in COHA

While there is undoubtedly a point to be made for working with tVPs when modals are analyzed, tVPs are no longer useful when modal adjectives and nouns are also taken into account. As Figure 2 illustrates, both nouns and adjectives undergo a highly significant increase in frequency between

1900 and 2009. This ties in with findings that we seem to be witnessing a trend towards an "increased 'nouniness'" (Leech *et al.* 2012: 78-79, cf. also Mair *et al.* 2002, Leech *et al.* 2009: 207-222, Biber and Gray 2011: 228, 2013[73]).

Figure 4 below shows the frequency of the noun *NEED* (sg. + pl. forms). We see an increase of 0.35 w/m per year and an overall increase of approximately 31% between 1900 and 2009. When all the nouns in COHA constitute the baseline for the calculation of the frequency of *NEED* (blue line), the frequency increases by 0.0084 % in 109 years, corresponding to 15% of its original value. Here, as in the case of the verb *must*, there is a difference between both methods of about 16-17%. Again, the tendency towards an increase is evident in both cases and there is a highly significant correlation between time and frequency.

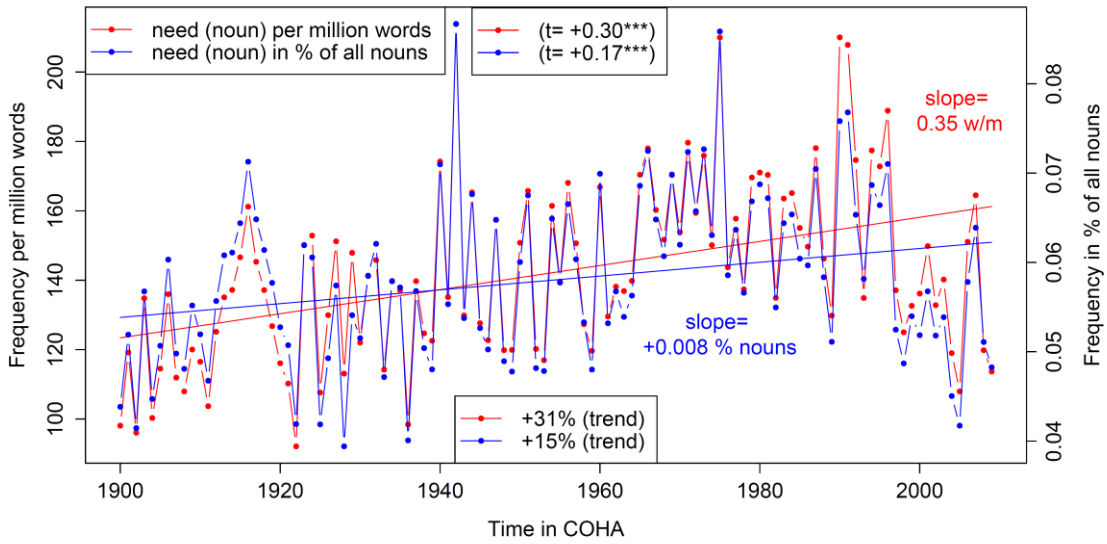

Figure 4 The frequency of *need* (noun) in w/m and in relation to the total number of nouns in COHA

These differences between using frequencies per million words or percentages of tVPs / nouns etc. should be kept in mind as we proceed in the analysis. While the latter approach certainly has the advantage that it excludes the influence any variation in the number of (t)VPs (or nouns etc.) may have, it does not take the interaction of all competing variants into account. In contrast to Bowie *et al.* (2013), I will not only look at core modals, but also consider their other competitors, i.e. semi-modals, adjectives, and nouns of obligation and necessity, and determine their meanings in the spoken language section of COCA. Given the large number of lexical expressions of modality (cf. e.g. Leech 2013: 108) and the difficulty of (automatically) retrieving them from a corpus (cf. Bell

[73] It may be added that text types are an important factor for the development of nouns and verbs. Biber and Gray observe an increase in the use of nouns from the 19th to the 20th century in academic writing, newspapers, and (to a lesser extent) in novels, but they detect a decline in fiction in BrE (data from ARCHER supplemented with texts from journals and newspapers, 2013: 104-107). They find a marked decrease in the use of simple VPs (no marked aspect, voice, modality) in science research articles (but not necessarily in non-science and popular science articles, 2013: 111). However, analyzing the use of nouns, tVPs, and adjectives in various sections of COHA would be too time-consuming here.

1994: 295-296, Smith and Leech 2013: 74[74], and Ch. 4.7), it may not be possible to identify all of them here, but I will aim for an approximation. In the meantime, the frequency of the analyzed expressions is measured per million words or, when the constructions are particularly rare or very fine distinctions are made, per ten million words. Yet at the end of this study, all analyzed expressions of modality will be used as a baseline for comparison (cf. Figure 68 and Figure 69 in Ch. 7.1).[75]

Since the ensuing analysis will be restricted to declarative clauses and exclude any occurrences of modals, adjectives, and lexical verbs of obligation in interrogative clauses (cf. Ch. 4.7 below), it would also be conceivable to use declarative clauses in general as a standard of comparison. Determining their frequency in large corpora like COHA and COCA is, however, impossible (for one human being alone) because a close reading of all potentially declarative clauses cannot be undertaken.

Considering that a decline of modalized declarative clauses might be counterbalanced by an increase in the use of interrogative clauses, for instance, I searched for the question mark in COHA and noticed a rise in frequency ($\tau_{dec1860\text{-}2009}$= 0.46**) until the 1970s, followed by a period of decline towards the turn of the 20th century. A similar search could not be done on the web interface of COCA. However, to conclude that there is a link between the decline of the modals and a (supposed) increase in the use of questions is impossible without thorough research.

[74] After a discussion of the advantages and disadvantages of the proportional and the variants / variable approach, Smith and Leech also opt for using the normalized frequencies pmw as the standard approach in the ensuing analysis, supplemented, when they have the means to do so, by the proportional method (2013: 74-75).

[75] Note that Bowie *et al.* eventually also choose to use the frequency of all modals as a baseline for the comparison of specific modals because "the patterns of change for individual modals were obscured by the overall pattern of modal decline" (2013: 86).

4.3. The Detection of Overall Trends

In order to determine whether there is a correlation between the frequency of a certain expression and different periods (years, decades etc.), a rank-order correlation is used (unless indicated otherwise, the values from COHA refer to the period between 1900 and 2009.). The most common correlation (cf. Gries 2010: 280) is Pearson's product-moment correlation *r* (used, for instance, in Biber 2012). Since *r* is more sensitive to outliers and requires that all variables involved be interval-scaled, Hilpert and Gries propose using Kendall's *tau* (τ) instead (2009: 389). Like Pearson's *r*, *tau* is close to 0 when there is (almost) no correlation between time and relative frequency and close to +1 or -1 when there is a strong positive or negative correlation. *P*-values smaller than 0.05 signal that the correlation is statistically significant (cf. Hilpert and Gries 2009: 390, Gries 2010: 280). The calculation is made with the `cor.test` function in R. Almost all τ-values presented here are based on the frequencies per year; when decade averages were taken into account, this is indicated by τ_{dec}. Instead of the exact p-value generally indicated in R, I will use asterisks to show that $p \leq 0.001$ (***), $p \leq 0.01$ (**), $p \leq 0.05$ (*), or $p > 0.05$ (ns, i.e. not statistically significant) in graphs as well as in my text. A simple *t* is used instead of τ in R graphs.

To capture trends in scatterplots, I will use linear functions and, if there is is a statistically significant improvement in the model, polynomial functions. Whether this is the case is identified with the ANOVA function, which compares two different models at the same time. Second and third degree polynomial functions are chosen instead of linear functions if there is a considerable improvement in the amount of variance that is captured. I usually only specify the degree of the polynomial function instead of the entire function. The R^2 adjusted value indicates how much variance in the data is explained by the model. The closer R^2 is to 1, the more variance is accounted for. To determine the overall size of an increase or a decline in COHA, the first and the last value of a function are generally used instead of the exact frequencies at the beginning and the end of a particular period. Any distorting influence individual values may have are thereby ruled out (cf. Figure 5).

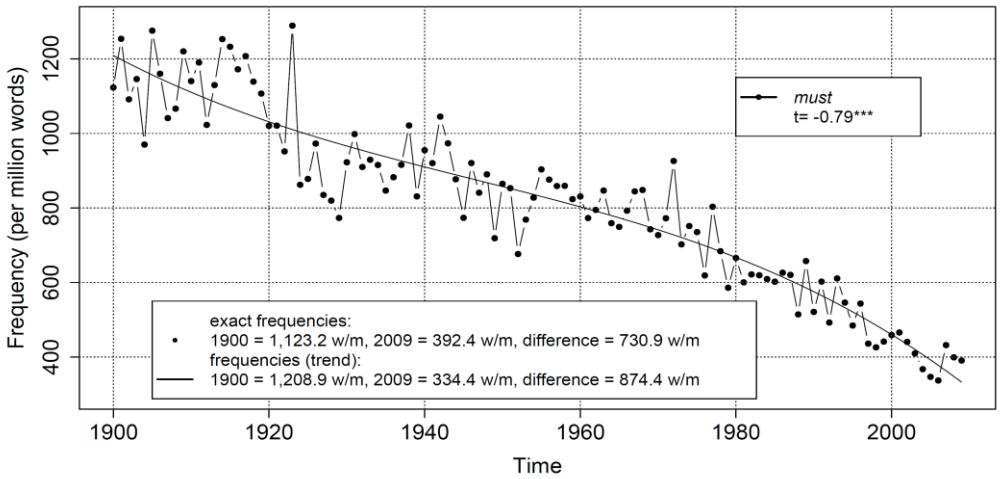

Figure 5 *Must* in COHA

4.4. Data Periodization via Variability-Based Neighbor Clustering

In order to identify stages in the use of the examined (semi-)modals, adjectives, and nouns in COHA not solely on the basis of a visual inspection by the researcher but with a data-driven bottom-up method, variability-based neighbor clustering (VNC) can be used (cf. Gries and Hilpert 2008). Step by step, the two immediately adjacent data points that are most similar to each other (the distance is measured in standard deviations) are merged until only one cluster is left (cf. Gries and Hilpert 2012 for a detailed description of the process and the logic of the VNC R code, and the companion website of the *Oxford Handbook of the History of English* for an R workspace made available by Gries and Hilpert[76]). The clusters determined via VNC are displayed in a dendrogram (as in regular clustering approaches). The distance on the y-axis indicates the sum of the standard deviations for the different clusters (cf. Hilpert and Gries 2009: 391). The scree plot (on the left side in Figure 6) "shows how much dissimilarity is covered with a one-cluster solution, a two-cluster solution, a three-cluster solution etc." (Gries and Hilpert 2012: 140). The aim is to cover as much distance as possible with a small number of clusters.

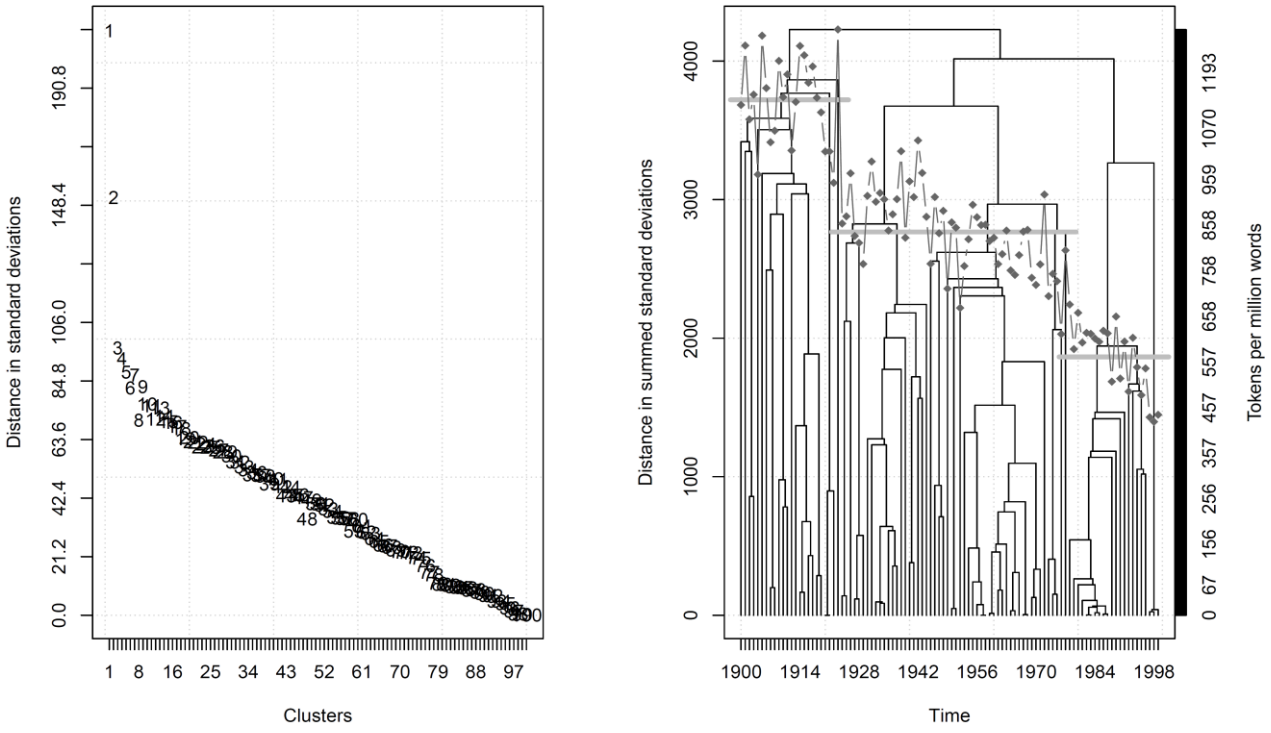

Figure 6 VNC for the verb *must* in COHA (years)

This is best illustrated by an example. In the case of *must* in COHA (overall corpus frequency), the scree plot in Figure 6 (left panel) clearly shows that the distances between one and two as well as

[76] I had access to two different R workspaces for the analyses. The first one I worked with was e-mailed to me by Martin Hilpert, to whom I am very grateful for this, in January 2012. Here the number of periods to be indicated in the amalgamation plot can be determined manually and are then displayed in an amalgamation plot on top of the dendrogram. The R workspace made available by Hilpert and Gries, however, has the advantage that the dendrograms can be enlarged up to a point where it is possible to identify the exact starting and end points of the selected periods (for more differences and information about the procedure see Appendix A.2).

two and three clusters are considerable compared to the very small distances that separate all following numbers of clusters. It is therefore best to distinguish three different periods. Enlarging the dendrogram makes it possible to identify the starting and the end points of these periods (which are indicated by grey lines in the amalgamation plot in the right panel of Figure 6). The average frequency is highest (1134 w/m) between 1900 and 1923 (the highest frequency of the century, 1,289 w/m, is found in 1923). The second period (with an average frequency of 868 w/m) begins in 1924 and lasts until 1977 (in 1976 the frequency drops below 700 w/m for the first time), the last period until the end of the century (average frequency: 543 w/m, cf. right panel of Figure 6).

VNC-analysis is used for the identification of stages in the development of the frequency of use of various (groups of) expressions in this study. Generally, yearly frequencies serve as the baseline. They are most of the time given preference over decade averages because they often provide clearer results and are more robust (cf. Appendix A.2 for a dendrogram based on decade averages in the case of *must*). Extreme outliers were of course eliminated (cf. e.g. Ch. 6.2.3) in order to avoid any distortion of the results.

4.5. (Multiple) Distinctive Collexeme Analysis

Since "[t]he meaning of words lies in their use" (Wittgenstein 1953: 43; cf. also Firth 1957: 11), the collocations of the analyzed modal expressions will be examined. In order to compare and contrast the collocational profiles of two (or more) constructions such as negated *need* and *need to* (cf. Ch. 6.1.4) in COCA, the use of *be to* in the 1930s, 1960s, and 1990s in COHA (cf. Ch. 6.1.6), and the distinctive collexemes of all 30 analyzed expressions spoken language section of COCA (cf. the respective chapters as well as Appendix F), (multiple) distinctive collexeme analysis[77] ((M)DCA, cf. Gries and Stefanowitsch 2004) is used. In this approach, the strength of association of a verb to a particular construction is calculated against the verb's frequency in one (or several) other construction(s). (By contrast, the frequency of the verb in the entire corpus is used as a base-line in collexeme analysis, cf. Stefanowitsch and Gries 2009: 944.) The Fisher-Yates exact test, a test that neither re quires a particular sample size nor makes any assumptions about the distribution (Gries and Stefanowitsch 2004: 101), is chosen for this kind of analysis.

The freely accessible collexeme analysis R script developed by Gries (2014) was used. The required input is either a tabulated list of the occurrences containing the frequency information (such as Table 14) or a raw list of all occurrences. Whenever possible, tabulated lists served as input, as the information how often a particular infinitive is used with either construction could easily be retrieved from the corpus (using the list display[78]).

	worry	other verbs
negated *need*	226	2,109
negated *need to*	146	3,466

Table 14 Input for distinctive collexeme analyses

However, when three or more alternatives are compared (MDCA), here when the collexemes of all analyzed modal verbs, adjectives, and lexical verbs are contrasted[79], the Fisher-Yates exact test can no longer be used.[80] Instead, Gries implemented a one-tailed exact binomial test in his script which requires a list of all tokens as imput. Such a list had to be created with the frequency information obtained from the corpus. For this purpose, a search for the infinitives of lexical verbs after all analyzed expressions in the spoken language section of COCA was made. The nouns *demand*, *necessity*, *need*, *obligation*, *request*, and *requirement* were excluded (because of the necessity to

[77] MDCA is used instead of the mutual information (MI) score that can be displayed on Davies' web interface (cf. Cappelle and Depraetere 2016 for a discussion of the merits of the different methods).

[78] The queries used are *need.[v] [x] [vvi*]* and *do|does [x] need.[v*] to [vvi*]* in all text types in COCA, 1990-2012.

[79] i.e. *must*, *should*, *shall*, *ought to*, *(had/'d) better / best*, *be to (*only 1990-94 and 2005-10), *need to*, *have to*, *want to*, *bound to*, *supposed to*, *forced to*, *required to*, *compelled to*, *necessary / essential / imperative / critical / crucial / essential to / that* (present tense forms only). See Appendix F for the respective queries. Nouns were not taken into account because of the difficulty to determine the tense of the clause in which they are used.

[80] Gries (2014, information in the script) explains that the "so-called multinomial test, an exact test with sampling without replacement for 2+ alternatives […] only gives you a single *p*-value and, thus, doesn't tell you where some deviation actually comes from. […] Thus, this script uses an approximation to the multinomial test, namely the one-tailed exact binomial test. This test is still an exact test, i.e., it is not sensitive to low frequencies.

identify the infinitives in *that*-complements manually), and only the passive forms of the examined lexical verbs were taken into account. Including the infinitives *be*, *do*, and *have* was not possible since the additional data would have made the calculation too computationally intensive. The extracted data were imported into a spreadsheet. A macro that read the tabulated information and transformed it into a list with the corresponding number of infinitives was run. The resulting list with 241,310 rows formed the basis of a MDCA that allowed me to see which infinitives are attracted to particular modal verbs, adjectives, or lexical verbs and which ones are repelled by them. The results are shown in the respective chapters (cf. also Appendix F).

Gries' collexeme analysis script outputs a list of the compared variables that contains information about the strength of association either indicated by $\log_{10}$-transformed probability values (DCA with only two constructions) or by p_{FYE}-values (in the case of MDCA). In both cases the values need to be higher than 1.30103 to signal that the chance that the null hypothesis is true is smaller than 5%. If CollStr or pbin is higher than 2, then $p<0.01$; if CollStr or pbin is higher than 3, then $p<0.001$).[81] To facilitate the distinction between attracted and repelled verbs in MDCAs the logs, which are positive by default, are set to negative when the observed frequency of a verb is smaller than the expected frequency (cf. Gries and Hilpert 2008: 67-68). In the tables below the negative sign is omitted since the infinitives are displayed in separate columns.

The use of Biber *et al.*'s classification of single-word verbs (1999: 361-364) into activity verbs (e.g. *buy*, *carry*), communication verbs (e.g. *say*, *tell*), mental verbs (e.g. *require*, *help*), verbs of facilitation and causation (e.g. *enable*, *permit*), verbs of simple occurrence (e.g. *change*, *develop*), verbs of existence or relationship (e.g. *seem*, *contain*), and aspectual verbs (e.g. *keep*, *stop*) made it possible to detect usage patterns. Likewise, a crossmatch with the top 100, 500, and 1,000 most frequent infinitives in COCA (spoken, 1990-2012) revealed highly frequent and rare collexemes.

Hilpert (2006, 2012) demonstrates the benefits of MDCA for diachronic analyses, uncovering, for instance, collocational shifts in the use of *may* (2013). Instead of comparing different constructions at the same point in time, the collocations of only one construction at a certain point in time are compared to those encountered in other periods. Ideally, these periods are identified via variability-based neighbor clustering and not dictated by the setup of the corpus (cf. Hilpert 2012). For the moment, a synchronic comparison of analysis of 20 different expressions is made, but identifying changes over time in COHA might be a fruitful avenue for further research.

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[81] Another information provided by Gries' DCA script (comparison of two constructions) is delta *p*, a directional association measure first proposed by Ellis (2007) and defined as

$\Delta P = p$ (outcome | cue = present) – p (outcome | cue = absent) (Ellis 2007, quoted by Gries 2013a: 143).

ΔP indicates whether the presence of the cue (in my case an infinitive or a modal verb) increases the likelihood of the outcome (here: the combination of the modal with the infinitive in question), in which case the ΔP-value approaches +1.0, or decreases the chance of the outcome (ΔP approaches -1.0). A ΔP-value approaching zero suggests that the occurrence of the outcome is as likely when the cue is present as when it is not (cf. Gries 2013a: 143). The modal verb is never a good cue for its occurrence with the infinitive in my cases (>10.061), whereas the infinitive is always a better indicator for the outcome. Since this information (its occurrence with a particular construction) is conform with what we would naturally expect, it is generally omitted.

4.6. The Determination of Statistical Significance

In many studies log-likelihood tests (LL or G^2) are used to determine whether a change in frequency is statistically significant (cf. e.g. Leech 2003: 228, Smith 2003, Meyer 2002). Dunning argues that the main advantage of this test is that it can be applied to "very much smaller volumes of text than is necessary for conventional tests based on assumed normal distributions" (1993: 65-66). Yet Agresti claims that "χ^2 is valid with smaller samples sizes and more sparse tables than G^2" (1990: 246). McEnery *et al.* stress that when one expected frequency is smaller than 5, both tests can be unreliable and using Fisher's exact test is preferable (2006: 56).

The chi-square test is primarily used in this study to determine whether the changes in the distribution of the (frequencies of the) meanings of the analyzed expressions in COCA are large enough for us to assume that they are not merely the result of chance. When one expected frequency is smaller than 5, Fisher's exact test (in R) is used instead. If this is the case, it is indicated by the subscript letters *fe* after the *p*-symbol, i.e. p_{fe}. The expected values and Pearson residuals were calculated as follows:

Expected values: $$\frac{row\ total\ \ x\ \ column\ total}{total\ number\ of\ cases\ overall}$$

Pearson residuals: $$\frac{observed\ value - expected\ value}{\sqrt{expected\ value}}$$

The Pearson residuals[82] indicate where the biggest differences between the observed and the expected values are. If they are higher than 2 or smaller than -2, the difference is statistically significant. This suggests that given the overall tendency towards de-/increase of the analyzed expression it is highly unlikely that the de-/increase of a particular meaning is simply the product of chance.

Cramers' *V*: $$\sqrt{\frac{\chi 2}{total\ number\ of\ cases\ (\min[n_{rows}, n_{columns}]-1)}}$$

Cramer's *V*[83] is used to give us information about the effect size. The closer it is to 1, the higher the effect (0= no correlation; 1= perfect correlation, Gries 2009: 172-173). Effect sizes between 0.1 and 0.3 are considered small, those between 0.3 and 0.5 medium, and all values equal to or above 0.5 can be qualified as large effects (cf. Gries 2013b: 371).

[82] Cf. <https://stat.ethz.ch/R-manual/R-patched/library/stats/html/chisq.test.html> (2015/05/01)
[83] The phi-coefficient is not used since we are always dealing with *k* x *m* tables where *k* or *m*> 2.

4.7. Knock-Out Contexts

In many studies of modal auxiliaries, all tenses and forms are considered (cf. e.g. Leech 2003, 2011). Since this seems to be the standard approach, it is often left unspecified. Aarts *et al.*'s recent study (2015: 15) is a rare exception, as the authors indicate that all forms of modal auxiliaries are included in their first count, i.e. also negated forms and contractions. (For comparison, you find the frequencies of all core modals and semi-modals analyzed here in Appendix B.) This approach seems to be particularly misleading in studies in which comparisons between the core modals and semi-modals are made since the latter can appear in contexts in which it is impossible to use the former. It is thus necessary to restrict the analysis to those contexts in which the speaker or writer presumably has the choice between all (kinds of) expressions to avoid "skewed comparisons" (Johansson 2013). Yet as Arts *et al.* (2013: 21, 22, 39) stress,

> [i]dentifying a set of true alternants is often easier said than done. […] [T]he process […] is in part, subjective, and hence an approximation, and any experimentalist engaging in excluding material must explicitly state their assumptions. […] We are obliged to *infer* that a choice existed at the point the utterance was made, working backwards from our data, constraining case retrieval grammatically and examining cases.

In some studies on modal auxiliaries, comparisons have been restricted to certain contexts. Table 15 gives an overview of recent empirical studies discussing interchangeable variants.

source	analyzed verbs	focus on / exclusion of
Westney (1995: 103-127)	*must*, *have (got) to*, *need to*	present tense affirmative forms are treated separately
Myhill (1996: 347-348)	*must*, *have / got to*	exclusion of combinations with modals, negated forms, "the *to*-infinitive," and questions
Smith (2003: 254-255)	*HAVE to* vs. *must*	syntactically-motivated uses, i.e. non-finite, negated, and past tense forms (except (free) indirect speech) vs. contexts with free alternation
Tagliamonte (2004: 37-38)	*must*, *have / got to*, *gotta*	exclusion of past tense, future; only meaning "it is necessary for…"
Jankowski (2004: 91)	*must*, *have / got to*	present tense affirmative uses only
Close and Aarts (2010: 171-173)	*must*, *have to*, *have got to*	exclusion of negations, interrogative clauses, infinitival *have to* (+ future forms), *had to*, *must have been / V-ed*
Aarts *et al.* (2013: 24)	*shall* vs. *will*	positive declarative utterances only
Lorenz (2013: 88)	*have to* vs. (*have) got to*	exclusion of past tense forms, preceding core modals and "DO-support contexts"
Seggewiß (2013: 128)	*must*, *should*, *have / got to*, *need to*	excludes "any inflections, negations and interrogatives" from the semantic analysis

Table 15 Studies excluding forms of semi-modals that are not interchangeable with core modals

Similarly, the focus of this study will lie on those contexts in which an expression can be exchanged with a core modal. "Knock-out contexts" in which such substitutions are not possible are:

1. co-occurrences with other modals

Whereas semi-modals can be preceded by core modals, it is not possible for two core modals to co-occur in the same verb phrase.[84]

2. non-finite forms (infinitival clauses, present and past participles)

Since the core modal verbs do not have non-finite forms (cf. e.g. Quirk *et al.* 1985: 127), these forms were excluded. Detailed information about the use of the core modals and semi-modals with *be* + *-ing* can be found in Appendix D. The progressive forms of *have to* and *need to*, which are more recent innovations currently rising in popularity, are treated in Ch 6.2.4.

3. past tense

The core modals themselves are "essentially non-past" and can no longer indicate past time on their own (Jacobsson 1979: 300). Even though *could*, *might*, *should*, and *would* can historically be considered past tense forms, it is "only in some respects useful…" to do so (Quirk *et al.* 1985: 220). Palmer stresses that *should* has "essentially […] no past time reference," whereas *could* and *would* can be used to refer to repeated or continuous actions in the past (1990: 13). Warner argues that the secondary modals "do not carry the tense morpheme of verbs but show a distinction proper to modals which may occasionally realize tense" (1993: 9).

The core modals can be used with perfect *have* to express anteriority, whereas some emerging modals like *have to* and *need to* have distinct past tense forms. Since it is pragmatically not possible to order somebody to do something in the past (Collins 2009a: 41), only present tense uses were considered relevant for this study focusing on non-epistemic modality.

4. co-occurrence with perfective aspect

Eide reports that there seems to be a consensus among scholars that a modal expresses epistemicity in Germanic languages when it precedes perfect *have* and a past participle (2011: 1), but she shows

[84] Westney rightly points out that studies in which only present tense forms are considered assume that the choice between *must* and *shall / will have to*, for instance, is made purely on grammatical grounds and that the two forms are not "alternative options in certain environments" (1995: 100). He draws attention to Palmer's observation that there is not necessarily always a difference between forms with or without *will* / *shall*. Compare:

(FN 24) Yes, I've got to be at London airport at fourish. (S.3.2b.21, quoted by Palmer 1990: 122)

(FN 25) Yes, I'll have to be back at the airport at six. (W.5.3.59, quoted by Palmer 1990: 122)

Westney clarifies that the substitution of *must* with *have to* is only possible without a change in meaning when reference to the near future is made and / or a specific time is given. When the future is more distant and the obligation is not yet specific or "seen as a rising at some as yet undetermined time in the future," he sees a clear difference in meaning and a preference for using *will* + *have to* (1995: 129). With *must*, the time when the modality "becomes relevant or is accepted as valid or binding" (M) and the time of fulfilment / obligation (E) are close, whereas with *have to* the latter (E) can be farther away. Westney considers this a factor that explains the use of *have to* for references to repeated habitual actions. The future form indicates that the time of speaking (S) is separate from M (1995: 130-131). If we were to accept that this is the case, we would have to differentiate between near and distant future. Automating this process would have been impossible, and a manual analysis would have been too time-consuming. Hence, future uses of semi-modal verbs were not considered here.

that this is not necessarily true for all verbs. Referring to English, Quirk *et al.* observe that obligation with perfect *have* can only be expressed when *should* or *ought to* are used (1985: 235). *Must have* + past participle (PP), for instance, almost exclusively expresses epistemic modality, here illustrated in example (113) (cf. e.g. de Haan 2012: 725 and Coates' observation that *must*, *may*, *and will* + "HAVE + EN construction (=past time marker)" are typically associated with epistemic meaning, 1983: 245). Bybee *et al.* (1994: 200) even argue that *must* "in the past tense […] can ONLY have an epistemic reading" (cf. also Jankowski's claim that perfective forms of *must*, *have to*, and *have got to* can only have epistemic meanings (2004: 91)). Yet Eide draws attention to uses of *must have* + PP with future reference in Germanic languages. The English example she quotes is (114).

(113) You weren't a fan of the Linda Tripp interview. And at the same time […] the circulation went up from 400,000 to almost 500,000. So somebody must have liked it. (2001/01/06, "'George' folds; is the press being fair to the Bush cabinet?" *CNN Reliable*, COCA)

(114) Students must have taken calculus by the start of their senior year. (Brennan 2004, an unpublished manuscript, quoted by Eide 2011: 4)

The situation with *should* is almost the reverse, with root uses being the standard. The speaker generally expresses that some other situation would have been preferable and that it would have been good if somebody had acted differently. Epistemic meanings only occur when an obligation reading is not possible in the particular context (cf. Bybee *et al.* 1994: 200). Such uses are very infrequent, but still more common than root meanings of *must have* + PP. In example (115), for instance, given the state of his health, it could have been concluded that the man would die.

(115) And just below the surface of this prattle was the insinuation of her failure, whispered and then hushed […]. Perhaps, the whispers went, Jack should have chosen a heartier woman, a woman who wasn't afraid of hard work and who had the hips for childbirth. (Ivey, E. (2012) *The Snow Child: A Novel*, COCA)

(116) Taneva pushed the rest of the sand aside to uncover the naked body of a man, curled in the fetal position and pale as death. […] By all accounts, the man should have been dead. By some miracle, he wasn't. (Niko, D. J. (2012) *The Tenth Saint*, COCA)

Both epistemic and root uses are found with *have to*, although the former (cf. example (116) below) seem to be more common. Collins deplores the lack of comments on the existence of "present requirements for the past fulfilment of an action" (2009a: 64, cf. example (117) below). The same type of meaning is also found with *need* (cf. example (119) below). It seems that the modals that express weaker meanings (e.g. *should*, *need to*) tend to express obligation meanings more often than the stronger modals (e.g. *must*, *have to*) in the perfective aspect.

(117) DERSHOWITZ: … Let me tell you Baker's most serious mistake [...] opening the argument by talking about that he'll prove that the photographs about the shoes were phony. He has to have known that if this one photograph of a man at a sports event, like O.J. Simpson, that there are going to be 30 or 40 more that are going to emerge. (1997/01/28, "Simpson civil case goes to the jury," *CNN King*, COCA)

(118) SARA-HAINES: ….it is time for our derby hat contest. […]: You must be wearing a hat and you have to have designed it and created it. (2011/04/27, "Today's talk; current events discussed." *NBC Today*, COCA)

(119) To be an effective advocate in the Supreme Court, a lawyer needs to have read widely on the issue being considered … (Savage, D. G. (1997) "Say the right thing." *ABA Journal* 83.9: 54-59, COCA)

The modals and semi-modals examined here thus show very different patterns of behavior. Hence, including the perfect forms might have distorted the picture.

5. negations

The exclusions of negations is owed to the difference in scope of negation between *must*[85] on the one hand and *needn't*, *need to*, and *have to* on the other hand. Whereas *must not* negates the whole proposition (cf. example (120) below), negated *need*, *have to*, and *need to* have a narrower scope.

(120) John mustn't go → *it's necessary for John not to go* (Coates 1983: 51)

(121) John needn't go → *it isn't necessary for John to go* (Coates 1983: 51)

(122) John doesn't need to / have to go → *it isn't necessary for John to go*

Since *must* is "not available to express the negation of necessity as we would expect [...], leaving a void" (Lima 1993: 460-461), *need(n't)* (cf. e.g. Ehrman 1966: 73, Van der Wouden 1996a: 17), *need to*, and *have to* are often considered suppletive forms for *must.* An exception to excluding negations is only made in the case of *need(n't)* to allow for a comparison with the full verb *need to* in this study.

6. questions

Excluding questions is more of a choice than a necessity. Factors influencing this decision were the different syntax of the core modals in interrogative clauses (subject-verb inversion vs. *do*-support) and the fact that the range of meanings of the analyzed verbs is smaller in interrogative clauses than it is in assertive contexts. Yet, as will be shown below, excluding questions in an automatic analysis is not an easy endeavor when it comes to semi-modals like *need to* and *have to.*

7. code

Since all search strings used for corpus queries contained the infinitive (cf. Appendix A.3), occurrences in codes (cf. example (48) below) are not included.

[85] Negated *should* is also often considered to behave like negated *must*, expressing (strong or weak) obligation not to do something (cf. Downing and Locke 2002: 183). Coates uses a different paraphrase for *should* than for *must*, i.e. *be advisable* instead of *be necessary*, thus taking the fact that *should* expresses a weaker sense of obligation into account. She stresses that both *it is not advisable…* and *it is advisable … not …* can be used without any semantic difference. Yet this interchangeability of both paraphrases is due to the nature of *be advisable*, a construction with transferred negation (the negative particle can be transferred from the subclause to the main clause without a change in meaning (cf. Downing and Locke 2002: 184) – something that is not possible in the case of *be necessary*), and not to the semantics of *should not.*

(123) We don't like to have to work this way, but we must. (1960, *Damned If You Don't.* Movie Script, COHA)

Identifying all relevant uses of modals was relatively simple. Two searches were made: for the modal verb in question followed by an infinitive (which is itself not followed by a past participle form) and for the modal followed by an adverb + a verb form (which is itself not followed by a past participle form[86]). Constructions with *have* +PP were subtracted. For *have to* and *need to*, the procedure was much more complicated and the number of searches thus a lot higher. The details are described in Appendix A.3.

In turn, the database of analysis was reduced considerably. Previous studies show that modal verbs are frequently negated. Schulz and Teich (2012), who examine the use of modal verbs (n=302) in EDNA (*Englische und deutsche Newsgroup Texte – Annotiertes Corpus*), observe that modal clauses "seem to attract negation more than non-modal ones" (23 % vs. 14%, 2012: 201)[87] and that sentences with epistemic meanings are less likely to be negated than those expressing root modality (15% vs. 23%, 2012: 203). One shortcoming of their study, as they admit themselves (2012: 203), is that they do not take semantic negation into account. This is indeed very hard to achieve since a manual analysis of all adverbs would have to be made. I only tackled the task in the case of *need* and *need to.* The searches for negated forms of the core modals (with max. one adverb between the modal and the infinitive), which are very easy to run, show that negations account for an average of 4.7% | 2.5 % (*must*), 10.6% | 13.8% (*should*), and 6.5% | 7.8% (*shall*) in COHA and COCA (spoken).

In 2015 Aarts *et al.* demonstrate that in DCSPE core modals occur with perfect forms in about 6.4% of all cases (*mc*, based on data on p. 74). They detect a decrease in the absolute and relative frequency of declarative sentences in the perfective aspect and an increase in interrogative clauses with the perfect (2015: 68). The small number of perfect uses determined for my purposes (i.e. only declaratives, only one intervening adverb, cf. above) account for an average of 12.5% | 13.4% (*must*), 12.5% | 7.5% (*should*), and 0.7% | 0.4% (*shall*) in COHA and in COCA (spoken). Table 16 shows the size of the knockout contexts, i.e. the difference between the lemmas (all occurrences) and the frequencies in contexts that are considered relevant for this study indicated as a share of all occurrences of the (semi-)modal verb. Less data is eliminated in the case of *must* and *have got to* than in the case of *have to*, *need to*, and *should.*

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[86] Aarts *et al.* chose a different procedure: They extracted all occurrences of *shall* and *will* after a noun phrase or a pronoun functioning as subject, thereby excluding cases of subject-auxiliary inversion (2013: 24). Additionally, negative forms (*shall not /shan't / will not /won't*) and contractions (*'ll*) were subtracted. This, however, would have meant that coordinated uses of the core modals such as example 26 below would not have been included in the count. On the other hand, code uses would have been part of the dataset. For the core modals, at least five searches would have been necessary. I opted for a different method because a smaller number of queries sufficed.

(FN 26) I suppose we should go and see if anything is amiss. (Thomas, W. (2006) *To Kingdom Come*, COHA)

[87] Epistemic modality is expressed in almost half of the negated clauses. 32% of all inclination meanings, among which the authors count examples like 27 below, are negated (cf. Table 20).

(FN 27) I just need to be alone. (EDNA corpus, quoted by Schulz and Teich 2012: 194)

= freq. of MV in knock-out contexts / frequency of all forms of the MV	COHA (1990-2009)		COCA (spoken) (1990-2012)	
	Range	Mean	Range	Mean
must	16.5-42.6 %	24.8 %	14.3-33.1 %	21.3 %
should	24.6-43.7 %	33.9 %	19.9-39.2 %	35.9 %
have to	64.2-82.2 %	74.7 %	36.0-42.5 %	39.9 %
have got to	9.8-54.4%	28.5 %	7.0-11.3%	10.5 %
need to	36.5-77.9%	57.5 %	13.5-22.0%	18.2 %

Table 16 Size of knock-out contexts as a share of all the occurrences of these verbs

Admittedly, one disadvantage of excluding various contexts is that comparisons to other studies are more difficult to make. For this purpose, the frequencies of the lemmas were also determined. They are illustrated in various graphs in Ch. 5 as well as in Appendix B.1.-B.4.

A few brief remarks about abbreviations and writing conventions should be added: When the total number of occurrences in a particular corpus subsection (e.g. a particular year) is referenced, the capital letter N is used, whereas n signals that only a sample of these occurrences forms the basis of the analysis. Lemmas (e.g. of semi-modals) are capitalized. Lower case letters are used in all other cases, even when more than one form is discussed. In the case of *have to*, for instance, both *have to* and *has to* as well as contracted forms are considered. In accordance with the general custom, the invariant core modals are not capitalized. To indicate that we are dealing with a reduced number of occurrences, discounting knock-out contexts, the abbreviation 'iwcm' (=interchangeable with core modals) is sometimes used for clarification. The analyzed verbs, adjectives, and nouns are underlined in the cited examples, even if they are quoted from other studies. Capitalizations meant to highlight certain words in other studies are reproduced here as in the original source.

In total, the meaning of more than 15,000 occurrences in the spoken language section of COCA was determined (cf. Table 18). Additionally, more than 50,000 occurrences in COHA were manually or semi-automatically (with the help of macros and the sorting option in Microsoft Excel) examined to determine the number of relevant occurrences (cf. Table 17).

	need/s (v.) *to*	*need* (v.) + infinitive	*be to* (COHA)	*be to* (COCA spoken)	nouns + *to*	nouns + *that*	total:
analyzed	16,055	3,767	16,004	5,507	8,652	2,424	52,409
reduced to	11,688	2,554	5,091	3,712	8,287	1,385	32,720

Table 17 Number of semi-automatically / manually analyzed expressions in COHA

	Period 1	Period 2	manually analyzed occurrences in COCA (spoken)			Period 1	Period 2	manually analyzed occurrences in COCA (spoken)	
must	1990	2009	1,318	375	*be forced to*	1990-94	2005-09	163	90
should	1990	2009	[S] 869	[S] 133	*be required to*	1990-94	2005-09	141	62
shall	1990-94	2005-09	219	103	*be urged to*	1990-94	2005-09	9	6
ought to	1990	2009	[S] 552	[S] 152	*necessary*	1990-94	2005-09	133	50
be to	1990-94	2005-09	329	213	*imperative*	1990-94	2005-09	15	17
need / needs to	1990	2009	796	1,394	*essential*	1990-94	2005-09	36	17
have / has to	1990	2009	[S] 298	[S] 238	*critical*	1990-94	2005-09	26	25
(have) got to / gotta	1990	2009	[S] 454	[S] 428	*crucial*	1990-94	2005-09	13	8
progressive *need to*	all occurrences in COCA		12		*demand* (n) *that*, *to*	1990-94	2005-09	22	18
progressive *have to*	1990-94	2005-09	99	98	*necessity that*, *to*	1990-94	2005-09	18	2
want to	1990	2009	[S] 1740	[S] 307	*need* (n) *that*, *to*	1990-94	2005-09	47	32
wanna	1990-94	2005-09	17	989	*obligation that*, *to*	1990-94	2005-09	159	97
modal + *want to*	1990-94	2005-09	667	678	*request that*, *to*	1990-94	2005-09	18	7
be supposed to	1990-91	2008-09	321	191	*requirement that*, *to*	1990-94	2005-09	44	29
be bound to	1990-94	2005-09	93	48	performatives *(demand*, *force*, *require*, *urge)*	1990-94	2005-09	80	49
had better	1990-94	2005-09	600	414					
be obliged to	1990-94	2005-09	20	8	TOTAL Period 1 & P2			**9,341**	**6,285**
be compelled to	1990-94	2005-09	7	1	TOTAL			**15,626**	

Table 18 Number of present tense affirmative expressions (iwcm) included in the semantic analysis in the spoken language section of COCA

[S:] this number refers to a sample of total number of occurrences

5. Overview: Changes in Frequency

The Use of the Modals in All Contexts in COHA

Before restricting the search to contexts in which all expressions can be used interchangeably, let us look at the overall frequencies of the modals and semi-modals in COHA. It has frequently been reported that the modals are declining in use (cf. Ch. 3.1 above) and this tendency can also be found in COHA. Figure 7 shows the frequencies of all modals and semi-modals in all contexts and tenses, documenting a pronounced decrease in the use of the core modals and the marginal modals (-3,326 w/m, -30.5 w/m on average per year). Three periods that can be distinguished via VNC-analysis (a technique that groups adjacent values on the basis of their similarity, cf. Ch.4.4). Semi-modals increase in use (+1,500 w/m, +13.8 w/m per year). We thus arrive at a "modality deficit" (Leech 2013: 110) of 1,826 w/m. As mentioned above, there might be a change in speaker preference towards other expressions of modality or less need to express these modal meanings in general. Note that the relative change in frequency of the semi-modals (+120%) is much bigger than that of the modals (-24%).

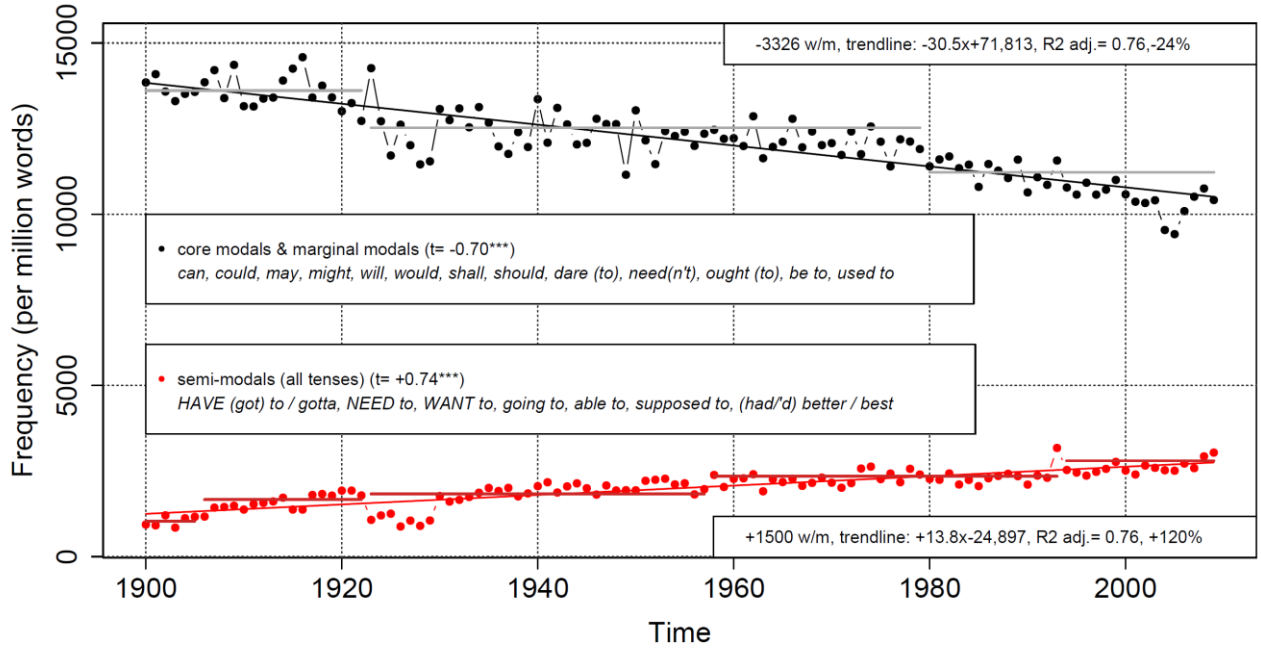


Figure 7 Modals vs. semi-modals in COHA[88]

Leech observes that the high-frequency modals *would*, *can*, *will*, and *would* "hold their own" in the 20th century, whereas infrequent modals such as *shall*, *ought to*, and *need(n't)* "become even

[88] The frequency of the group of semi-modals here is a little lower than it should be because the numbers for *be to* are based on the analysis of present tense affirmative uses only, which is restricted to 1900-1901, 1930-39, 1960-69, 1990-99, and 2008-09 (because of the considerable effort necessary to manually identify the occurrences, cf. Ch. 6.1.6 on *be to* and Appendix C.2). The missing values are calculated with a 3rd degree polynomial function. To identify the values for *(had/'d) better / best*, infinitives had to be included in the search. Negated occurrences of *(had/'d) better / best* were added to the values identified for affirmative present tense uses. The values of *need(n't)* stem from searches for *need* in questions, for negated *need*, and for *need* + infinitive aimed at identifying the uses in other non-assertive contexts.

more marginal" (2011: 555-556, cf. Ch. 3.1). I propose that we do not only consider the factor frequency as a dividing criterion, but that we take the meanings of the expressions into account and make com-parisons between modals and semi-modals of obligation and necessity, of prediction and volition, and of possibility, permission, and ability.[89]

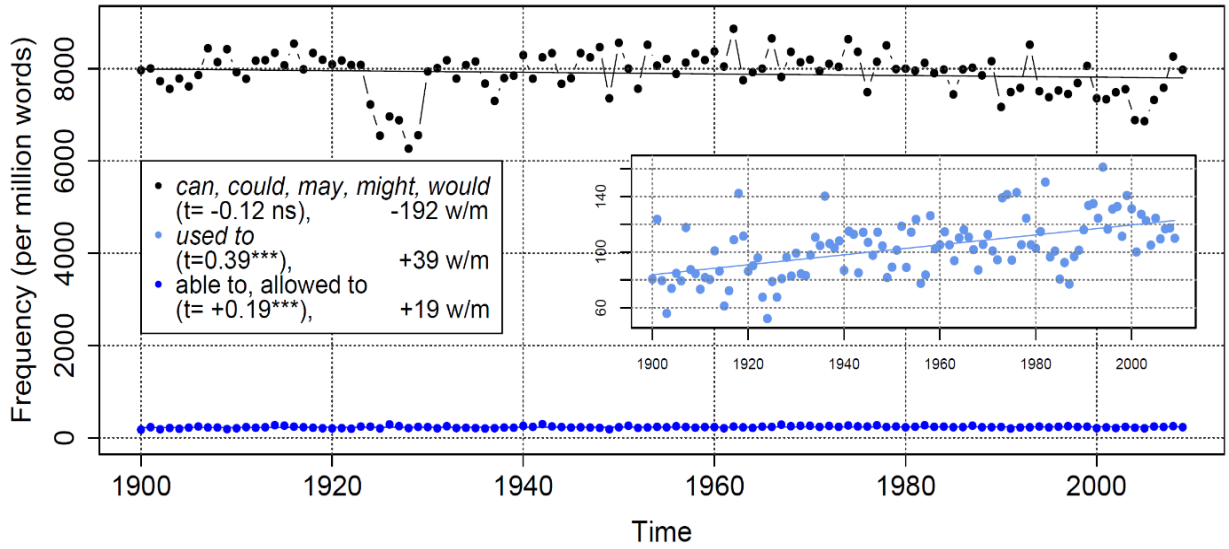


Figure 8 Modals vs. semi-modals of possibility, permission, and ability in COHA

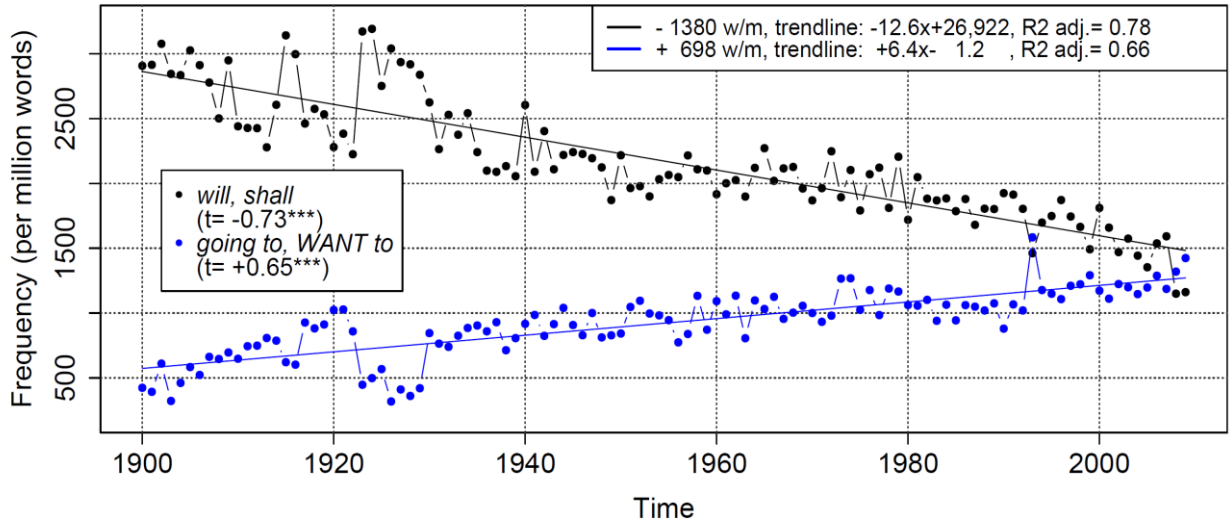


Figure 9 Modals vs. semi-modals of prediction and volition in COHA

There is very little change in the use of the modals of possibility, permission, and ability (t= -0.12ns, -2.4% between 1990 and 2009, cf. Figure 8[90]). *Used to* is considered separately here because of its status as a marginal modal and the fact that it increases in frequency (τ = + 0.39***) – like *be able to* and *be allowed* (τ = +0.19***), which are infrequent compared to the other modals of this group.

[89] The classification is based on Collins (2009a).

[90] Note that a 3rd degree polynomial function would be a slightly better fit for the data (R^2 adj.= 0.12). However, since linear functions have been used in all other graphs of this type, a linear function was chosen here as well.

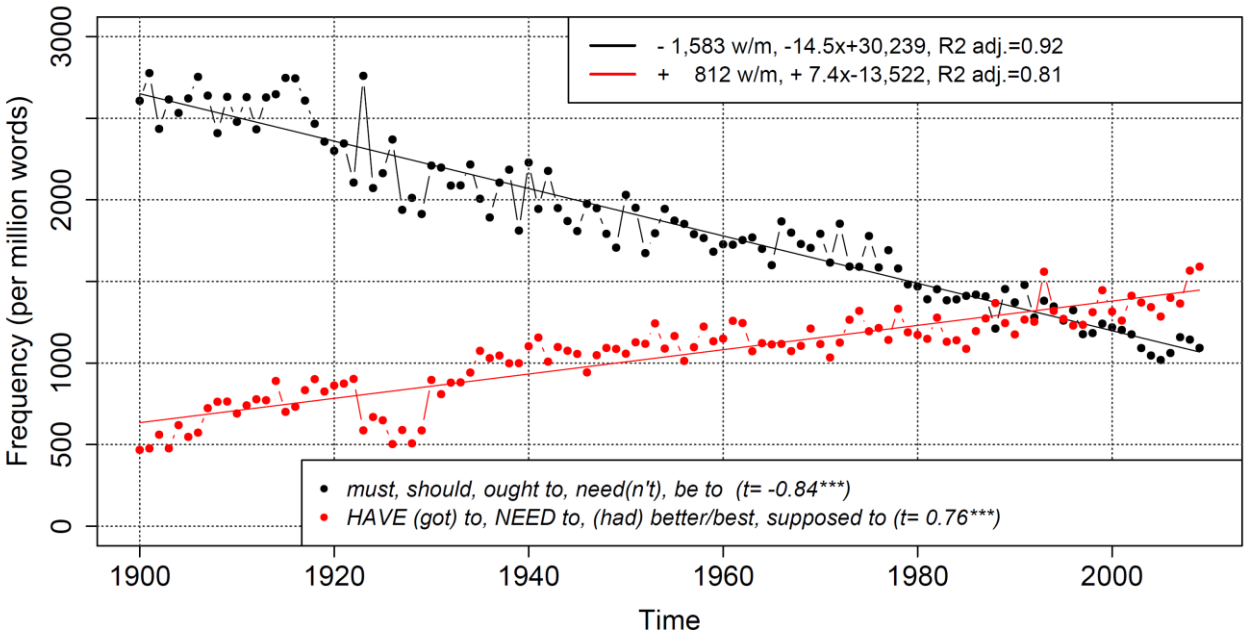


Figure 10 Modals vs. semi-modals of obligation and necessity in COHA

However, as Figure 9 illustrates, the wide gap between the modals (-1,380 w/m, -48%) and the semi-modals of prediction and volition (+698 w/m, + 122%) at the beginning of the 20th century seems about to close soon (if the trend remains stable, in the 2020s). Figure 11 shows that the semi-modals of obligation and necessity (all tenses and contexts) are already more frequent than their modal rivals, even if the former increase much slower (on average, +7.4 w/m per year, +812 w/m, i.e. +128% over the course of the analyzed period) than the latter decrease (on average, -14.5 w/m per year, -1,583 w/m, i.e -60%).

The Use of the Analyzed Expressions (iwcm) of Obligation and Necessity

In the following chapters, the focus will lie solely on the semantic field of obligation and necessity. When the search is restricted to only those contexts in which core modals, semi-modals, modal adjectives, verb forms, and nouns can be interchanged, the decline of the core modals seems even more drastic. The horizontal lines in the left panel of Figure 11 illustrate that three large periods in the development of both groups of verbs can be distinguished on the basis of variability-based neighbor clustering. Overall, in the course of analyzed time span, *must*, *should*, *ought to*, and *be to* decline by 1,219 w/m in written English between 1900 and 2009, whereas the combined frequency of *have (got) to*, *need to*, *be supposed to*, and *had better/ best* increases con-siderably (+358 w/m). These developments lead to a modality deficit of approximately 860 w/m. If we assume that both groups of verbs continue on the same paths towards decline and increase in the future, the point in time at which they attain the same frequency is situated in the very near future, around the year 2020.

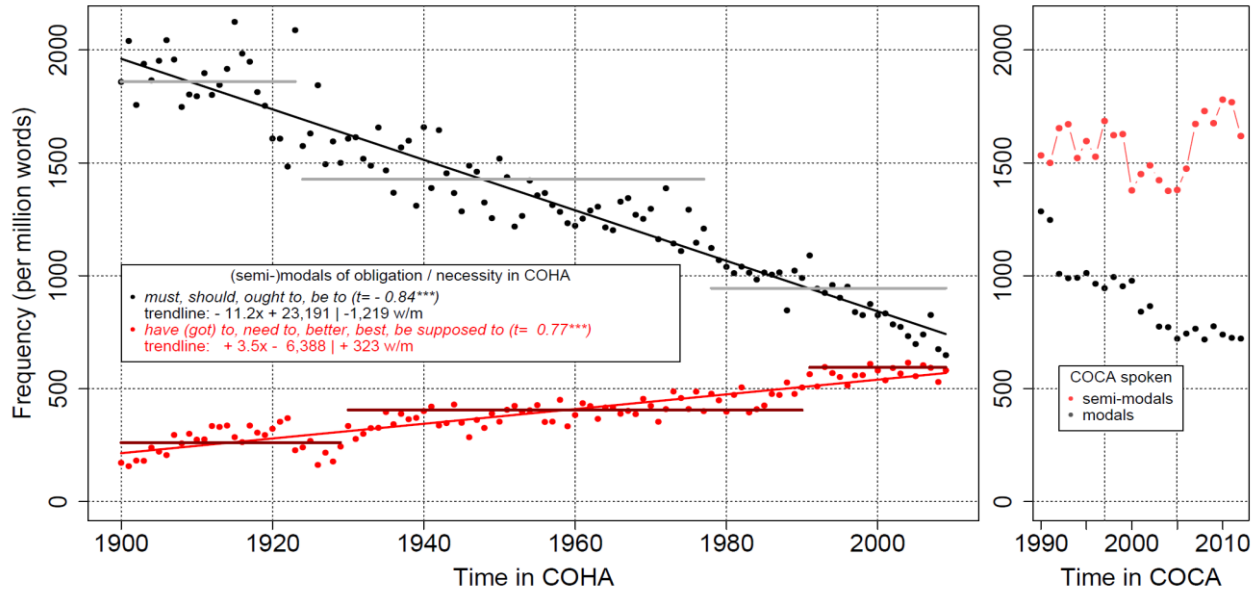


Figure 11 (Semi-)modals of obligation and necessity in COHA (with VNC) and COCA (spoken)[91]

Have (got) to, *need to*, *better*, *best*, and *be supposed to* already outnumber *must*, *should*, *ought to*, and *be to* by a factor of 1.8 in the spoken language section of COCA (1,579 w/m to 897 w/m, average frequency per year, 1990-2012). Still, the use of the core modals decreases drastically (-451 w/m), while the semi-modals become more frequent (+160 w/m).[92] The core modals decline by 236 w/m in COHA in the same time span, whereas semi-modal usage increases by only 64 w/m.

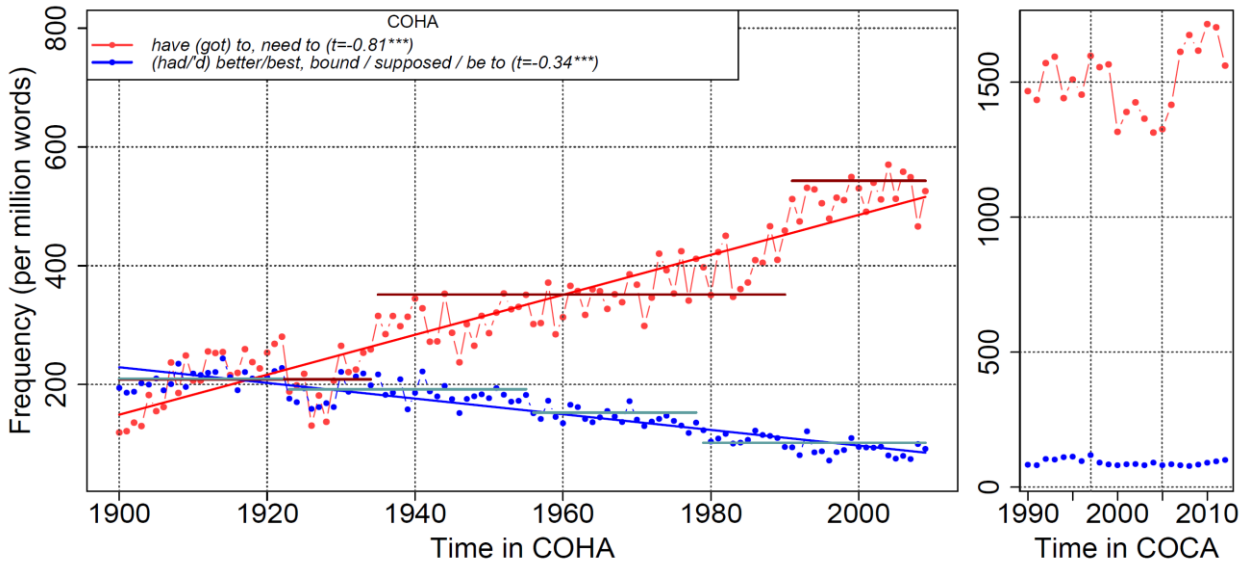


Figure 12 *Have / got to*, *need to* vs. *(had/'d) better*, *be to / bound / supposed to* in COHA and COCA (spoken)

[91] *Need(n't)* is left out here because the majority of its forms are negated (cf. Ch. 6.1.3), and *be bound to* is not included because it almost exclusively expresses epistemic meanings (cf. Ch. 6.2.8).

[92] The calculation of these values is based on the average frequency for the years 1990, 1991, and 1992 on the one hand and the average frequency for 2007, 2008, and 2009 on the other hand.

Figure 12 shows that *have (got) to* and *need to* drastically increase in use (+41.7 %, +330 w/m, τ = 0.70***), whereas *(had/'d) better/ best*, *be bound to*, *be supposed to*, and *be to* decline (-69.4%, -146 w/m, τ = -0.78***). In spoken English the former verbs are almost three times as frequent as in written English (note the difference in scale between the left and right panel of Figure 12). The average spoken-written ratio between 1990 and 2009 is 3.1:1. Yet compared to other studies (cf. e.g. Collins 2009a, where the overall spoken-written ratio of these three verbs is 4.9:1) the number from the spoken section of COCA is low, probably because these emerging modals tend to be less frequent in public conversation than in private discourse (cf. Seggewiß 2013: 199).

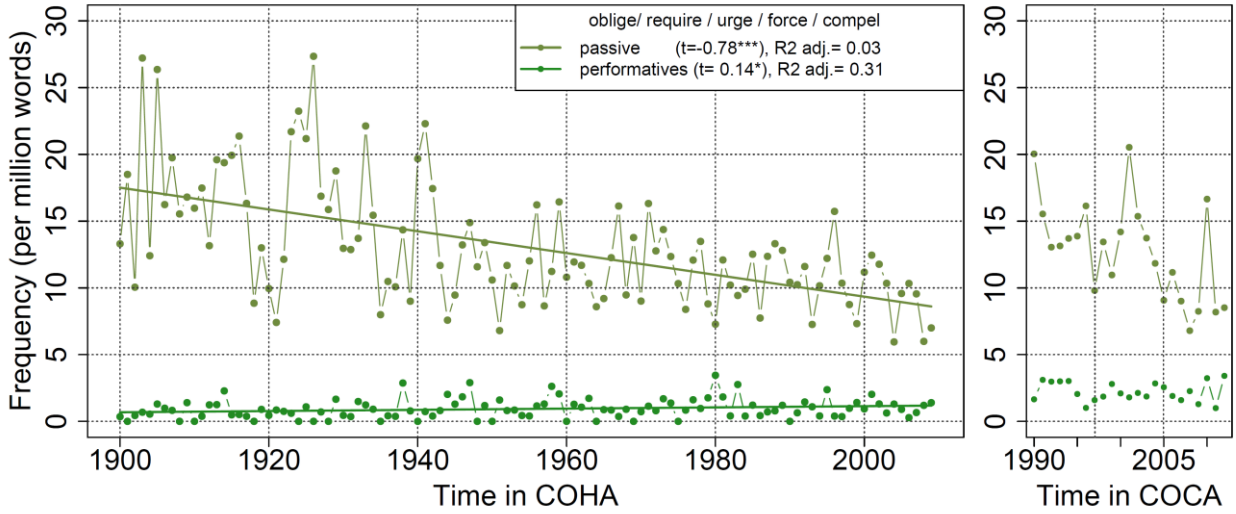


Figure 13 Lexical verbs with modal meaning in COHA and COCA (spoken)

Present tense passive forms and performative uses of lexical verbs are a lot less frequent than the semi-modals (but please note that when we consider all tenses, as in Appendix B.3, the situation is reverse with passive constructions being more frequent than semi-modals). The quick decline of the passive forms (-51%, τ = -0.78***, -9 w/m) is at variance with the rise of the performative forms (+ 73%, τ = 0.14*, + 0.5 w/m). The passive forms are on average more frequent in COCA (spoken) than in the same period in COHA (13.2 w/m vs. 10.0 w/m) – which is somewhat surprising given that the passive is generally considered a characteristic of formal writing. This issue will be discussed in more detail in Ch. 6.3.1 below.

Modal adjectives in extraposition constructions and nouns that can be interchanged with core modals are rather rare. The use of adjectives stays relatively stable until the end of the 1920s ($\tau_{1900\text{-}1927}$ = 0.01 ns) and then declines towards the end of the analyzed period ($\tau_{1929\text{-}2009}$ = -54***). This tendency might be due to their formality: An examination of the frequency of these – to use Halliday's terminology – explicitly objective wordings (cf. Ch. 2.2 above) in the different corpus sections of COCA shows that they are more than 4 times as common in academic writing than in spoken language and that they are least frequent in fiction.[93]

[93] 40.7 w/m (academic writing) vs. 8.4 w/m (spoken) vs. 1.87 w/m (fiction), *be* (present tense) + *imperative* | *critical* | *crucial* | *essential* | *necessary that / to* + infinitive, 1990-2009.

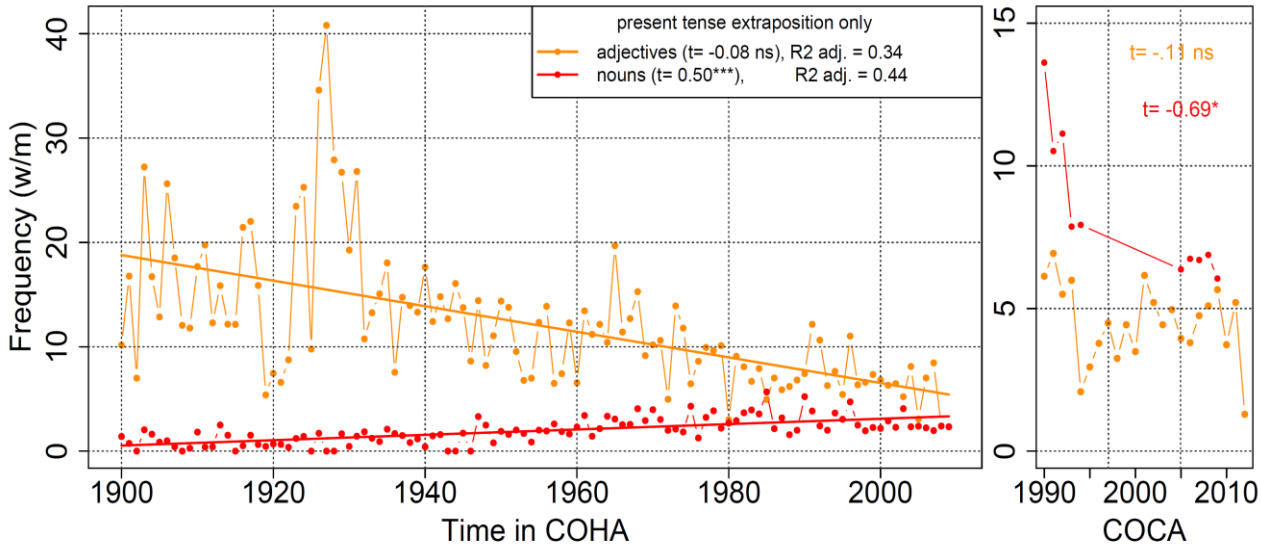


Figure 14 Adjectives in extraposition constructions and nouns in COHA and COCA (spoken)

However, as in Leech's data (2013, cf. Ch. 3.2) for BrE, there is an increase in the use of some of the analyzed nouns: *Obligation*, *need*, and *necessity*[94] steadily rise in frequency ($\tau = 0.52$***) in COHA.[95] In the spoken language section of COCA, where these nouns are considerably more common (please note the different scale of words per million on the y-axis in the right panel of Figure 14), both nouns and adjectives decline.

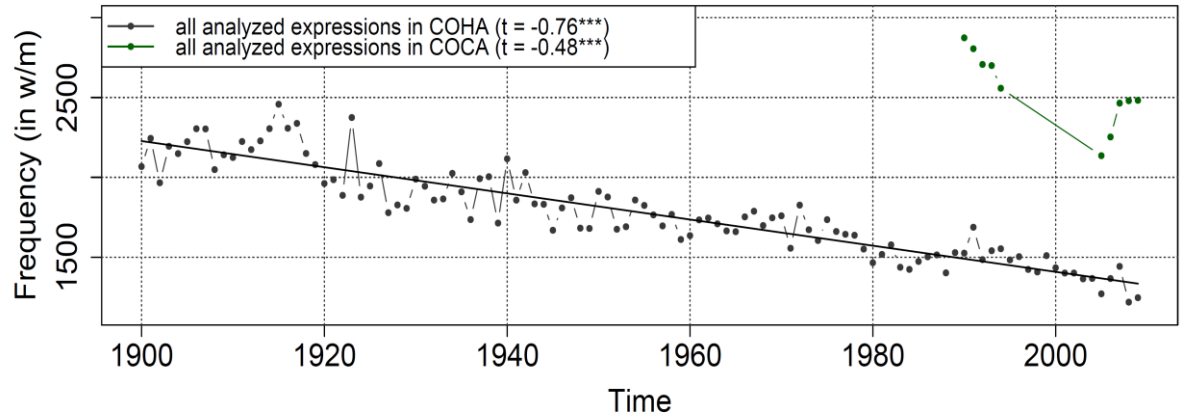


Figure 15 All analyzed expressions (iwcm) in COCA and COHA

[94] *Constraint* and *requirement* can be used interchangeably with other modal expressions, but only in a very limited number of cases (i.e. 5 in COHA).

[95] A comparison between the use of these nouns in all contexts (without the restrictions made in this study) in COHA and the BrE Brown family of corpora (cf. Leech 2013: 109) shows close similarities in the frequency of *need* and *obligation(s)*, whereas *necessity* is more than twice as frequent in BrE in the 2000s. The difference in the use of *requirement* is particularly pronounced (~20 w/m in COHA in the 2000s vs. 86 w/m in 2006, cf. Figure B.13 in Appendix B.4).

Finally, a comparison of all groups of expressions reveals a pronounced decline in the use of all expressions in both COHA (τ = - 0.77***, -898 w/m) and COCA (τ = - 0.47***). Overall, there is a drop in frequency of 929.6 w/m between 1900 and 2009 in COHA. Between 1990 and 2009, 157 w/m are "lost" in the written data. In COCA (spoken) both the absolute and the relative decrease (based on the values for 1990 and 2009) are much more drastic (with 391 w/m, -14% in COCA vs. -17% in COHA).

If we take into account that root meanings tend to lose ground as the modal verbs grammaticalize, it seems very likely that there is a marked decline in the use of root meanings in COHA. In the following, I will retrace the developments of all expressions separately in COHA and analyze their meaning in the spoken language section of COCA. Will we indeed see a decrease of root meanings in spoken AmE? Or can the adjectives and nouns, which almost exclusively express root meanings, as well as the expressions with a strong foothold in spoken language such as the semi-modals *have to* and *need to* – which have not advanced as far as the core modals on their grammaticalization path – counterbalance the loss of root meanings of the core modals?

6. Results of an In-Depth Study of All Examined Modal Expressions

In the following subchapters, all expressions of obligation and necessity analyzed in this study will be considered separately. I will start with the core modals and semi-modals before moving on to less frequent expressions of modal meanings such as modal adjectives, lexical verbs, and nouns. As explained in Chapters 1 and 2.1, I do not believe the distinction between core modals and semi-modals to be clear-cut. Particularly the classification of *ought to* and *be to* can be disputed, yet since the distinction is frequently made in the literature, for the purpose of clarity and in order to use categories roughly comparable in size to that of adjectives and nouns, two separate categories are distinguished. All chapters contain information about the frequency of the analyzed expressions in COHA, comments about their morphosyntax when they are relevant, and the results of the semantic analysis and the MDCA in the spoken language section of COCA (1990-2012).

6.1. Core Modals

6.1.1. *Must*

Must is one of the verbs that are reported to undergo a drastic decline (e.g. by 31% from Frown to Brown, Leech *et al.* 2009: 283; cf. also Ch. 3.1). In COHA it[96] decreases by 73% in all contexts between 1900 and 2009. This percentage is based on the values for the years 1900 and 2009 of the 3rd degree polynomial function fitted to the data (R^2 adj. = 0.88) (cf. Ch. 2.2 for an explanation why the fitted functions are used instead of the actual normalized frequencies). Unless indicated otherwise, this method is adopted for all calculations of relative changes.

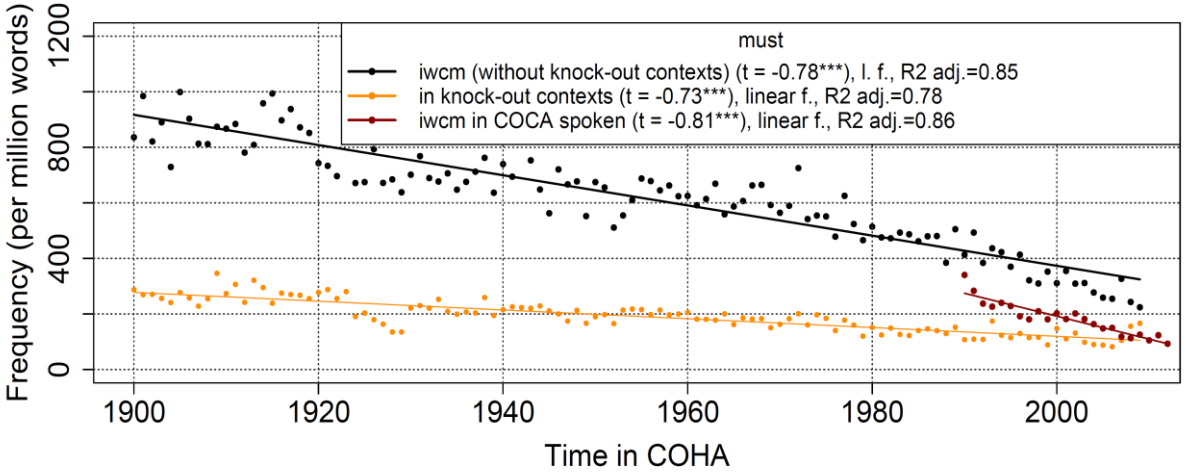


Figure 16 *Must* (+adverb) + infinitive in COHA and COCA (spoken)

My data confirm findings that this trend towards a decline affects all text types (cf. Appendix B.2 as well as Smith 2003: 251-252) and concerns affirmative forms (iwcm, -65%, ~ -590 w/m, slope:

[96] Occurrences with adverbs (*must* + adverb + infinitive) are included in this count, but not in the semantic analysis. Their addition to each manually analyzed sample would have drastically increased the already high number of occurrences of examined expressions.

-5.4 w/m) as much as negated, past tense, and non-finite forms, questions, and code uses (= knock-out contexts, -62%, ~ -172 w/m, slope: -1.6 w/m). As Figure 16 illustrates, *must* is more common in the former than in the latter. Overall, *must* is less frequent in COHA than it is in Brown and Frown (1,018 vs. 773 w/m in 1961 and 668 vs. 602 w/m in 1991), which is likely due to differences in corpus composition. *Must* is even less frequent and declines faster (slope: -8.3 w/m) in the spoken language section of COCA. (Note that *ought to* decreases less fast in the same time span, whereas the reduction in the use of *should* and *shall* is even more pronounced.)

It has been pointed out that the use of *must* is particularly sensitive to external factors (cf. Ch. 3.3 above). An analysis of newspaper data in COHA equally shows that the frequencies are particularly high in 1910, 1917-22, 1932-33, 1940-44, and 1946-47 (cf. Figure C.1 in Appendix C.1. While the high values for 1917-22 may be caused by irregularities in corpus editing (cf. Ch. 4.1), the peaks in frequency in the 1940s suggest an increased usage of *must* during and after the Second World War, which has been attributed to a need for unequivocal language in times of crisis (cf. Millar 2009: 213). However, the scope of this study does not allow for a semantic analysis of *must* in newspapers to substantiate this claim.

Semantics

Must is one of the more frequent modal expressions examined here. All 86 collexemes attracted to it are among the top 1,000 most frequent verbs in the spoken language section of COCA – which is only the case of one other expression analyzed here (i.e. extraposed present tense *imperative*, which has only 7 distinctive collexemes in total). Since *must* is so common, the semantic analysis in the spoken language section of COCA was restricted to the starting point and the end point of the period under investigation, i.e. to 1990 (a year in which the corpus section contains 4.33 million words) and 2009 (3.97 million words). All 1,693 occurrences of *must* (iwcm, without intervening adverbs) in these years were considered. The detected decline of *must* from 304 w/m in 1990 to 94.2 w/m in 2009 is highly significant.

Meaning in w/m (N^{97}= 1,693)	1990	2009	Difference (Freq.)	Pearson Residuals (Distribution)	
root	210.2	63.2	-69.9%	0.03	-0.45
epistemic	45.7	22.4	-50.9%	-1.60	**3.28**
formulaic	44.8	7.3	-83.7%	1.74	**-2.81**
ambiguous	3.5	1.3	-63.6%	0.05	0.39
total (iwcm)	304.2	94.2	-69.0%	χ^2 = 25.0, p<0.001, V= 0.07	

Table 19 Meanings of *must* in COCA (spoken)

Epistemic meanings (cf. example (124) below) also decrease significantly in use between 1990 and 2009 (cf. Table 19). Their share is very low compared to other studies. This is at least partially due

[97] N refers to the total number of occurrences in a particular corpus subsection (e.g. a particular year), whereas n signals that only a sample of these occurrences forms the basis of the calculation.

to the exclusion of occurrences of *must* with perfective aspect, which primarily express epistemic meanings (cf. Ch. 4.7).

(124) Do you see a sign of hope in the statements about negotiations coming today from Iraq? ZBIGNIEW-BRZEZINSK: I think it's an indication of some Iraqi concern. They must feel very isolated. They must feel quite beleaguered. (1990/08/21, *PBS NewsHour*, COCA)

Collins identifies a share of 61.1% of epistemic occurrences as opposed to 36.1% deontic and 2.8% dynamic occurrences in his corpus of US spoken data (*mc*, 2009a: 163). De Haan detects an even higher percentage of epistemic uses (79%) in the Switchboard telephone speech corpus (AmE, 2012: 706). In COCA epistemic meanings account for only 15% and 24% of all uses in 1990 and 2009. The relative increase of epistemic *must* from 15% to 24% is conform to grammaticalization theory. The absolute decline of epistemic *must* (in COCA (spoken) by a little more than 50%, i.e. 23 w/m) is a phenomenon that has also been observed in Brown and Frown (-39%, i.e. 21 w/m, cf. Leech *et al.* 2009: 285) as well as in DCSPE (-51%, i.e. 23 w/m, cf. Close and Aarts 2010: 177-178). Rejecting Leech *et al.*'s proposition that the decrease of epistemic *must* may be "due to contamination by the dramatic fall of deontic *must*" (2009: 88) on the grounds that it is unclear how one development would influence the other, Close and Aarts argue that the change in the use of both root and epistemic meanings of *must* can be explained by a declining willingness of speakers and writers to strongly commit to their claims (2010: 178).

Formulaic meanings account for 14.7% of all occurrences in 1990 and for 7.9% in 2009. (The numbers change to 11.6% and 4.7% when the analysis is no longer restricted to specific contexts.) There is thus a statistically significant decline in the use of formulaic meanings – just like in Close and Aarts' study of LLC and ICE-GB (which shows a decrease from 10.3% to 5.8%, N= 802, 2010: 175) and in data from the American Brown family of corpora.[98] The slightly higher frequencies in COCA (as opposed to LLC) at a later point in time might be explained by regional differences or they could be due to the particular composition of this corpus section. Here subjects are particularly prone to voicing their personal and professional opinions (cf. Ch. 4.1). The expression *I must say* stands out in terms of frequency (cf. example (34) above). *Say*, *confess*, *admit*, *tell*, and *inform* are distinctive collexemes of *must* ($p < 0.001$) in the spoken language section (cf. Table F.1 in Appendix F, Johansson (2013: 376-377) for the mutual information scores of *must* + infinitive in the entire corpus, and Cappelle and Depraetere (2016: 88) for collocations in the BNC).[99]

[98] A search for *I must admit* | *confess* | *say* | *tell* in Brown, Frown, LOB, and FLOB (using the frequencies in Leech *et al.* (2009: 283) as a baseline) suggests that formulaic uses of *must* are slightly more frequent in BrE than in AmE. In AmE there is a clear decline in frequency, but a small increase in the share of formulaic uses in the BrE data.

[99] The use of the fixed phrases *must needs* and *needs must* (cf. Erdmann 1982, Molencki 2003) decreases drastically in COHA (τ= -0.51***, -0.37***).

The majority of the uses of *must* in COCA (spoken) have a root meaning. There is a decline by 74 w/m, but the share of root meanings almost stays the same, with 69.6% in 1990 and 67.2% in 2009 (hence the small Pearson residuals which indicate that this change in proportion is not statistically significant). Example (125), in which the speaker voices his personal opinion that the situation of the hostages should not become the major concern of the government, illustrates the most frequent meaning expressed by *must* in my data (cf. Table 20). The results of the MDCA mirror this strong focus on advice: 14% of all distinctive collexemes of *must* are mental verbs (e.g. *understand*, *accept*, *approve*), 14% are communication verbs (e.g. *acknowledge*, *admit*, *convince*), and 11% are activity verbs (e.g. *watch*, *leave*, *work*), all of which are well suited for recommending what other people should do.

(125) BRUCE LAINGEN, former Iranian Hostage: The hostages must remain a secondary consideration. If we allow that issue to become primary, or near primary, or to dominate others, we've got a problem. (1990/08/23, "Just cause?; King fear; 14-love," *ABC Primetime*, COCA)

In example (126) the speaker's utterance is an exhortation to his colleagues on the discussion panel to mentally focus on a particular aspect (cf. Ch. 2.2.2.2 above). These uses account for 1.6% (n=32) of all occurrences of *must* (2.0% in 1990 and 1.1% in 2009) and are classified as possibly directive utterances. This ties in with the finding that *remember*, *understand*, and *recognize* are strongly attracted collexemes of *must* ($p>0.001$, cf. Table F.1 in Appendix F). Cases in which it is not clear whether the speaker is merely expressing an opinion or trying to give an order to the addressee(s) are likewise classified as possibly functioning as directives. Utterances in which a head of state specifies what the people should do – such as in example (127) – are also placed into this category.

(126) AL Well, all sanctions, Ted, I think do have loopholes and flaws. But we must realize one thing. Iraq is an agricultural country. (1990/09/12, "A critical look at U.S. Persian Gulf policy," *ABC Nightline*, COCA)

(127) OBAMA-: And a nursing mother is torn away from her baby during a raid, that is the problem that all of us, black, white, brown, must solve together as one nation. (2009/04/15, "Political headlines," *Fox Baier*, COCA)

By contrast, when the President tells somebody else concretely what to do, a classification as a directive utterance is justified since it can be assumed that he is in a position of power. Example (128), where it is very clear that we are also dealing with a command given by a superior, is another illustration of this sense. In my data 36% of all utterances with a directive function have a 2nd person subject (*you*). This is concordant with Coates' finding that uses of *must* with 2nd person subjects are usually stronger than those with 1st or 3rd person subjects (1983: 37, cf. also e.g. Tagliamonte and D'Arcy 2007: 64). In only about 14% of all directive utterances, it is the speaker who imposes upon himself, or "voluntarily accept[s], an obligation to do something" (Huddleston and Pullum 2002: 183, cf. example (129) below).

(128) I received the order from my commander. "All of you boys and soldiers, you must go and attack and kill." (1990/03/02, "Children of terror; U.S.S. Iowa follow-up," *ABC 20/20*, COCA)

(129) SEN-GEORGE-VOINOVI: I must devote my full time, energy, and focus on the job I was elected to do and the job in front of me, and seeking a third term, with the money-raising and campaigning that it will require, would not allow me to do that. (2009/01/12, *PBS NewsHour*, COCA)

As Table 20 shows, the number of clearly directive utterances, often considered prototypical (cf. Portner's claim that *must* "imposes an obligation as part of its conventional meaning," 2007: 364), is relatively small. Their share (2.9%) is even smaller than in Coates' analysis of the spoken part of the SEU (3.5%, 1983: 33). Biber *et al.* observe that *must* is avoided in conversations because of its strong directive force (1999: 495). There is a slight increase in their relative frequency, from 2.0% in 1990 to 3.7% in 2009, yet the share is too low to confirm that "as *must* obsolesces, it remains entrenched for readings with strong obligation," as has been argued for BrE by Tagliamonte (2004: 52). Similarly, the share of possibly directive utterances rises (from 3.4% to 6.1%). Expressions of simple advice / desirability become less common (-76%).

Meaning in w/m (n= 1,169)	1990	2009	Difference	Pearson Residuals	
subjective deontic	100.9	24.2	-76.0%	1.08	**-2.00**
subjective deontic (possibly directive function)	10.4	5.8	-44.2%	-1.09	**2.06**
subjective deontic with directive function	6.0	3.5	-41.2%	-0.92	1.74
descriptive: subj. deontic / directive function	16.4	6.3	-61.6%	-0.43	0.82
objective deontic	51.5	15.9	-69.2%	0.02	-0.02
dynamic	25.2	7.6	-70.0%	0.08	-0.13

Table 20 Root meanings of *must* in COCA (spoken)

Objective deontic uses, in which collective decisions such as contracts, rules, and regulations constitute the source of the obligation (cf. example (130) below), only account for 17% of all occurrences. The absolute frequency of use of this meaning decreases while the relative frequency remains stable.

(130) Some products must adhere to military specifications objectives that demand CFC use (1990/06/17, *ABC Business*, COCA)

Dynamic uses make up 8% of all occurrences. In a small number of cases, the need is internal. Breathing, for instance, is a physical necessity (cf. example (131) below). Likewise, there is no element of human will in example (132) either because external circumstances (geographical conditions) create the necessity to pipe water from one hundred miles away.

(131) The third, and I think perhaps the most significant reason, is that the American people demand action to clean up the air which they must breathe. (1990/04/02, *PBS NewsHour*, COCA)

(132) Wells have dried up or been contaminated by salt and chemicals. What little water is left is stagnant, a breeding ground for typhoid. Cases have increased here by 29 times. Every drop of drinking water must be piped from a hundred miles away and laboriously collected from public pumps. (1990/04/16, *PBS NewsHour*, COCA)

As we have seen, there is an absolute decrease in all meanings of *must*. Jankowski finds that as *must* becomes obsolete, it is mainly used under special conditions, e.g. with 2nd person subjects and the stative verbs *be* and *have* (2004: 108). In my data, formulaic uses discounted, *be* and *have* are indeed the most frequent verbs, but they only account for 35% and 6% of the infinitives in 1990 and 2009. The relative frequency of formulaic uses increases, which can be taken as a sign of a specialization of *must*.

Close and Aarts claim that the causes of the decrease of root and epistemic *must* lie in a general decline in the use of expressions of strong commitment (2010: 178). *Must* is considered the strongest of the deontic modals since it encodes a stronger obligation that seems impossible to disregard without severe consequences (cf. Bybee *et al.* 1994: 186) and is "directly applied and irresistible" (Sweetser 1990: 54). Yet true directive utterances are rare and the decline of *must* is particularly pronounced in expressions of advice, in which the commitment expressed by *must* is much stronger than the force associated with *should*. Subjective deontic *should* is more than 10 times as frequent (cf. Table 22 in Ch. 6.1.2 below).

6.1.2. *Should*

Like *must*, *should* decreases considerably in use between 1900 and 2009, from 843 w/m to 443 w/m (~ -47%).[100] Yet as its decline is less pronounced than that of *must* (-65%), *should* becomes more frequent than its competitor at the end of the 1980s. In spoken AmE *should* is even more common and undergoes a steep decline as well (-21.4%, cf. Figure 17).[101]

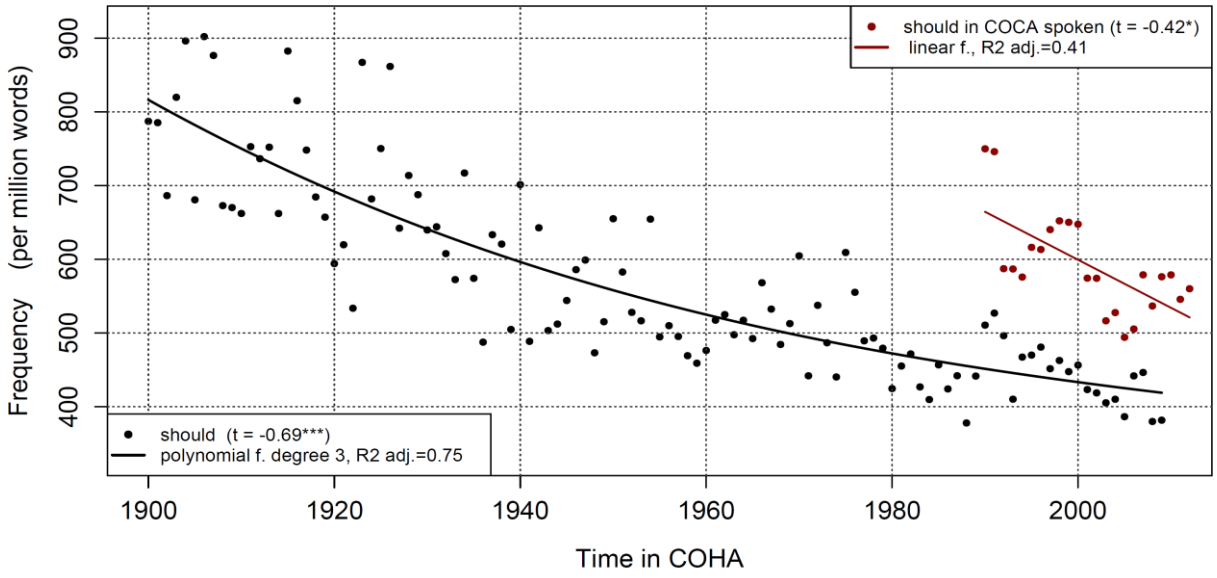


Figure 17 *Should* (+adverb) + infinitive in COHA and COCA (spoken)

Semantics

Should mainly expresses obligation (cf. Leech *et al.* 2009: 86-87, Collins 2009a: 45) and desirability (cf. Table 21 and Table 22), but also a variety of other meanings. The semantic analysis presented in the following is based on the examination of 852 occurrences of *should* + lexical verbs in *ABC 20/20*, *ABC Nightline*, *ABC Primetime*, and *PBS NewsHour* (2,528,975 words in 1990 and 530,517 words in 2009, cf. Ch. 4.1). Because of the high frequency of *should* with *be*, *do*, and *have* in these TV programs (1,057 occurrences), only the 150 occurrences in *ABC 20/20* and *ABC Primetime* were considered. For significance testing, the numbers for *be*, *do*, and *have* were extrapolated. Uses in knock-out contexts were disregarded.

Like *must*, *should* often has a formulaic meaning. In 4% of all uses of *should*, the speaker performs the action in the same speech act in which s/he utters it. *Should* collocates ($p<0.001$) with *point out*, *mention*, *say*, *explain*, *warn*, *state* etc. (cf. Table F.2 in Appendix F). As can be seen in example (133), using a modal makes the utterance more polite. The purpose of this use is mainly

[100] As in the case of *must*, the decline of negated, past tense, and non-finite forms, questions, and code uses of *should* between 1900 in 2009 is less pronounced (~ -27%, cf. Figure B.17 in Appendix B.6) than the changes in other contexts here illustrated in Figure 17.

[101] Note that the situation is reverse in Collins' data from C-US, ICE-GB, and ICE-AUS (2008: 135, 2009a: 52). This may again be due to the particular corpus composition of COCA.

pragmatic, but there is an element of obligation because the speaker refers to a felt necessity to act.

(133) KOPPEL I think I should say for both your sakes and my sake also, I did not want this to look as though it was a Bob Dole-Israel kind of dialogue. (1990/01/16, "Where should foreign aid go?" *ABC Nightline*)

Should sometimes occurs after potential triggers of the subjunctive (such as *suggest*, *recommend*, *order*, *it is important that* etc., cf. example (134) below).[102] This use is called quasi-subjunctive (e.g. by Coates 1983: 67-68) or putative (e.g. by Quirk *et al.* 1985: 157; Leech 2003: 233; Leech *et al.* 2009: 86-87 list both terms; cf. Behre 1934, 1955).

(134) I suggest that you probably should go into another line of work, because you're not very well informed. (1990/08/31, *PBS NewsHour*, COCA)

The quasi-subjunctive is very rare (1.2%) in the spoken language data from COCA. This low frequency can partially be explained by the fact that the subjunctive is a much more popular alternative in AmE (cf. the discussion of types of complement clauses after modal adjectives in Ch. 6.4.1 below as well as Appendix F). Yet the frequency of the quasi-subjunctive in COCA is also surprisingly low compared to the data from SBC (9.5%, *mc*, Collins 2009a: 45, 164) and from Brown and Frown (10% and 4% of all occurrences analyzed by Leech *et al.* 2009: 284), i.e. corpora that only contain written texts. The differences in corpus composition and in the time span covered might play an important role here. The data suggest that the quasi-subjunctive is particularly rare in public and institutional monologue / dialogue (as opposed to the more informal speech of SBC). By contrast, Hundt finds more uses of the quasi-subjunctive (and the subjunctive) in the context-governed part of the BNC than in the spoken-demographic corpus component (1998: 170).

Meaning in w/m (n= 1,002 (1,542)	1990	2009	Difference	Pearson Residuals	
root	449.1	332.1	-26.0%	-0.29	0.77
epistemic	28.8	30.4	+5.7%	-0.48	1.42
quasi-subjunctive	7.9	3.8	-52.6%	0.68	-1.78
conditional clauses	13.0	1.9	-85.6%	0.40	-1.06
= *would*	2.4	0.0	-100.0%	0.01	-0.04
formulaic	22.1	15.1	-31.9%	0.04	-0.11
ambiguous	4.8	5.7	+19.8%	-0.31	0.81
total (iwcm)	528.2	389.0	-26.1%	$\chi^2 = 6.9$, p>0.05, $V = 0.03$	

Table 21 Meanings of *should* in COCA (spoken)

Should is also used in conditional clauses, expressing a "theoretical" condition that is "less vivid" than the indicative (Curme 1931: 425). The occurrence of the event is considered doubtful (more so than when the indicative is used, cf. Huddleston and Pullum 2002: 188) or highly improbable

[102] The past tense triggers *recommended* and *suggested* are used in three cases, yet it is very likely that at the time of the utterance, the proposed action has yet to take place (cf. the following example).

(FN 28) COMMISSIONER-BROWN: I'm the president of the International Association of Chiefs of Police. In that capacity, I wrote our President [… I suggested to the President that he should convene a crime and violence commission for the' 90s. We had that under the Johnson administration; we made progress. (1990/12/07, *PBS NewsHour*, COCA)

(cf. Curme 1931: 425). Curme observes that not the subject's free will, but external circumstances or business constraints are the causes for the action when *should* is used in the protasis (1931: 426). In 59% of these utterances, such as in example (135), the topic of the conversation is (the outbreak of) a war. This seems to support Curme's theory that speakers want to signal that this war is the worst-case scenario and that they intend to present it as highly unlikely. Yet the actualization of the situation is not always considered implausible, which can be seen in example (136). Here the speaker later on switches to the indicative to stress the disastrous consequences of a gas spill. (Note that occurrences with subject-auxiliary inversion (e.g. *should he* in example (136) below) are not considered here.)

(135) JUDD: It also raises the nightmare scenario of Soviet officers being killed by U.S. forces if war should break out. (1990/09/07, "Americans hiding in Kuwait / Summit preview," *ABC Nightline*, COCA)

(136) DONALDSON *voice-over* One of those environmentalists is Donna Smith, who lives near the pumice pit and has a Ph.D. in mining economics. […] Smith worries the nearby mining may have dangerous effects. Ms. SMITH: Should he remove the pumice, it's liable to damage our wells and our water. If he should spill gasoline, diesel oil, it's going to get into the water and ruin our water. And at that point, everybody that lives up here is basically sunk. (1990/08/09, "'One who confronts'; Toby's journey; sale of the century, *ABC Primetime*, COCA)

Occasionally, *should* is also used in the apodosis of conditional clauses. It can then often be used interchangeably with *would* (cf. example (137) below). These rare utterances (0.2%) were classified as having a meaning that is close to *would (= would).*

(137) MR-RADO: It's not hard to find reasons in Leipzig while [*sic*, meant is *why*] the people should want the higher standards of living. They've been able to see for themselves in West Germany. (1990/03/07, *PBS NewsHour*, COCA)

Compared to other corpora, epistemic meanings are rare in COCA (spoken) (on average 6.3% vs. 13.2% in DICE (Leech *et al.* 2009: 285) and ~13-15% in SBC[103]). They slightly increase in use, from 28.8 w/m to 30.4 w/m (the relative frequency rises from 5.5 % in 1990-94 to 7.8% in 2005-09), following the well-known grammaticalization path. One example is (138), where the speaker estimates how much time it will take to rebuild an edifice. Here *should* even alternates with *will.*

(138) The living conditions are less than desirable, but at least, people now a have a place where they can sleep until the rebuilding is completed, rebuilding that should take years, will probably take years. (1990/06/26, "The Iran earthquake relief," *ABC Nightline*, COCA)

It is sometimes difficult to determine the exact meaning of *should* in an utterance. In example (139) the speaker might want to suggest that the ANC may, after a period of assessment, come to the conclusion that it is better to start negotiations sooner than later. Yet he could also mean that he considers it necessary that they understand this premise. Huddleston and Pullum stress that "there

[103] *Mc:* Since Collins (2009a: 164) does not specify how many of the indeterminate cases occur in each of the different corpora he analyzed, it is not possible to arrive at a precise number.

are many cases where the interpretation is purely deontic, but few where it is purely epistemic" (2002: 187; cf. also Collins 2009a: 47). In many "ambiguous" cases, *should* can be interpreted as both having a deontic and an epistemic meaning and – to use Coates' terminology – "exhibit[s] […] merger" (1983: 78). In example (140) it is both intended and expected that the lowering of the discount rate leads to lower loan rates.

(139) I think the ANC must clearly assist [*assess*] the situation and if they do I believe they will come to the conclusion that the conditions have already been largely met for negotiations and I think that they should understand that the sooner the negotiations themselves commence the sooner progress will be made and after the country becomes aware of progress so that will have a calming effect on the various factions fighting with in the country. (1990/06/07, *PBS NewsHour*, COCA)

(140) MS-WOODRUFF: Again, […] the Federal Reserve Board lowered the discount rate to 6.5 percent. The move should lead to lower loan rates for mortgages, automobiles, and businesses. (1990/12/18, *PBS NewsHour*, COCA)

As mentioned above, *should* most frequently expresses root meanings (85.2% of all uses, cf. also Table 21). In this sense, it is often considered a weaker *must* (cf. Ch. 3.3.2 above as well as Biber *et al.* 1998: 205 or Collins 2009a: 44, to name just a few). Leech observes that the meaning of *should* is very close to desirability with a "lack of confidence in the fulfilment of the happening described by the main verb" (2004: 100-101). Altman observes that native speakers rephrase the meaning of *should* in example (141) with phrases like (142) (1986: 82).

(141) In order to improve our English, we should try to talk with Americans.

(142) It would be a good idea… / It might help… (both examples from Altman 1986: 82)

Meaning in w/m (n= 827 (1,312))	1990	2009	Difference	Pearson Residuals	
subjective deontic	305.3	241.4	-20.9%	-0.27	0.69
subjective deontic with directive function	15.1	24.6	+63.2%	-0.93	**2.37**
descriptive: subjective deontic	77.1	37.8	-51.0%	0.64	-1.63
descriptive: directive utterance	17.1	7.5	-55.8%	0.36	-0.92
objective deontic	34.5	20.8	-39.7%	0.23	-0.58

Table 22 Root meanings of *should* in COCA (spoken)

Table 22 shows that subjective deontic uses (cf. example (143) below) – "friendly advice kindly given," to use Curme's nice phrase (1931: 435) – are indeed most frequent. We can assume that the speaker actually wants to give an order to somebody in less than 5.5% of all cases. Example (144), for instance, is the statement of a director who is telling an actress how to play a particular scene and, as could be seen in the video still available online, she acts accordingly. An imperative could be used instead of the modal, yet *should* is more polite and seems to suggest that there are reasons other than the mere will of the speaker to realize the state of affairs.

(143) ERIC-SCHLOSSER-1A# You know, in the same way that candidates debate issues I think companies should engage in a dialogue with people who disagree with some of their business practices. (2009/06/18, "Food Inc., Robert Kenner, Eric Schlosser," *ABC Nightline*, COCA)

(144) CARLA-BLANK: Actually, that one I think you should come downstage on, because you're really asking a question of the audience. (1990/05/13, *PBS NewsHour*, COCA)

The pragmatic purpose of *should* is also apparent in those situations in which the speakers include themselves in the group of people that are asked to perform the action. There are also many occurrences of *should* in which advice is reported (13.2%) or in which orders are repeated (2.9%). Pertinent illustrations of these uses are example (145), where the opinion of a large part of the American population is stated, and example (146), which presents a demand made by kidnappers holding three American university professors hostage. References to rules, regulations, or conventions are also quite common.

(145) Roughly 3/5 of Americans say if Saudi Arabia is attacked, we should use military force. (1990/08/17, *PBS NewsHour*, COCA)

(146) The kidnappers [*sic*] statement said U.S. Assistant Secretary of State John Kelly should fly to Damascus, Syria for the release. (1990/04/18, *PBS NewsHour*, COCA)

In Table 22 we see that almost all root meanings decline in use.[104] Yet only the increase of directive utterances is pronounced enough for us to assume that it is not the result of pure chance. Finally, it should be mentioned that, as emphasized by Collins, there are no dynamic uses of *should.* Even when the necessity originates in external circumstances, the action is recommended by a human agent, in many cases by the speaker him-/herself (cf. Collins 2009a: 44).

[104] Since semantic analyses of spoken AmE data are rare, we can only compare this result to Seggewiß' analysis of CSAE. She finds about 85% root uses of *should* and only a few formulaic cases (2013: 129). Deontic meanings of *should* remain relatively stable in written AmE between 1961 and 1992 (654 of 910 occurrences of *should* in Brown and 622 of 787 in Frown), whereas other meanings decline (cf. Leech *et al.* 2009: 284).

6.1.3. *Shall*

Shall is usually classified as a modal of prediction or volition (cf. e.g. Coates 1983, Biber *et al.* 1999: 485, Collins 2009a) that is considered to be of minor relevance compared to *will* and *would* (Collins 2009a: 125). However, it is also used to express obligation. This will be discussed in more detail below. Smith and Leech observe that *shall is* "now little more than a remnant of its former self" (2013: 80). It is the expression with the most pronounced decline between 1900 and 2009 analyzed here (-93%). As Figure 18 illustrates, it undergoes a period of rapid decline at the beginning of the 20th century in COHA. *Shall* is even less frequent in AmE than in BrE (cf. e.g. Leech *et al.* 2009: 283). In the spoken language section of COCA, it is comparatively rare.[105] The right panel of Figure B.4 in Appendix B.2 shows that at the end of the 20th century, *shall* is particularly rare in newspapers and magazines, but more frequent in non-fiction books in COHA.

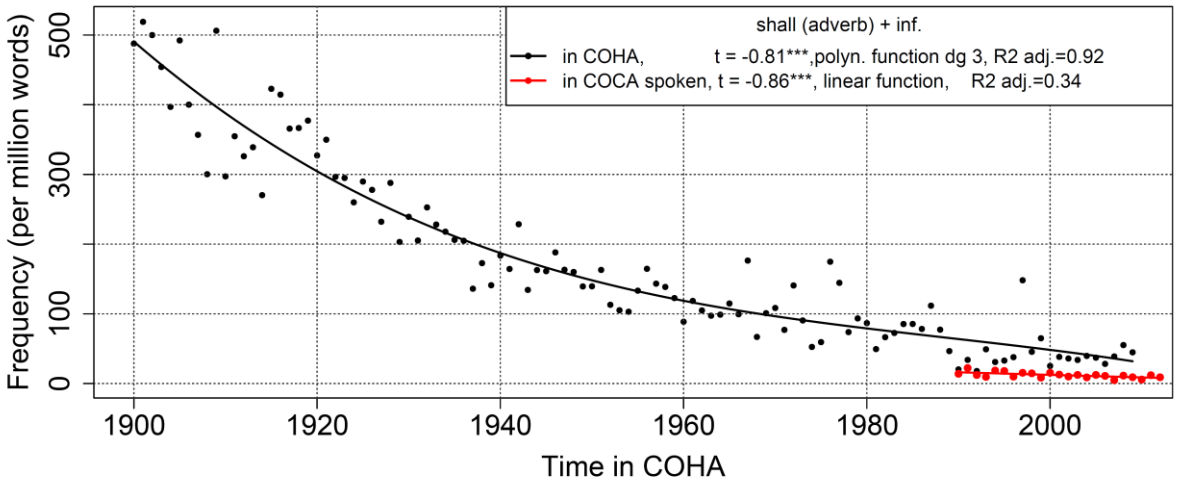


Figure 18 *Shall* in COHA and COCA (spoken)

This ties in with recent findings by Hilpert. His analysis of the collocations of *shall* in COHA (2011: 442-443) shows a diachronic shift from verbs referring to obligations and intentions (e.g. *forbid*, *advise*, *govern*, *avoid* etc.) to meta-linguistic expressions of discourse structure (i.e. *discuss*, *argue*, *grant*, *explore* etc.). In my data from COCA (spoken), these infinitives are rare, yet the formal character of *shall* is also mirrored in the list of distinctive collexemes (cf. Table F.3 in Appendix F). Only 7 of the 78 infinitives attracted to *shall* (p<0.05) are among the top 100 most frequent verbs in the spoken language section of COCA, whereas as much as 46% are not even among the top 1,000 most frequent verbs. The overwhelming majority of the collexemes are elaborate expressions typical of a formal style (e.g. *inherit*, *vacate*, *behold*, *commence*, *weep*, *conceive*, *dwell*, *rejoice*, *rename*, *reap*, *mount*, *forfeit*, *vanish*, *fold* – all p<0.01). The semantic analysis of *shall* reveals that the modal is often used in vows given in wedding ceremonies or in courtroom proceedings (such as in example (147)) as well as in quotations from the Bible or from old poems, and in the

[105] The frequencies for spoken English indicated here include vows and quotations that were not taken into account in the semantic analysis. Knock-out contexts are included.

song "We shall overcome." Since they constitute fixed phrases in which a substitution with another expression of modality is impossible, they were not considered in the semantic analysis. Repetitions of the same laws or rules were likewise eliminated. The number of analyzed utterances was thus reduced by 28% from 304 to 219 occurrences for 1990-94 and by 43% from 180 to 103 in 2005-09. Formulaic phrases such as *this*, *too*, *shall pass* and *we shall see* (cf. example (148) below) were counted separately. They account for 6% and 23% of all remaining uses respectively.

(147) JUDGE Do you swear the testimony you shall give in this case shall be the truth, the whole truth, and nothing but the truth, so help you God? (1994/09/27, *ABC Nightline*, COCA)

(148) RUSS-MITCHELL: I'm still here to talk about it. And I believe I'm still employed by CBS, we shall see. It was an experience to remember, I can tell you that. (2009/10/27, *CBS Early*, COCA)

The most common meaning of *shall* in my data is obligation (43% of all uses when formulaic meanings and *if*-sentences are excluded, cf. examples (149) and (152)). Expressions of futurity also account for almost a third of all occurrences (29.7%). A pertinent illustration is example (150). Here the speaker stresses that only time will tell what will happen in the future, and *shall* even alternates with *'ll* (which is generally considered the contracted form of *will*, cf. Aarts *et al.* 2013: 28)). This meaning is supposed to have developed out of the modal meaning of constraint, which often implies that the situation is actualized in the future (cf. Curme 1931: 363). Sweetser stresses that in her dialect, *shall* signals that the speaker "make[s] him/herself responsible for carrying out the action" and takes it upon him/herself to "see to it or to command that the action be done" (1990: 54, 55). This meaning – like all other meanings of *shall* – drastically declines in use. However, its relative frequency remains quite stable (26.5% in 1990-94 and 23.3% in 2005-09).[106] As Table 23 shows, only formulaic uses and occurrences of *shall* in *if*-clauses increase in use.

(149) ROBERT SHAPIRO: Is the policy generally that no crime scene shall be entered except in the accompaniment of an officer? (1994/07/07, "O.J. Simpson preliminary hearing, day 5, part 3," *ABC Breaking News*, COCA)

Meaning in w/m (n= 322)	1990-94	2005-09	Difference	Pearson Residuals	
future	2.64	1.19	-55.0%	0.30	**4.69**
intention	2.73	1.09	-60.1%	0.57	**4.30**
root	3.69	1.54	-58.4%	0.55	**4.39**
formulaic, *if*	0.91	1.29	+41.5%	**-2.02**	-0.08
total (iwcm)	9.97	5.10	-48.8%	$\chi^2 = 15.0$, $p<0.01$, $\varphi = 0.12$	

Table 23 Meanings of *shall* in COCA (spoken)

(150) BAIN: I don't want to make anybody uncomfortable in my house. GIBSON: We shall see if they're going to be uncomfortable. We'll see how the seasonworks [*sic*] out. (2005/11/11, "Talking points and top memo story," *Fox O'Reilly*, COCA)

[106] Note, however, that Aarts *et al.* (2013) found a decline of epistemic *shall* from 67% to 38% between the 1960s and 1990s in BrE (LLC, ICE-GB). This drastic reduction cannot just be explained by the overall decline of *will* and thus points towards "a shift in use from Epistemic *shall* to *will*" (2013: 35).

A sort of intermediate position is occupied by the occurrences in which the speaker expresses an intention[107] or a plan to perform a certain action (27.9%). These utterances often have the character of promises (or threats) with a guarantee of future actualization (cf. Palmer 1990: 74). Haegeman observes that the speaker is certain to control the future actualization of these events (1981: 5-8). The meaning of these utterances is thus very close to futurity and a substitution with *will* is possible. Yet the resulting obligation to realize the state of affairs is self-imposed and not a matter of course. Since the speaker seems to engage in what Collins calls "insistent self-incitement" (2009a: 36), this use is also very close to other obligation meanings. This can be seen in example (151), in which the speaker commits himself to paying the money.

(151) Mr. KING: I pay more money than anybody in the history of the sport. I'm opening the door, Sam, to all those who are heavy-laden- DONALDSON: And you shall give them rest? Mr. KING: Yes, I shall give them money, M-O-N-E-Y (1991/06/27, "King of the ring," *ABC Primetime*, COCA)

Table 24 shows the different obligation meanings that were distinguished. References to laws or the constitution (cf. example (152)) are particularly frequent. These are fixed, laid-down rules with a binding character; looser policies or general agreements are rarer. Occasionally, *shall* is also used when the speaker gives a direct order (cf. example (153)) or repeats someone else's directive.

(152) Senator ROBERT BYRD (Democrat, West Virginia): What does the Constitution say? By and with the consent, he, the president, shall have power to nominate and, by and with the consent of the United States Senate, SHALL appoint.' (2005/05/15, "Analysis: Voices in the news this past week," *NPR Sunday*, COCA)

(153) This evening, as dusk fell, the mayor of Los Angeles ordered a curfew. Mayor RIORDAN: No person shall be on public property, including public streets and sidewalks, or on any vacant private property during the period from sunset until sunrise of the next day (1994/01/17, *ABC Nightline*, COCA)

Meaning in w/m (n=112)	1990-94	2005-09	Difference	Pearson Residuals	
objective deontic	0.41	0.40	-3.3%	0.88	0.36
subjective deontic (with possibly directive function, incl. descriptive uses)	3.28	1.14	-65.2%	0.16	0.41

Table 24 Root meanings of *shall* in COCA (spoken)

As we can see in Table 24, there is a pronounced decrease in all the use of all of these meanings. However, since the numbers are very low, reliable statements are hard to make.

[107] Collins (2009a: 137) classifies some of these utterances as volitional, i.e. dynamic. This label is avoided here because of the hybrid nature of these meanings. Instead, the label 'intention,' already used by Coates (1983: 186-188), is meant to signal this particularity. Collins notices that there are utterances in which the speaker gives a guarantee to act accordingly, yet the corpus example he gives (listed as 29 below), classified as deontic, does not seem to fit the description. Here it is hard to imagine that the speaker is in any way obliged to see what will happen. Examples like these were considered to embody future meaning in my data.

(FN 29) A: But I thought he was going to go in October or or November or some

B: Yeah he was and then they they sort of haven't called him up yet but he saw somebody last week excuse me who said uhm oh we should be interviewing you in the next couple of weeks so yeah. […] We shall see. (ICE-GB S1A-098 27-29, Collins (2009: 137) only quotes the last sentence).

6.1.4. *Need*

Once considered a "black sheep" of the modal family (Duffley 1994, Jacobsson 1994: 169) and neglected in many studies dealing with modal auxiliaries, *need* has received considerable attention in the past two decades (cf. e.g. Taeymans 2004a, 2004b, Müller 2008, van der Auwera and Taeymans 2009, Nokkonen 2010, 2012, van der Auwera *et al.* 2012, Loureiro-Porto 2013), often in comparison to the "main verb construction" *need to* (Quirk *et al.* 1985: 138). Its common classification as a marginal modal does *need* owe to the fact that it can behave like a modal or a lexical verb (cf. Biber *et al.* 1999: 484, 163). While I believe that *need(n't)* and *need to* should be considered two separate verbs, one a core modal and one an emerging modal or semi-modal (cf. Taeymans 2004a: 101 for a list of the criteria for (modal) auxiliary verbs fulfilled by both forms), some aspects of *need to* will be analyzed in this chapter to allow for a detailed comparison between the two verbs. The first step is an examination of the frequencies of *need* and *need to.* Then, restrictions in the use of *need* will be described before the use of both *need* and *need to* in (non-)assertive contexts is examined. After an examination of blend constructions, a comparison of the semantics of the two verbs will follow.

Changes in the Frequency of Use of Need *and* Need to

Van der Auwera and Taeymans' diachronic study (2012) shows that *need to* was used exclusively in late Middle English and continued to be more frequent than its competitor *need* until the middle of the 18th century. *Need* is still dominant in the 1850-1920 data from CLMET (BrE), but it is outnumbered by *need to* in the 1990s (LOB). In quotations in the OED, *need* is still the dominant form between 1950 and 1960 (cf. Müller 2008: 77), whereas *need to* is already more frequent than *need* in the American Brown corpus (1961, 68 vs. 40 occurrences, cf. van der Auwera *et al.* 2012: 58). Regional differences between BrE and AmE probably play a decisive role.

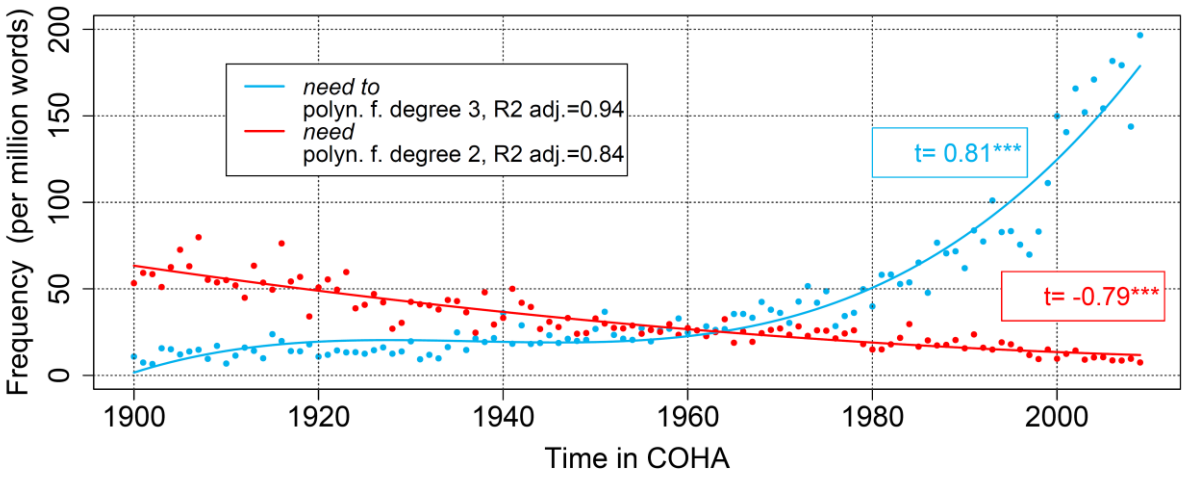


Figure 19 *Need* and *need to* (iwcm) in COHA

An examination of COHA (for which only occurrences of *need to* in the present tense, i.e. *need* and *needs to*, without any preceding core modal, were considered, cf. Figure 19) also suggests that *need to* overtook *need* in the 1960s. (Corpus composition is certainly also important here. In the newspaper data from the TIME corpus (1926-2006, cf. Appendix C.4 and Jäger 2009), for example, *need to* becomes more frequent than *need* in the 1930s.)

Restrictions in the Use of Need

The decline in the use of *need* is often attributed to restrictions in its use. As a product of its time, it lacks the syntactic flexibility that *need to* offers. As Taeymans and Snellinx (2003: 11) point out,

> *need* + *to infinitive* seems to be gaining ground at the expense of the auxiliary; it expresses more or less the same notion of necessity in negative sentences, but is free to appear in positive affirmative constructions. Therefore, it may well push modal *need* further into the corner.

Kalogjera (1966: 153) and Hargevik (1983: 29) suggested that *need* is preferred in subordinate clauses, whereas *need to* is used in independent clauses. However, the majority of linguists are nowadays convinced that the use of *need/n't* is restricted to non-assertive contexts (cf. Jacobsson 1974, Quirk *et al.* 1985, Duffley 1994, Palmer 1979) or non-affirmative contexts (cf. Huddleston and Pullum 2002: 834-838), i.e. "contexts that are negative in a certain way" (Jespersen 1909-1949: IV 1931, 8-13) or express doubt (Palmer 1990: 40, Swan 2001: 400). *Need(n't)* is also often called a negative polarity item (cf. Akmajian *et al.* 1979: 18, quoted by Van der Wouden 1996b: 2, Duffley and Larrivée 1998: 89). Duffley and Larrivée note that *need* appears in "contexts bearing negative presuppositions to produce inferences which involve a strengthening or a softening of negation" (1998: 89). They are convinced that the reasons are semantic rather than formal (1998: 92).

Below, you find a list of the types of non-assertive contexts that have been identified. (All examples given below are quoted from Jacobsson (1974: 62-63) unless indicated otherwise.)

Type	Examples	Additional Information
Questions	*Need I be present?* *I wonder if I need be present.*	in direct as well as in embedded questions (Erdmann 1982: 98; Duffley 1994: 220), especially when the speaker hopes for a negative answer (Jacobsson 1974: 60)
Negation	*He needn't come.* *One need be by no means ashamed to know them.* (Erdmann 1982: 97)	*not* can occur in the VP and in contracted form in the NP or VP (Erdmann 1982: 97)
Shifted negation	*There is nothing you need trouble about.* *I don't think I need say more than that*, *need I?* (Erdmann 1982: 97)	the existence of a negative "in a higher clause [...] makes the modal form possible" (Palmer 1990: 127, cf. also Poutsma 1926: 610); Quirk *et al.* use the term "transferred negation" (1985: 1033-1035)
Restrictive adverbs	*I need hardly say how glad I am.*	*hardly*, *scarcely* (Jacobsson 1974: 60), *hardly*, *scarcely*, *no one* (Palmer 1965: 41) *hardly*, *never*, *only*, *few*, *little* (Erdmann 1982: 97) *only*, *hardly* (Quirk *et al.* 1985: 138) "the minimizing adverbs" *barely*, *but*, *scarcely*, *seldom*, *solely*, *rarely* (Bolinger 1942: 63-64)

'Hidden negatives'	*All he need do is state his opinion clearly.* → *He needn't do more than...* *There is little left in the directive after the German compromise that need alarm the committee…* → *Little that need alarm the committee is left in the directive…* (Erdmann 1982: 98) *This completes what need be said about principal sentences.* → *No more need be said…* (Poutsma 1926: 410)	implicit negation in the superordinate clause (Erdmann 1982: 98) Taeymans (2004a: 98-99) points to the use of universal quantifiers "when the complex, although containing no negative, has a negative import" (Poutsma 1926: 410)
Com-parative clauses	*Standards are lower than they need be*. → *Standards need not be as low as they are* (Duffley 1994: 220). *By co-vary*, *we mean that the more a language has of one of the processes*, *the less it need have of the other.* (Keenan 1978: 120) → *if it has more of one*, *it need not have as much of the other* (Duffley 1994: 220)	
After super-latives	*His book covers most that need be said on the subject.* → *There is little more that need be said…* (Duffley 1994: 219)	
Before-clauses	*I have half an hour to spare before I need go.* → *I needn't go yet.* (Duffley 1994: 219)	"latent negation" (Jacobsson 1974: 61)
Subjunctive force	*It is embarrassing that such a truth need be stated at all.*	
Concessive clauses	*However much need be said*, *let it wait.* → *There may be a great deal that needs to be said but it need not be said immediately.*	"the need [...] is conceded" (Jacobsson 1974: 61) *need* only appears in the protasis of condi-tionals; many speakers only accept *if need be* (Van der Wouden 1996a: 3)
Conditional clauses	*If you need borrow money at all*, *borrow as little as possible.* (Duffley and Larrivée 1998: 97)	

Table 25 Non-assertive contexts in which *need* occurs

Information about the actual frequency of *need* in non-assertive contexts comes from van der Auwera *et al.*'s comparative study of *need (to)* in BrE, AmE, and Asian Englishes (2012), from van der Auwera and Taeymans' (2009) analysis of the development of the *need* modals between 1150 and 1991, and from Hoeksema's examination of *need*, *hoeven*, and *brauchen* in a self-compiled corpus (2010). Unfortunately, Loureiro-Porto's analysis of the data from ARCHER is unsuited for comparison because a different definition of negative and affirmative uses of *need* is adopted (2013: 181-183), whereas van der Auwera *et al.* seem to adhere to the standard view ("negative contexts, in questions, in conditionals and […] a few other non-affirmative contexts," 2012: 55). It needs to be mentioned, though, that they count blend constructions such as example (154) as occurrences of *need* with the bare infinitive (the authors assume that this has been the standard practice in other studies on the topic), but I will treat blends separately.

(154) You don't need worry, Angela (Brown)

In a time-consuming process of manual analysis that will be described in detail later, the number of uses of *need to* in non-assertive contexts in COHA was determined. My analysis supplies more fine-grained data for written AmE in the 20th century (cf. Figure 20) than studies of Brown and Frown, which found a relatively stable number of occurrences of *need* (-8%) and a decrease in the share of occurrences of *need to* in non-assertive contexts (from 31% to 19%) as the use in affirmative contexts increases drastically (from 69% to 81%, cf. van der Auwera *et al.* 2012: 58).

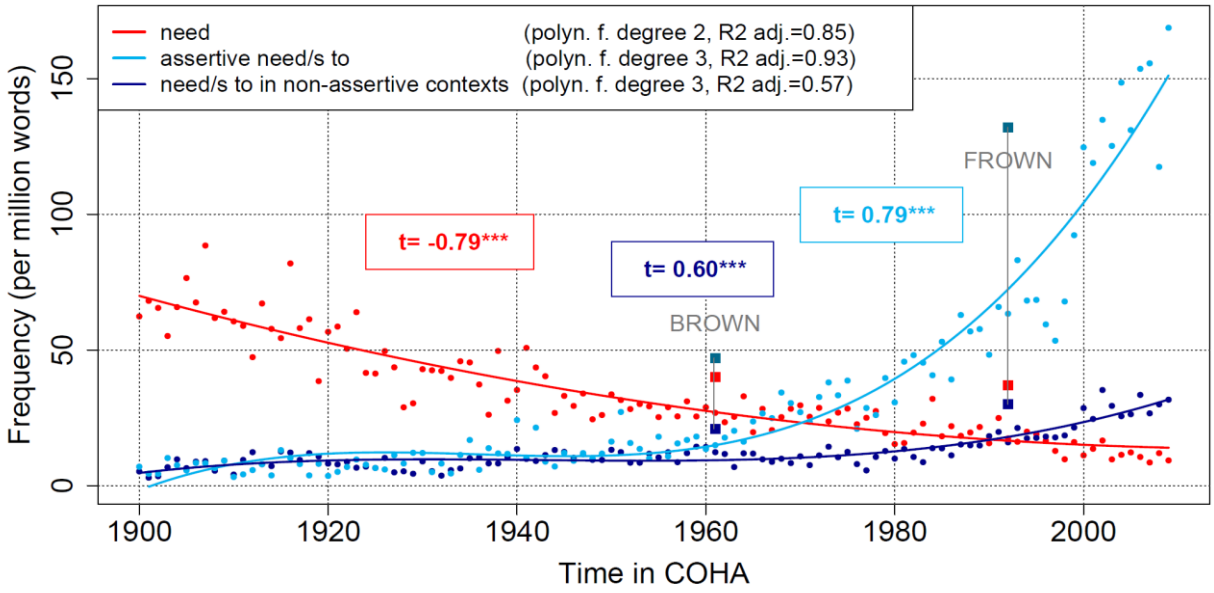


Figure 20 *Need/s to* in (non)-assertive contexts in COHA

The data from COHA – like van der Auwera and Taeymans' data from 20th century BrE (2009: 325) – mirror an increase in the use of *need to* with positive and negative polarity. (That the frequencies are slightly lower than in Brown and Frown is most likely due to differences in corpus composition.) A similar picture can be found in the TIME corpus (cf. Figure C.10 in Appendix C.5). As we can see in Figure 20 and in the left panel of Figure 21 below, in COHA *need to* is marginally more frequent in non-assertive contexts than in affirmative contexts at the beginning of the 20th century, but the situation changes considerably as *need to* makes considerable headway in assertive contexts towards the end of the analyzed period. My results thus confirm Smith's claim that "most of the increased uses of NEED TO are in affirmative contexts" (2003: 260) – which is, unfortunately, not backed up by numbers –, even if only for present tense uses. These findings suggest that the rise of *need to* does not simply compensate for the decline of *need* (cf. also Smith 2003: 249). Van der Auwera *et al.* conclude that *need to* encroaches on the territory of other modals (2012: 59).

My data also indicate that the 1990s are the decade in which the relative frequencies of *need* and non-assertive *need to* converge. In Frown *need* is still preferred in non-assertive contexts (55% vs. 45% of all uses with negative polarity with *need to*, cf. van der Auwera *et al.* 2012: 61). In COHA *need to* is already slightly more frequent in the 1990s (51%, cf. right panel of Figure 21 below). The figure rises to 70% at the beginning of the 21st century.

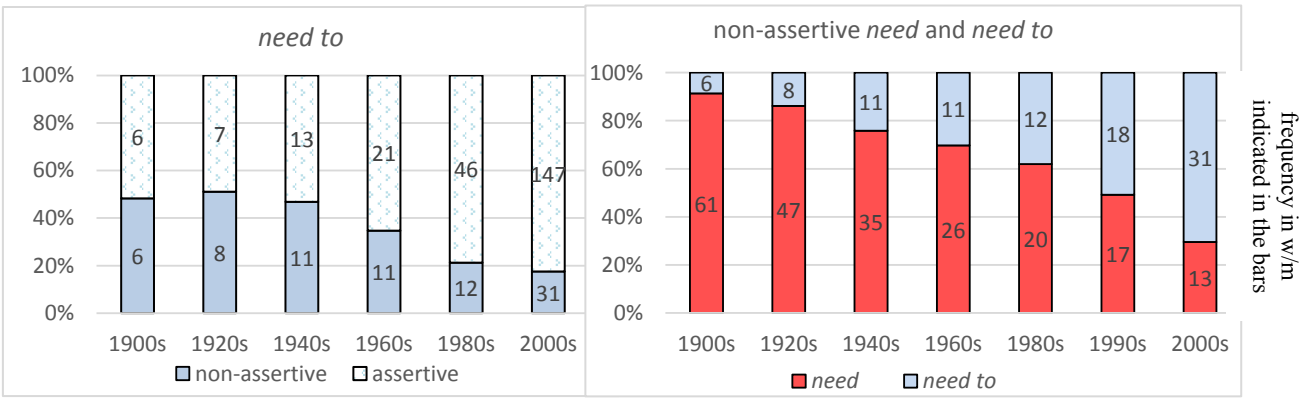


Figure 21 Share of (non-)assertive uses of *need to* and *need* in COHA

Van der Auwera and Taeymans speculate that there might be an evolution towards a functional split between "a negatively polar *need*" and a "positively polar *need to*" if *need to* primarily increases in use in affirmative contexts (2009: 324). If, however, *need to* takes over the functions of *need*, *need* may disappear entirely (van der Auwera and Taeymans 2009: 324). However, this position implies that *need to* and *need* are completely synonymous in non-assertive contexts. I will examine below if this is indeed the case.

An examination of the types of non-assertive contexts in which both verbs are used seems in order. As Figure 22 shows, the majority of the occurrences of *need* can be found in negated clauses, where the decline is very steep (more than - 80%, τ = -0.76***). A comparison to the frequency of negated *need to* (light blue line) shows that the increase in the use of negated *need to* (~ 9 w/m) does by far not compensate for the decrease in the use of negated *need* (~ -38 w/m).

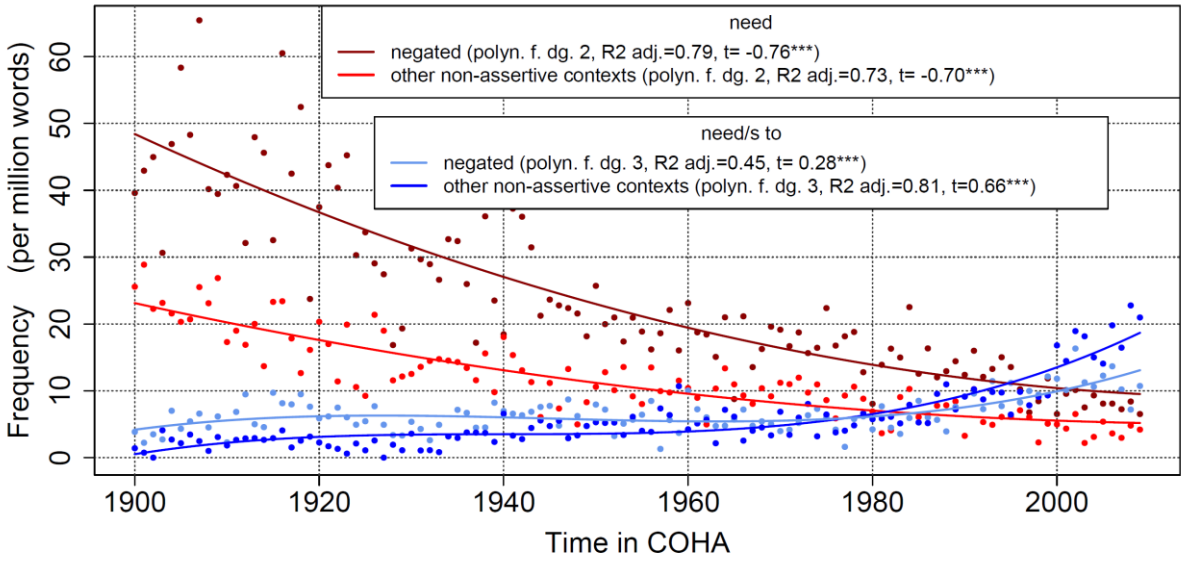


Figure 22 *Need* and *need to* in negated clauses and other non-assertive contexts in COHA[108]

[108] Figure C.13 in Appendix C.5 illustrates the corresponding relative changes in frequency.

Closer analysis reveals that full forms of the negator *not* decrease with both *need* (-27 w/m) and *need to* (-2 w/m), whereas contracted forms undergo an increase in use with *need to* (+ 6 w/m) and decline with *need* (- 18 w/m). This seems hardly surprising if we consider that *need to* is much more frequent in the sections of the corpus that contain spoken language. It should be kept in mind, though, that only those forms that precede an infinitive are included in the count here.

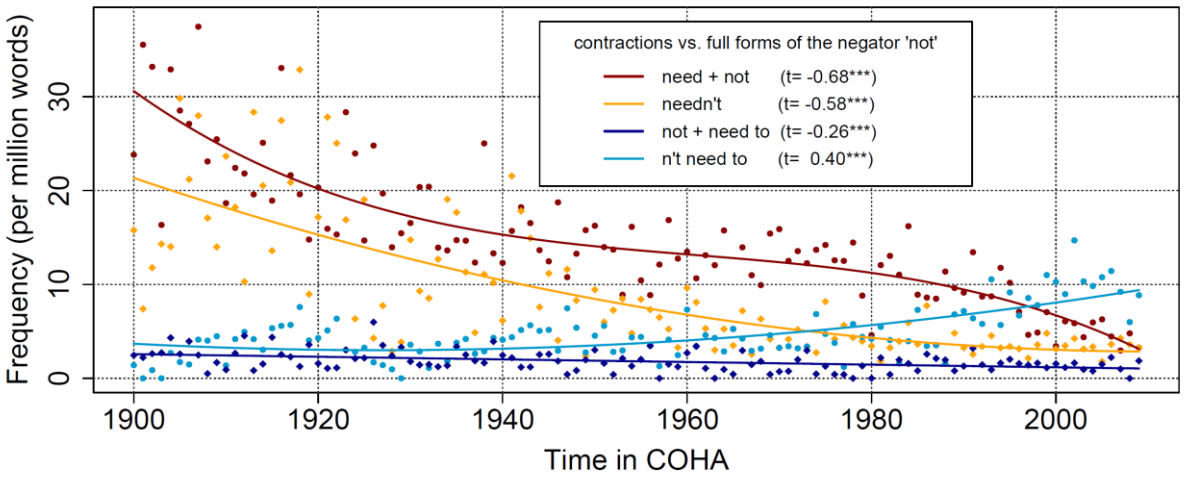


Figure 23 (Non-)contracted forms of negated *need / need to* in COHA

Figure 22 above also shows the frequency of both *need* and *need to* in other non-assertive contexts. From the 1900s on directly negated *need to* is slightly less frequent than uses in other non-assertive contexts, but this situation changes in the 1960s. The use of *need to* in other non-assertive contexts becomes a lot more frequent towards the end of the analyzed period. The cumulative frequency of *need* and *need to* in these other non-assertive contexts even rises above the level of the 1900s in the 2000s (cf. Figure 24). The question that arises here is whether – cases of direct negation excluded – both forms occur in the same types of non-assertive contexts.

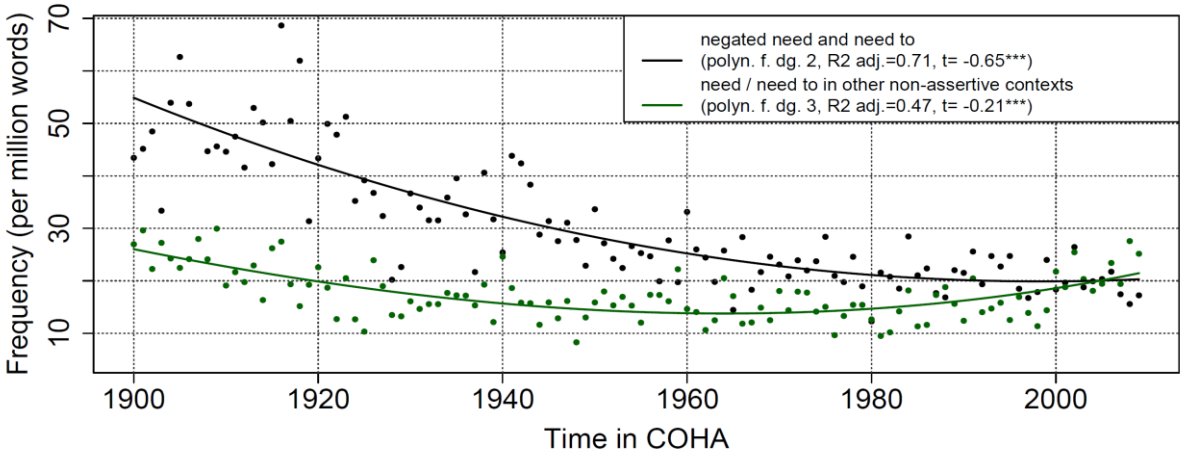


Figure 24 Negated and non-assertive *need* and *need to* in COHA

As mentioned above, the different types of non-assertive contexts in which *need to* and *need* are used in COHA were also identified. To my knowledge, such a large-scale study of both verbs in

non-assertive contexts has so far not been undertaken: 11,500 occurrences of *need to* were semi-automatically examined and more than 2,500 sentences with *need* were manually classified.

Let us first consider the restricted use of *need.* Questions with *need* were automatically retrieved in COHA (410 hits for *need* + pronoun + infinitive; examples of *need* + noun / name + infinitive were not found); so was the phrase *if (it) need be* (560; 7 other uses were identified manually). Additionally, 3,767 occurrences of *need* + (adverb +) bare infinitive were extracted from the corpus. After duplicates, nouns incorrectly tagged as verbs, and other irrelevant cases had been eliminated, 2,554 occurrences were manually analyzed. These were classified according to the type of non-assertive context they appear in. Sentences with a negative semantic element (e.g. *reservations* and *deny* in examples (155) and (156) below) were classified as cases of semantic negation.

(155) But there are great reservations whether the words "separately administered" need come out in order to achieve this. (1958/05/11, *NYT-Reg*, COHA)

(156) we can admit the difficulties, […] yet nevertheless deny that this state of affairs need continue: the technical difficulties can be overcome (Barnett, S. A. (1971) *Human Species*: *A Biology*, COHA)

In 31 cases, however, none of the non-assertive contexts described in the literature could be identified. Two occurrences are found in utterances where the speaker corrects her-/himself, three can be characterized as representing mock-broken English, one is a quote from the Bible, and eight cases are found in direct speech in the fiction and in the magazine section. Some of the remaining 13 cases might be due to errors in the scans. In example (157), for instance, where the source, the magazine *Motor Boating & Sailing*, could be accessed online via Google Books, *to* is simply missing in the corpus. Other cases (such as example (158) below) can be considered genuine examples of the rare affirmative uses that van der Auwera and Taeymans (2009) describe. Having identified 7 occurrences of this type in CLMET (nearly 10 million words, 1850-1920), they do, however, find none in the much smaller Brown and Frown corpora (2009: 318-319).

(157) We passed through the swing bridge that carries the main Inverness-Fort William road along the Glen […]. The channel was clearly marked by buoys, but you need (to) concentrate on navigation. (Pike, D. (1998) "Highland fling." *Motor Boating & Sailing* 181.4: 112, COHA)

(158) Nothingsteadily [*sic*] and perennially full of perennially new and perennially renewed anguishes for me to measure my stature against whenever I need reassure myself that I also am Motion. (Faulkner, W. (1957) *The Town: A Novel of the Snopes Family*. New York: Random House, p. 143, COHA)

Table 26 shows the number of uses of modal *need* in various non-assertive contexts (excluding cases of direct negation). The actual frequencies of *need* in non-assertive contexts are rather low compared to other modal verbs, ranging between 23.2 w/m and 5.0 w/m. Note that for the sake of good visualization the numbers are not, as usual, displayed per million but per ten million words. The periodization is based on VNC-analysis of decade averages (cf. Fig C.15 in Appendix C.4).

Decade	1900s	1910s-30s	1940s-70s	1980s-90s	2000s	Change in w/m
questions	22.6	18.9	12.8	11.2	13.8	-0.9
negated element in NP	29.3	17.1	14.2	4.1	1.4	-2.8
negated object	40.4	26.3	14.5	6.0	3.1	-3.7
negation in main clause	6.7	4.5	3.8	2.1	1.4	-0.5
no longer / further / more	2.2	5.0	2.1	1.5	0.3	-0.2
ever	16.4	14.2	8.1	3.6	4.1	-1.2
neither / nor	12.0	9.4	6.9	3.4	0.3	-1.2
only, (none) but, merely, simply	23.5	23.1	20.7	21.9	11.9	-1.2
all	4.4	4.4	5.3	0.9	1.7	-0.3
hardly, scarcely	20.9	14.3	6.3	2.1	0.7	-2.0
seldom		0.1	0.1			0.0
few, just, little	4.9	1.9	1.7	0.2		-0.5
if- clause		1.0	0.6			0.0
if need be	45.6	24.1	19.0	13.8	9.1	-3.7
other formulaic uses (*e.g. when need be*)	0.4	0.1	0.7	0.9	1.4	0.1
before	0.4	0.4	0.3			0.0
comparison	2.2	3.3	4.1	2.5	0.7	-0.2
semantic negation	0.4	1.0	0.8	0.4	0.3	0.0
total (n=3,095)	232.3	169.0	122.1	74.6	50.0	-18.2

Table 26 *Need* in non-assertive contexts (excl. direct negation) in COHA (av. per 10 million words)

At the beginning of the 20th century, *need* is frequently found in the phrase *if need be* (cf. example (159) below), in clauses with negated objects (cf. example (160)) or negated elements in the noun phrase, in questions, and in combination with restrictive adverbs like *only*, *(none) but*, *merely*, *simply* or *hardly* and *scarcely*. Yet in the course of the 20th century *need* experiences heavy losses in most of these constructions (e.g. with negated objects from 4.0 w/m to 0.3 w/m or with a negated element in the NP from 2.9 w/m to 0.1 w/m). *Need* seems to seek shelter in primarily three contexts: The phrase *if need be* accounts for 18% of the non-negated non-assertive occurrences in the 2000s. Questions become more frequent than *if need be* in the 2000s (28% of the forms presented in Table 26). Restrictive adverbs like *only* remain relatively frequent even at the beginning of the 21st century (23.8%, cf. also Hoeksema 2010). They constitute the second-to-largest group of uses with non-assertive *need* (24%) in the 2000s (excluding direct negation). An additional contender for fossilization is the use of *need* with *ever* (8.2% in the 2000s).

(159) If Dorothy were found, he meant to steal her -- if need be, even against her will. (Steele, Jack (1909) *Husband by Proxy.* New York: Desmond FitzGerald, COHA)

(160) "A man away from home need feel no shame," says a much-quoted Japanese proverb. (Gibney, F. (1951) "The birth of a new Japan." *Reader's Digest:* 55-59, COHA)

(161) We need only examine the anxious reaction of his contemporaries to gauge how politically risky a move it was. (2005/01/25, "Letters." *Time Magazine*, COCA)

To see if similar results can be found, the same type of analysis was also done for *need to*, yet considerably more time and effort had to be invested. In order to identify all occurrences of *need to* in non-assertive contexts, searches for cases of direct negation in the present tense (cases followed by *have* + past participle excluded) and for other non-assertive contexts (present tense *needs* and *need to* + infinitive) were performed. 3,731 and 12,324 occurrences were found respectively. 2,055 duplicates were (automatically) eliminated in Microsoft Excel. With the help of visual basic macros, the three words preceding *need/s* (word 4, 3, and 2 before *need/s*) as well as the three words following *need/s* + infinitive were sorted alphabetically and manually examined with particular attention paid to possible indicators of non-assertive contexts such as *all*, *any…*, *as*, *before*, *but*, *do* (questions), *do(es) not*, *doubt*, *ever*, *few*, *hardly*, *if*, *just*, *less*, *little*, *more*, *most*, *much*, *never*, *not*, *no …*, *only*, *rarely*, *scarcely*, *unless*, and the question mark. Triggers of the subjunctive were not searched for. Clauses in the past tense (not counted), nouns incorrectly tagged as verb forms (not counted), clauses with both a core modal and a form of *need to* in the verb phrase (cf. example (162), approximately 1,661 cases), and (~ 400) uses of the full verb (cf. example (163) below) were disregarded. A total of 11,688 occurrences of *need to* formed the basis of this manual analysis. 1,626 uses of *need to* in non-assertive contexts were thus identified (89 of these occurrences were cases in which the negator *not* preceded *need to* and which were counted as negated forms in the final count). Additionally, a separate search for present tense forms of negated *need* (*do/does not*/*n't need to* + infinitive) was made.

(162) The question it makes you ask is what kind of roots we need to survive. (Higgins, Richard (1983/10/11) "Going from corn to chips'; high-tech firms flourish on an ancient farmland," *Boston Globe*, COHA)

(163) You*'ll* probably need to bore the cylinders to a standard oversize and use new pistons. (Allen, M. (2006) "Auto clinic." *Popular Mechanics* 183.8: 105-109, COHA)

To identify the other non-assertive contexts in which negated *need to* is found and to allow for an easy comparison, the same time periods as in Table 26 were chosen in Table 27. *Need to* gains ground in one context in which the decline of *need* has been substantial: It becomes particularly common in questions (+2.1 w/m vs. -0.9 w/m in the case of *need*). The rise of *need to* outweighs the loss of *need* in the phrase *all somebody needs to …* (+1.1 w/m vs. -0.3 w/m), after negations in the main clause (+0.8 w/m vs. -0.5 w/m), and in comparisons (+0.4 w/m vs.-0.2 w/m). By contrast, the increase of *need to* in *if*-clauses (+2.0 w/m) is a lot smaller than the decline of *if*-clauses with *need*, particularly that of *if (it) need be* (-4.6 w/m). The same can be said about the use of *need to* after negated elements in the noun phrase (0.2 w/m vs. -2.6 w/m), after negated objects (+0.3 w/m vs. -3.4 w/m), and its use with the restrictive adverb *only* (+ 0.2 w/m vs. -1.2 w/m). With regard to other restrictive adverbs, *need to* and *need* exhibit different preferences. Whereas *need* was primarily used with *little* (in particular in the phrase *little need be said*, which is no longer found at all after 1971 in COHA, cf. example (164)), *need to* frequently co-occurs with *just* in the 1990s and 2000s (cf. example (165), which is one of the first uses in COHA).

(164) About the Yugoslays, finally, little need be said. (Birnbaum, N. (1971) *Toward a Critical Sociology.* New York: Oxford University Press, COHA)

(165) I don't have to be good now. Just need to line up the enemy in my gunsights. (Weidman, J. (1958) *Enemy Camp*, COHA)

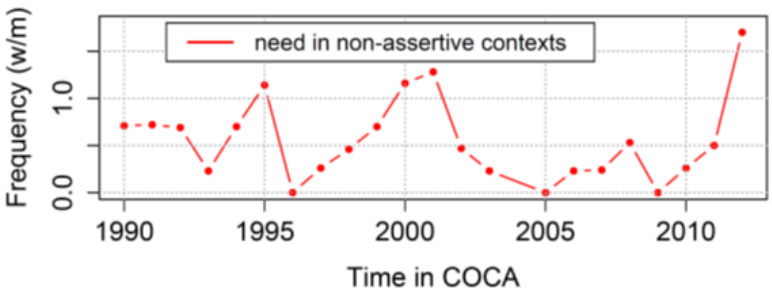
Decade	**1900s**	**1910s-30s**	**1940s-70s**	**1980s-90s**	**2000s**	**change in w/m**
questions	2.2	1.7	9.0	20.4	45.8	4.4
negated element in NP	3.1	2.5	3.4	3.0	4.7	0.2
negated object		0.6	1.6	0.6	3.4	0.3
negation in main clause	0.9	1.7	2.2	4.3	8.8	0.8
no longer / further		0.3	1.7	1.5	2.7	0.3
(n)ever	1.3	1.7	1.9	1.3	1.7	
neither / nor	0.9	0.7	0.5	0.6		-0.1
only	2.7	1.7	2.3	3.0	4.1	0.1
few, just, little		0.1	0.9	7.7	24.8	2.5
all	6.7	6.9	12.4	14.1	34.6	2.8
hardly, scarcely	1.8	1.4	1.9	1.5	1.7	-0.01
rarely, seldom, simply			0.5	0.6		
if-clause		0.6	2.5	9.8	19.3	1.9
before	0.4		0.3	0.4	1.7	0.1
comparison	0.9	1.8	3.5	5.7	8.8	0.8
any		0.4	0.6	1.1	1.7	0.2
total (n= 1,537)	20.9	21.7	45.2	75.6	163.8	14.3

Table 27 *Need to* in non-assertive contexts (excl. direct negation) in COHA (av. per 10 million words)

We can thus say that while the use of *need to* may compensate for the loss of *need* in some contexts, there are others in which it spreads more than *need* declines – a development which explains why we see an overall increase in the use of non-negated *need to* in non-assertive contexts. Many uses of *need*, such as the co-occurrence with *before*, *neither*, and *nor*, seem to die out.

Not much additional information could have been gained by performing the same type of analysis in the spoken language section of COCA. The number of sentences with *need to* that would have had to be examined is even higher than in COHA. Hence the analysis was restricted to uses of *need*, which could be classified in their entirety. Their number in the spoken section is much smaller than in other text types (probably owing to the high level of formality associated with *need*). Only 54 occurrences remained after all 25 non-catenative complements of *need* had been removed.

As illustrated in Figure 25, the overwhelming majority of uses of *need* occurs after negated noun phrases. Additionally, there are 28 occurrences of *need* + bare infinitive in contexts that have not been characterized as non-assertive (cf. example (166) below). It is striking that *need* + infinitive and *need to* + infinitive are often both used in the same context.



frequency per 10 million words	
questions	0.10
negation in noun phrase	1.01
negation in main clause	0.11
never	0.11
only	0.11
hardly	0.22
all	0.11

Figure 25 *Need* in non-assertive contexts in COCA (in w/m, left panel | per 10m words, right panel)

(166) You need make a stand valuewise, whether you're going to condone that or not. (1998/09/12, "Talking to children and adolescents about the Clinton and Lewinsky scandal," *CBS Saturday Morning*, COCA)

(167) I think that the United States needs to evolve in a way that they interrogate prisoners, in the – a way that they need evolve, and the way that they interrogate individuals who might have pertinent information. (2007/12/12, "Political wrap-up: Senate probes destruction of CIA tapes," COCA)

However, examples like (167), for which it was possible to find the original spoken source online[109] and in which the speaker clearly says "needs to evolve," raise doubts about the accuracy of the transcription. One may wonder if all constructions of *need* + infinitive in assertive contexts stem from transcription errors or if they could also be considered blend constructions.

Blends

The existence of blend forms between auxiliary and main verb syntax is occasionally mentioned in the literature, often in comparisons to *dare*, which occurs much more frequently in blend constructions than *need* (cf. Svartvik 1968: 140, Palmer 1990: 39, Duffley 1994: 237). Müller claims that until at least 1800, "*need* + bare infinitive and *need* + *to*-infinitive were two different forms of the same verb […] used in variation with auxiliary and main-verb syntax" (2008a: 78), but observes that none of these mixed forms are acceptable today (2008a: 78).

In COHA we see a highly significant decline (τ_{dec}= -0.68***) in the use of negated *need to* without *do*-support and of the inflected form *needs* with a bare infinitive (τ_{dec}= -0.66***, cf. left panel of Figure 26). Table 28 shows that the most frequent forms are *needs not to* and *need not / n't* + infinitive in both COHA and COCA (spoken) – and not like Quirk *et al.* (1985: 138-139) note blends with *needs* and the infinitive (cf. example (168) below).

(168) ? One needs only reflect for a second. (Quirk *et al.* 1985: 138-139)

[109] <http://www.npr.org/templates/story/story.php?storyId=17180465>, minute 5:03 (2017/07/22).

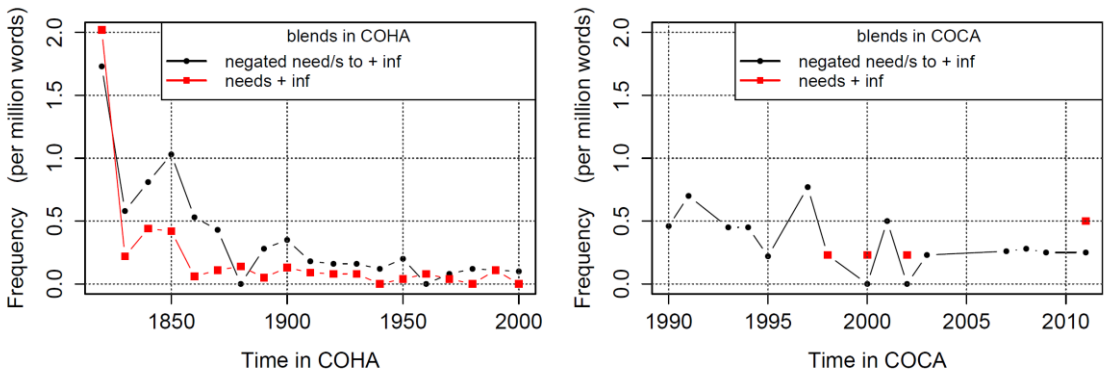


Figure 26 Blends of *need* in COHA and COCA

Needs not / adverb + infinitive is nonexistent in spoken AmE. There is not a single use of negated *need* with *do*-support followed by a bare infinitive (*don't* / *do not need* + inf.) either – a construction that was found twice in the Brown corpus and LOB (cf. example (169) below).

		COHA (all text types)			COCA (spoken)		
		1820-1859	1860-1909	1910-2009	1990-97	1998-2005	2006-13
need/s not to + inf.	*needs not to* + inf.	0.64	0.17	0.01	0.06	0.06	0.19
	need not /n't to + inf.	0.29	0.20	0.11	0.36	0.06	
	needs not only to + inf.	0.02	0.02				0.04
	need not only to + inf.			0.01			
needs + inf.	*needs* + infinitive					0.10	0.07
	needs not + inf.	0.02	0.04	0.03			
	needs adverb + inf.	0.32	0.06	0.02			

Table 28 Types of blends of *need* in COHA and COCA (spoken)

(169) You don't need worry, Judge. Big wind like that can't drown good men. (LOB N031346)

However, both examples have been characterized as "attempts at imitating foreign speakers of English" (Duffley 1994: 237) and, in the case of example (169), as "mock-broken English" (Ehrman 1966: 72). Example (170) from the spoken section of COCA could be a similar case. In other cases (e.g. (171) below), it seems possible that the word *to* has been merely omitted in the transcription.

(170) 2nd child: She needs go on to her country, you know? (2000/11/14, "Profile: New trial granted by Peruvian government in the case of Lori Berenson, an American convicted of revolutionary activity," *NPR Morning*, COCA)

(171) Frankly, I don't need know where we'd have to go to a universal training requirement. (1998/05/17, "Gary Hart, former presidential candidate, and William Bennett of empower America discuss private lives and character in leadership," *NBC Meet the Press*, COCA)

Stylistic Differences Between Need *and* Need to

Many linguists detect a difference in style between *need* and *need to* in non-assertive contexts (e.g. Swan 2001, Lee 2001). *Need* "is often felt to be 'bookish [...] and 'old-fashioned'" (Lee 2001: 135-136). Swan states that non-negated forms of *need* in non-assertive contexts are "mainly used" in a formal style, whereas in "informal usage we would probably use the ordinary forms" (Swan 2001: 400[110]). More context would have been desirable in the examples he gives, yet we can imagine that example (172) is uttered in a formal setting, whereas example (173) is an expression of advice or reveals a person's private thoughts to the reader.

(172) I wonder if we need take sleeping-bags. (Swan 2001: 400)

(173) The only thing you need to do is fill in this form. (Swan 2001: 400)

Not a single occurrence of *need to* in indirect questions could be found in COHA, and there are only a few cases of *need.* However, as we have seen above, both verbs are used with the restrictive adverb *only*, but *need* by far more frequently (540 occurrences in COHA between 1900 and 2009) than *need to* (66 occurrences). The relative frequency of *only* in combination with *need* is much higher in magazines (44.1%) than in non-fiction books (27.6%). Hence, we cannot conclude that *need* + *only* is a particularly formal construction.

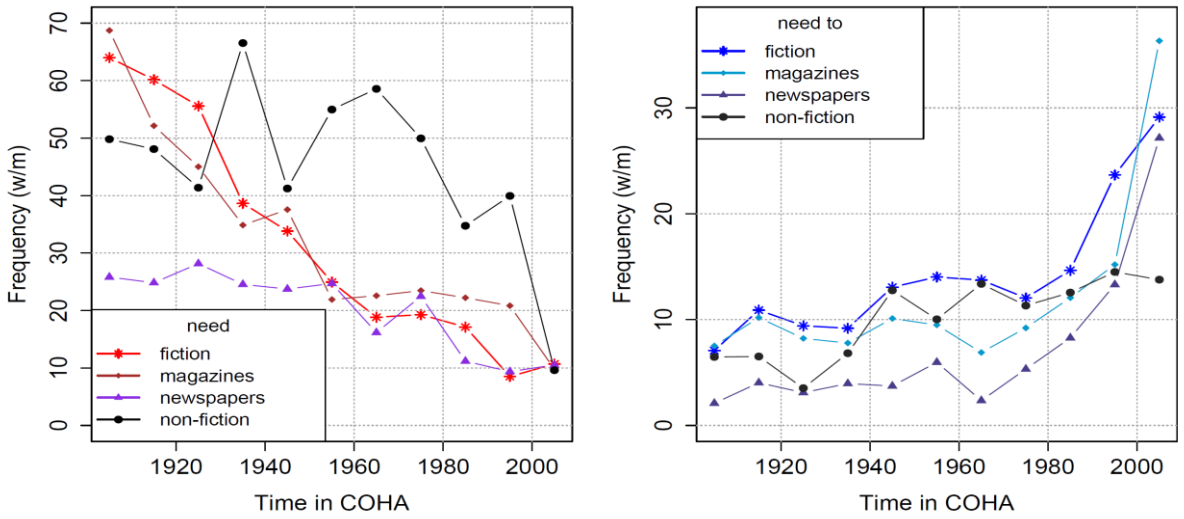


Figure 27 Non-assertive *need* and *need to* (excl. questions) in different text types in COHA

An analysis of the use of non-assertive *need to* in different corpus sections uncovers that for most of the century both *need* and *need to* are least frequent in newspapers (cf. Figure 27). On average, *need* is most common in non-fiction books, whereas *need to* is primarily found in fiction. Two developments that require further comment will be considered in more detail. First, at the beginning of the analyzed period, *need to* also flourishes in fiction and magazines. A close examination of the types of non-assertive contexts indicates that the ensuing decrease towards the middle of the century is mainly caused by the pronounced decline in the use of the contracted form *needn't* (cf.

[110] In the third edition of his usage guide, Swan just states that *need* is more common in BrE than in AmE (2005: 342).

Figure 28). This frequent use with the shortened negator signals that *need* is also in common use in oral language at the time and is not considered old-fashioned (yet).

Second, as Figure 27 illustrates, *need to* is surprisingly frequent in non-fiction between the 1940s and the 1990s, almost equaling the frequency in fiction in five decades – which seems to contradict the idea that it is the more "oral" and colloquial of the two verbs. Only towards the start of the 21st century does the use of *need to* drastically increase in fiction, magazines and, to a lesser extent, in newspapers, leaving non-fiction books far behind. This change is mainly caused by an increase in the use of *need to* with the contracted negator (cf. Figure 29, dark blue line) and by an even bigger rise in other non-assertive contexts (light blue line), particularly in magazines and in fiction. The increase of contracted negative forms can be taken as a sign of the increasing colloquialization of these registers.

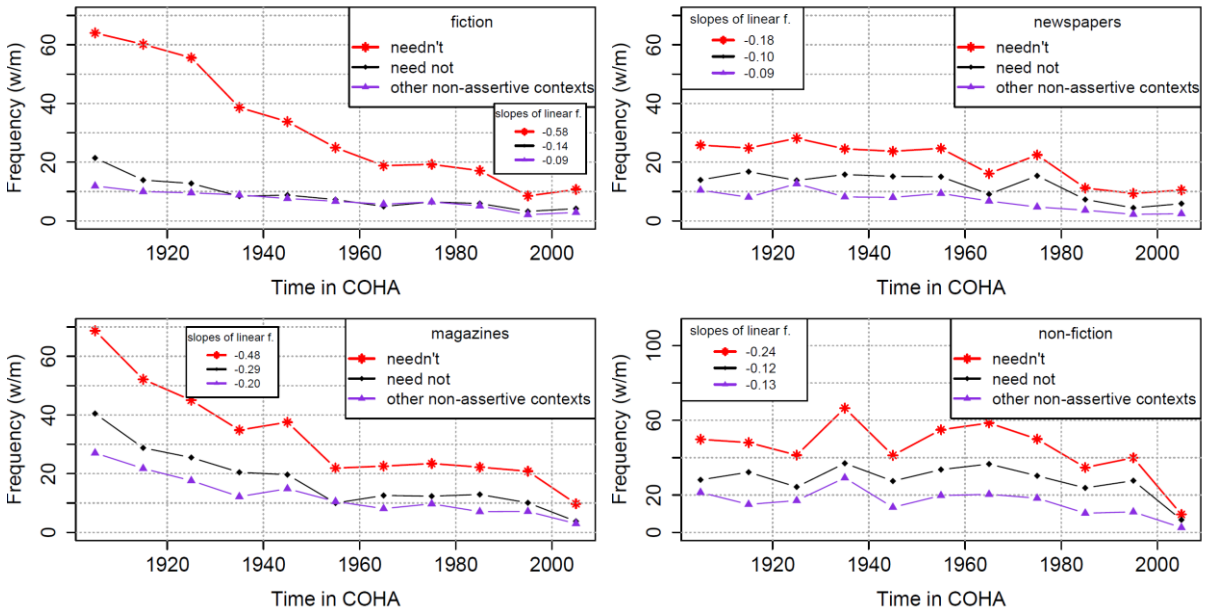


Figure 28 *Needn't / not* and *need* in other non-assertive contexts in different text types in COHA

The data show that primarily the combinations of *need to* with *all* and *just* and the use in questions and *if*-clauses enjoy more popularity. Affirmative *need to* undergoes a similar development (cf. Figure 30): Until the 1990s it is most frequent in non-fiction books, but in the 2000s *need to* is more popular in magazines and newspapers. A note of caution is in order, though. There are substantial differences in corpus composition between the 1910s and 1920s as well as between the 1990s and 2000s (e.g. the number of words from movie scripts rises from barely 1,000 in the 1900s to more than 82,000 in the 1910s and more than 500,000 in the 1920s; the share of novels in the corpus increases from 5 million words in the 1990s to 9.5 million words in the 2000s), so some of these results might be artefacts of corpus composition.

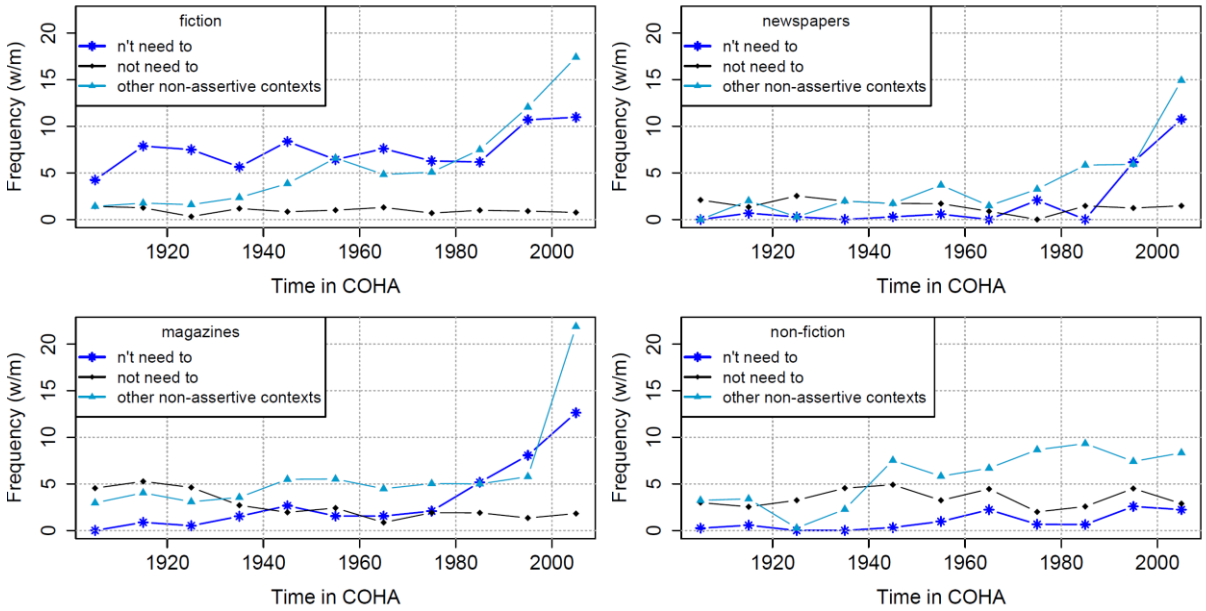


Figure 29 *Not / n't need to* and *need to* in other non-assertive contexts in different text types in COHA

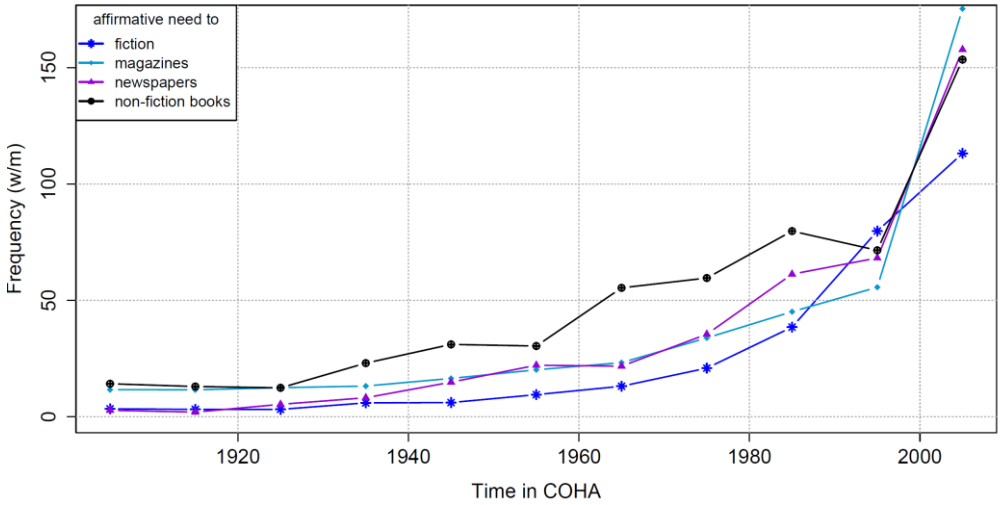


Figure 30 Affirmative *need to* in the different corpus sections of COHA

Semantic Differences Between Need *and* Need to

Some authors stress that there is "no noteworthy difference in meaning" between *need* and *need to* (Taeymans 2004a: 98) or that the two verbs have the "same meaning" (Sinclair 1990: 241). Poutsma, for example, notes that in non-assertive contexts, the *to*-infinitive is only used "for the sake of the metre or rhythm" (1926: 410). Smith claims that semantic distinctions "tend to be neutralized" (2003: 260). Most linguists focus their attention on the difference between *need* and *need to* in negated sentences. Occasionally, a few comments are made about contrasts in interrogative clauses (cf. e.g. Jacobsson 1974: 60; Palmer 1990: 128, Duffley 1994: 231). Müller observes that the very fact that *need* only appears in non-assertive contexts and that *need to* is "preferred in

affirmative contexts inevitably leads to a slight difference in meaning." She argues that an accurate comparison can only be made in non-assertive contexts (2008: 83). In the following, various views on the differences between *need* and *need to* will be analyzed.

a) Permission vs. Own Interest

Bolinger claims to discern a major semantic difference between *need* and *need to*. In his opinion, the "psychological motive" triggers the use of full verb forms in affirmative contexts and the use of modal forms in other types of sentences (1942: 65). "[T]he nonauxiliary calls for the fulfilment of a personal want, the auxiliary for compliance with something external" (1942: 63).

(174) He needs to see the doctor.

(175) Does he need to see the doctor now?

(176) Need he see the doctor now? (all examples from Bolinger 1942: 62-63)

Comparing examples (174), (175), and (176), Bolinger states that *need to* is closer to the "literal meaning of *need*," suggesting that the performance of the action serves the speaker's own interest (1942: 63). According to Bolinger, the existence of a real need, a "literal requirement or expression of lack within one's self," is already implied in a question like (175), whereas the use of *need* "suggests a more indefinite compulsion" and may imply "'if he is to see him at all'" (1942: 62). The need is caused by factors that are external to the subject of the sentence. Bolinger asks: "In what kind of sentences involving the idea of external compulsion would *need* fit most naturally? Obviously, those having a suggestion of permission" (such as example (177) below) fit the description (Bolinger 1942: 65). According to Bolinger, and presented in van der Auwera and Plungian's (1998) terminology, *need* thus mainly expresses participant-external modality, i.e. a necessity that is external to the participant engaged in the state of affairs (including deontic modality), whereas participant-internal necessity is preferred with *need to*.

(177) Need it cost so much? (Bolinger 1942: 65)

Bolinger is certainly correct in assuming, then, that *need* can, however, not be used to express participant-internal necessity. Müller finds no examples of participant-internal *need* (2008: 81) and Collins states that only "dynamic *need to*, but not *need*, may express a need that is intrinsic to the subject-referent" (2009a: 75).[111] By contrast, Duffley stresses that Bolinger seems to have overlooked that participant-external necessity can also be expressed by *need to*. There are also cases in which the need stems "'from an external source, [which is] neither the subject nor the speaker or the hearer'" (Palmer 1974: 122, also quoted by Duffley 1989: 210). He therefore claims that "Bolinger's definition of *need to* as evoking an internal requirement within the subject cannot apply" (1989: 210). As Müller (2008a: 81) and the data from COCA show (cf. Ch. 6.2.3 on *need to* below), *need to* rarely has a participant-internal meaning in PDE. It is also important to point out that *need*

[111] Note that in most studies that apply a broader terminology (using dynamic modality as a cover term for participant-external and participant-internal necessity) this difference becomes invisible.

to can also express deontic meanings (cf. Table 42 below). Consequently, a distinction between *need* and *need to* can currently not be drawn along the lines of participant-external (*need*) and participant-internal modality (*need to*).

b) The Conceivability of a Need

Duffley also detects "a subtle but real distinction in meaning" between *need* and *need to* (1989: 212). He agrees with Jacobsson that the use of *need* is restricted to non-assertive contexts, but in contrast to the Swedish researcher, who sees no significant difference in meaning between the modal (*need*) and the full verb (*need to*) and concludes that "there should be no obstacle to *need* being used as an auxiliary even in affirmative sentences" (1974: 62), Duffley claims that there is "a semantic repugnance to modal use [i.e. of *need*] in affirmation" (1994: 220). He states (1989: 213):

> Need is by definition a lack calling for future fulfilment, i.e. something whose existence is primarily known through imagining the consequences of not performing the action one suspects is needed: if one realizes that something essential would be missing if this action did not occur, then a need is perceived to exist. Seen in these terms, *need* auxiliary can be said to express the opposite situation in which someone (usually the speaker) does *not* feel obliged to conclude that something would be amiss if a given event were not to take place. In this case, all that is evoked is the mere possibility that a need might exist, there being no [...] or a least no clear perception - of its real existence.

Duffley postulates that "it is possible to assert the existence of a need unequivocally" with *need*, whereas *need* "signifies the absence of awareness of any factor or circumstance which would be weighty enough to make some event necessary" (1989: 213). Based on the results of a survey of usage, he identifies three basic situations in which the focus lies "on whether the conditions necessary for the constitution of a real need are fulfilled" (Duffley and Larrivée 1998: 99):

(1) in-/evitability sense:

Cases in which events are not considered inevitable ("fated to occur," Duffley 1989: 213), as in

(178) Presently Rosalie said, "Your mother *need* never know about you." (Christie 1937: 202, quoted by Duffley 1994: 223).

(2) logical necessity

Situations in which the speaker sees no compelling reason, no evidence for the conclusion that a certain proposition is true, such as in

(179) He may be there, but he *needn't* be. (Palmer 1979: 54).

(3) dispensation / indispensability sense

According to Duffley, a need is also conceivable when it "can [...] be identified with the existence of some imperative reason to do something" (1994: 223). This can be for one of two reasons:
(a) the "imperative will of an authority" (Duffley 1994: 223), such as in "*You needn't wait*" (Joos 1964: 192). In Joos' example a need for the speaker's interlocutor to wait is conceivable, but it is

negated by the imperative will of an authority who "is either firmly dismissing or indulgently excusing the hearer" (Duffley 1989: 213), thus giving "the impression of a dispensation (be it indulgent or condescending)" (Duffley 1994: 223).

(b) "Simply the feeling that the reasons for doing something have sufficient weight to give rise to a real need" (Duffley 1994: 223). In example (180) it is conceivable that there might be a need to get to the destination before half past, but the "existence of some imperative reason to do so" is negated. The sentence thus suggests "that getting there before that time isn't indispensable" (Duffley 1994: 223).

(180) Oh, I doubt if we *need get* there before half past" (Erdmann 1982: 98)

Duffley clearly determines the circumstances in which he considers the use of both *need* and *need to* possible. He observes that *need* can be substituted by *need to* in the indispensability sense, but not in the inevitability sense. Among the examples he gives for the inevitability sense are the following ones:

(181) For the Sabres game ... need not have happened, at least not then. (Strathy GAME 3. BK. 1502, quoted by Duffley 1994: 229)

(182) ... preliminary identities during infancy and childhood need not be irreversibly deterministic ... (BUC F 39 0490 1, quoted by Duffley 1994: 229)

Here the speaker sees no reason why these events should be fated to occur. The conceivability of any need is thus negated. However, despite Duffley's claim that in the inevitability sense, *need* cannot be substituted by *need to*, *need to* is used in very similar situations. Nokkonen, who considers this use epistemic, reports finding a similar example in FLOB (2006: 57):

(183) None of it, not the sufferings of one mutilated soldier or murdered civilian, had been inevitable. None of it needed to have happened. Hitler and Mussolini could have been stopped long before. (General fiction K14: 35, FLOB)

The speaker stresses that both the war in Iraq and the death of three people would have been avoidable. Although the *needed to have* + past participle structure cannot be found in the BNC and COCA and a search on google.com shows only 122 occurrences of the construction, the existence of this use should not be overlooked. Example (183) can be considered evidence against the idea that *need to* cannot replace *need* in order to express 'inevitability'. Patrick J. Duffley signaled me in personal correspondence that he was not aware of this type of usage (e-mail 2009/09/16). Both *need* and *need to* can be used here and the distinction between them then lies, as mentioned above, in the fact that the use of negated *need to* suggests that there is no reason why the events denoted by the infinitive should have taken place, whereas *need* would even negate the mere possibility that such a need could exist (cf. Duffley and Larrivée 1998: 101-102).

Similar examples with *need to* can also be found in the simple past. In example (184) it is also possible to use *need never have happened* as a substitute.

(184) It is time to bring our troops home from a war that never needed to happen. # JOE PARKO, Atlanta # Admit Iraq war is a mistake # (2005/05/15, "Letters." *Atlanta Journal Constitution*, COCA)

The difference between *need* and *need to* here is the same that Duffley detects in the indispensability sense, which he illustrates with the following example:

(185) … people often think of buying expensive outdoor aerials when they need not do so. (LOB H22 104, quoted by Duffley 1994: 230)

The use of *need to* would suggest that, objectively speaking, there is no need to buy expensive aerials. In contrast to that, *need* seems more subjective, as it implies that the speaker cannot imagine "anything which could possibly give rise to a real need for such equipment." Therefore, the attitude of the speaker seems a bit condescending (cf. Duffley 1994: 230). According to Duffley, the speaker's choice between *need* and *need to* depends on (the impression s/he wants to give about) the conceivability of the need.

Duffley's theory also clarifies why *need* is often considered a negative polarity item (cf. Ch. 6.1.4). Negative polarity items (NPIs) cannot be explained by formal criteria alone, for their semantic value also has to be taken into account. NPIs like *lift a finger* or *ever* "evok[e] an extreme point on a scalar model or a random choice which covers all imaginable cases" (Duffley and Larrivée 1998: 95-96). They are considered to strengthen negation and to evoke extreme points on scales. The speaker negates one element on the pragmatic scale that functions as "an archetype" of minimal or a maximal point ("maximally favourable condition") on this scale (cf. examples (186) and (187) below). If the speaker is not even willing to make a minimal effort or to take action under the most favorable conditions, the NPIs suggest that he is unwilling "to perform it under any circumstances at all" (Duffley and Larrivée 1998: 94-95).

(186) She didn't even lift a finger to help Joe. (Duffley and Larrivée 1998: 94)

(187) I wouldn't touch it with a ten-foot pole. (Duffley and Larrivée 1998: 90)

The use of *need* has a very similar effect. Since *need* "evoke[s] potentiality rather than reality," the negation with *need* is more radical than that with *need to.* Whereas *need to* expresses a more factual form of negation, *need* "preclude[s] any possibility of any form of a need," i.e. the speaker negates the smallest chance that a need exists, thereby negating the eventual necessity for the event or action denoted by the infinitive to ever take place or to be performed by a subject (Duffley and Larrivée 1998: 100-102). This conception of the difference between *need* and *need to* explains why both forms can be used in non-assertive contexts.

Duffley also comments on the use of the adverbs *only* and *hardly* with *need* and *need to*.[112] For him, *only* indicates a limit in both cases. The difference between the two verbs is due to different concerns of the speaker: When *need* is used, s/he "feels any need to be inconceivable beyond

[112] He reports that only *need* has been attested with the adverb *hardly.* There are, however, many instances in COHA and COCA in which *hardly* is used with *need to.* In COCA it is even more frequent with the full verb than with the modal (0.12 w/m vs. 0.02 w/m).

the limit." Focusing attention beyond this limit is "unreasonable and useless." *Need* is more restrictive than *need to* (Duffley 1994: 233).

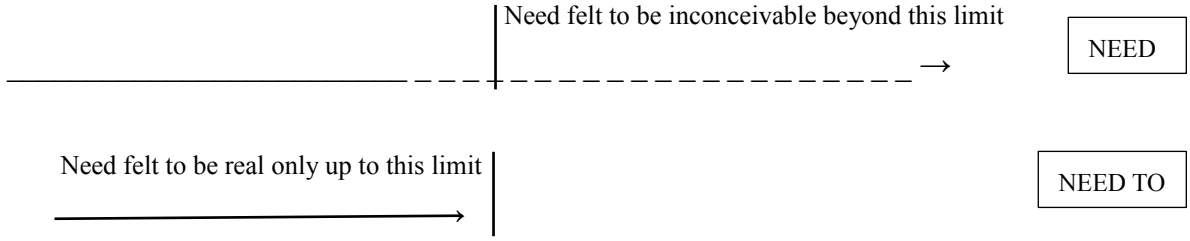


Figure 31 *Need* and *need to* in combination with o*nly* (adapted from Duffley 1994: 233)

By using *need to*, the speaker puts more emphasis on the existence of a real need within the limits evoked by *only.* S/he thereby creates a "more factual view, since one is not extrapolating beyond the established limit into the realm of the inconceivable," but staying confined to the real extent of the need. Duffley explains that, with *need*, the speaker or writer expresses that there ought to be no need to state something which should already be evident from the situation or to voice something that has been said (1994: 233). This certainly applies to the following case:

(188) It's a memo that Alito wrote to the solicitor general in 1985 about whether the government should take a position on an abortion rights case that was coming before the Supreme Court. [...] He says in the memo, 'We should make clear that we disagree with Roe vs. Wade,' but, he says, he finds the incremental approach preferable to a head-to-head battle. Just sort of as a side note here, the solicitor general, Charles Fried, said in a cover letter to the memo, 'I need hardly say how sensitive this material is and ask that it have no wider circulation.' (Block, M. (2005/11/30) "Analysis: Alito Documents; `We disagree with Roe v. Wade,'" *NPR All Things Considered*, COCA)

Here the situation clearly indicates that a delicate subject is concerned and that the government's position towards it should, at this point in time, only be a known to a restricted circle of persons. This should be intuitively understood by the addressees of the memo and there should thus be no need for the speaker, Charles Fried, to ask them to keep it from circulating wider. Such a need is inconceivable in his eyes. Let us now compare this to an example in which *need to* is used:

(189) And when Palin addressed the convention, she wasted no time in making her role clear: Alluding to Obama's controversial remarks about working-class Americans who turn to guns and God when the economy sours, she presented herself as proof that his characterization was not only false but condescending. [...] McCain hardly needed to say any more on that point when his time to speak came. His choice of Palin said it all. (Tolson, J. (2008) "John McCain's choice of Sarah Palin reignites the battle over values." *News & World Report* 145.7: 40, COCA)

Here it was conceivable that McCain would have had to say more on the subjects of gun-holdership, religion, and abortion, but once Palin had appeared on stage and expressed her point of view, there was virtually no need for McCain to add anything else. It could thus be argued that the reality of a need is negated. It is also obvious that the public appearances of Palin and McCain were aimed at creating a certain impression on the American people. In light of this *telos* (to borrow Dufaye's

terminology), the speaker judged whether it was necessary for McCain to say anything else. Since this assessment is based on an objective evaluation of the (external) situation, it appears much more detached than the more subjective use of *need* in example (188), in which Charles Fried's statement draws more attention to the personal judgment of the speaker than to the necessity to comply with something external.

These examples show that the line that can be drawn is very thin, and in many cases these fine nuances are not easy to discern. Very often, the differences seem to disappear entirely, and it is thus easy to see why many linguists refrain from discussing the matter in detail.

c) Social vs. Technical Messages

Leech stresses that "on many occasions" the auxiliary and the main verb "scarcely differ in effect," such as in the sentence *You needn't wake her up / You don't need to wake her up*, but he does not clearly define the circumstances in which this is the case (2004: 103). He (1987: 102) observes that in other contexts, however, "a clear distinction" can be drawn between them:

> Let us suppose that Lady P. addresses her gardener with the words: *The hedges needn't be trimmed this week*, *Smithers.* This means 'You are excused the task – I shall not oblige you to trim the hedges this week' (perhaps because Lady P. is feeling kind, or because she has more important jobs in mind for Smithers). But the import is different if she says: *The hedges don't need to be trimmed this week*, *Smithers.* The point she makes here is that the hedges do not require attention – because, we presume, they have not grown enough to make them look untidy.[113]

In the first example, Lady P. gives Smithers permission not to trim the hedges. In the second sentence, she states that the situation does not require that the hedges be trimmed. Joos makes a very similar distinction. He compares the sentences *You needn't wait* and *You don't need to wait* and finds that *need to* simply expresses a technical message such as "your waiting is not technically requisite: the state of the factual world will be just as good if you don't wait." *Need* "carries two social messages, either 'I'm indulgently excusing you' or 'I'm firmly dismissing you'" (1964: 192). Talmy equally stresses that negated *need* "indicates the release from [*sic*, of] the subject of [*sic*, from] a socially based obligation, imposed from the outside against the subject's desires, to perform the indicated action" (2000: 441).

Nagle considers verbs like *needn't* in negative and interrogative clauses to be "more 'modal than those of the do competitors" (1989: 96). Drawing on Shepherd's idea that modality "alters the neutral semantic quality (Shepherd 1982) of a proposition," he proposes that the meaning expressed by *need* is "'less' neutral." In "*He need not finish this right away* [...,] [the] negation of obligation is speaker-oriented"; in sentences with *need to* it may be subject- or speaker-oriented (Nagle 1989: 98-99). This, in turn, might be a factor that plays an important role for the decline of

[113] It is interesting to note that in the 2004 edition of Leech's book, Lady P. has been updated to *Mrs.* P. and *John* is excused from the task because *she does not want* him to trim the hedges [emphasis added]. The information is also relegated to a footnote with a comment on its "minor importance" in light of the infrequency of *needn't* (2004: 103).

need. Instead of drawing attention to a subjective decision, speakers can opt for what it is perceived as a more objective form.

d) Abstract vs. Concrete Verbs

Hargevik observes that *need* is the preferred choice with verbs and verb + noun/adjective-combinations "expressing a state of anxiety, lack of comfort, etc." (1982: 27). Such verbs are, among others, *worry*, *fear*, *bother*, *be afraid*, *mind*, and *be ashamed*. Describing the semantics of participant-external *need(n't)* and *need to*, Müller states that negated *need* is often used when the speaker wants to give advice to the addressee or seeks to reassure her/him. By contrast, negated *need to* is preferred in impersonal situations, where "it states a necessity to do something in order to achieve an aim." The *to*+ infinitive construction expresses this purpose (2008: 85). Müller substantiates her claim that *need* co-occurs with abstract verbs and *need to* with concrete verbs with pertinent examples:

(190) He replied: "If they think they are doing the correct thing they need not fear." (1950-90.bre\1959man1.n9)

(191) ... Tulbach Browne, who, brazenly cheerful, leant on one corner of the bar with the air of a man who doesn't need to work for some time to come, and said, ["I told you I'd make you famous, didn't I"] (1950-90.bre\1956mons.f9, both examples quoted by Müller 2008: 85)

In example (190) the speaker is expressing the reassuring thought that they need not fear. The speaker in example (191) is comparing Tulbach Browne to men who do not need to work to earn a living or to lead a comfortable life. *Fear* certainly expresses a more abstract concept than the technical word *work*.

	Distinctive collexemes of negated *need*	Distinctive collexemes of negated *need to*
$p \leq 0.001$	*apply*, *fear*, *worry*, *mean*, *concern*, *imply*, *involve*, *lead*, *feel*, *require*, *limit*, *fret*, *cost*, *detain*	*know*, *see*, *hear*, *get*, *tell*, *talk*, *go*, *eat*, *use*, *read*, *put*, *win*
$p \leq 0.01$	*bother*, *become*, *suffer*, *exist*, *conflict*, *entail*, *expect*, *lie*, *choose*, *include*, *plan*, *resemble*, *trouble*	*keep*, *run*, *say*, *work*, *watch*, *write*, *wear*, *call*, *buy*, *play*, *add*, *move*, *change*, *listen*, *remember*, *sell*
$p \leq 0.05$	*consider*, *depend*, *except*, *undermine*, *adopt*, *appeal*, *coincide*, *compensate*, *conform*, *despair*, *indicate*, *preclude*, *result*, *subscribe*, *abandon*, *begin*, *cause*, *correspond*, *meet*, *discuss*, *focus*, *return*, *follow*, *leave*	*hide*, *bring*, *show*, *spend*, *cook*, *remove*, *sit*, *replace*, *sleep*, *wash*, *learn*, *deal*, *find*

Table 29 Distinctive collexemes of negated *need* and negated *need to* in COCA (1990-2012)

The results of a distinctive collexeme analysis of *needn't / need not* + infinitive (of a lexical verb) and *do(es) not / do(es)n't need to* + infinitive (of a lexical verb) in COCA (all text types[114], 1990-2012) partly support Müller's claim. The collexemes of *need to* can be qualified as expressing

[114] See Table F.8 in Appendix F for the results of the DCA for affirmative *need to* in the spoken language section.

rather concrete and technical concepts (maybe with the exception of *keep*). Many of them are activity verbs (e.g. *get*, *move*, *sit*, *watch*, *go*, *buy*, cf. Table 29 below) and almost 40% are among the top 50 most frequent infinitives in COCA (spoken, 1990-2012). By contrast, many of the collexemes of negated *need to* are mental verbs (e.g. *plan*, *worry*, *accept*, *bother*, *choose*, *consider*, *expect*, *fear*) and 14% of them are among the top 501-1,000 most frequent infinitives (vs. 2% in the case of negated *need to*).

e) Two Different Levels of Operation

Another linguist who underlines the purposive character of *need to* is Lionel Dufaye. The aim of his 2002 paper is to demonstrate the meaning of *need* and *need to* with the help of schemata à la Antoine Culioli. Dufaye thinks that the verb phrase containing the *need to* construction is always seen in relation to an aim (telos) <q> that is defined by the context. The speaker judges whether it is necessary to meet a condition <p> in order to reach this aim <q>, thus carrying out a qualitative evaluation. Aspect and tense of the proposition are entirely determined by the time frame in which the *telos* is situated (2002: 59).

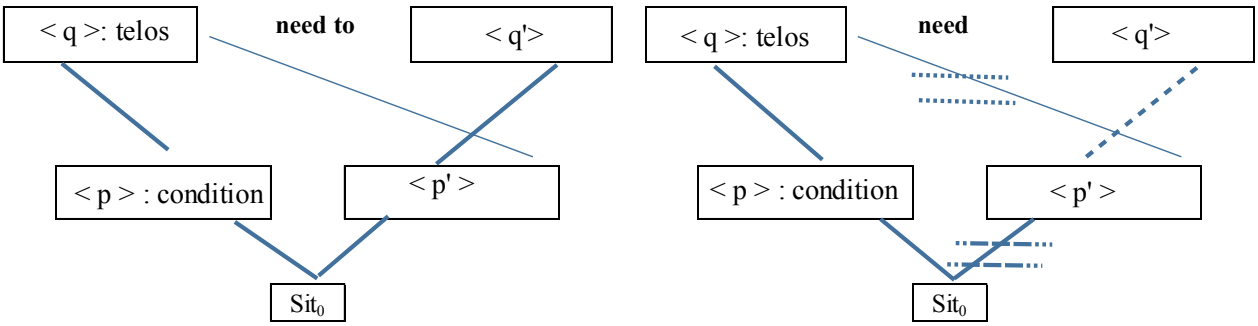


Figure 32 Scheme of negated *need to* and *need* (adapted from Dufaye 2002: 58, 63)

In case of negated *need to* + infinitive, the condition <p> is unfulfilled because there is no potential aim to be reached. Dufaye supports his thesis by adducing a simple example that he translates into the scheme in the left panel of Figure 32. Here <p> represents a positive condition (*need to be put back*), <p'> the contrary (2002: 58). The visualization clarifies that the absence of necessity stems from the fact that there is no aim that has to be reached. By contrast, *need not* does indicate the absence of an aim, but bears the trace of the reestablishment of a previously blocked negative scenario.

(192) When you see any turtles come on the beach, they are not sick and they do not need to be put back into the water. (Dufaye 2002: 58)

(193) "Pardon me," he [A] began, "but I must --"
She [B] took a step toward him. "No, you needn't go." (Dufaye 2002: 51)

After considering the positive scenario "I'm going" and its negative counterpart "I'm not going," subject A in example (193) decides that the first scenario is preferable and rejects the second one. A second subject B asserts that it is not necessary for A to go and thereby reestablishes a possibility

that A has rejected earlier on (cf. Dufaye 2002: 51-52). In contrast to *need to*, the tense of *need* is not determined by the time frame of the *telos*, but is relative to the situation of utterance. The speaker carries out a subjective *a posteriori* evaluation of a past event (cf. right panel of Figure 32, Dufaye 2002: 59). However, Dufaye stresses that this distinction is not always reliable and that there are a number of examples in which *need to* expresses a subjective judgment. Having once reflected the degree of subjective involvement of the speaker, the slight contrast between *need* and *need to* seems to become less evident in contemporary English as the frequency of use of *need to* increases (2002: 59-60).

Dufaye's theory explains why *need to* can be used in various tenses, whereas *need* is restricted to the present and one past form. It also accounts for the tendency of *need* to be more subjective than the more objective *need to.*

Application of the Theories on Semantic Differences

In a final step, I will now consider some examples to see which of these theories can be applied:

(194) "Welcome to the Ark, Mary Hope." And as the Flock murmured its reflected pleasure he held out his other hand to Luke and said, "Luke tells me the two of you wish to be married." "Yes, sir, we do." [...] The Doctor laughed. "By the way, you needn't call me sir. At the Ark we call each other Sister and Brother. (Wren, M. K. (1990) *A Gift Upon the Shore.* New York: Ballantine Books, COCA)

(195) Modern medicine was wonderful. Now that the experimental treatment had cured her, Consuelo could be the person she should have been. [...] "If you don't mind, Dr. Young, I'd like to go to bed now." "That's fine. By the way, you don't need to call me 'Doctor' anymore. 'Anna' will be fine." (Stratmann, H. G. (1998) "The eumenide." *Analog Science Fiction & Fact* 118.1: 112, COCA)

The situation in both utterances is very similar. Müller's idea of a contrast between abstract and concrete verbs cannot be tested since both sentences contain the same verb (*call*). The doctor in the first example, living in a world without any social hierarchy, does not, to use Duffley's terms, conceive of any reason why he should be addressed as *sir*. The thought of it even seems so odd that it causes him to laugh. The patient – doctor relationship between Consuelo and Anna in the second example has ended now that Consuelo is cured by the experimental treatment, and for her to address Anna as "her doctor" would no longer correspond to reality. This end of the patient – doctor relationship is, in this case, the specific factor Duffley refers to when he states (1994: 231):

> Negative contexts in which only *need to* can be used only make sense if they are interpreted as referring to the absence of some specific factor or factors constituting a need.

Duffley's perception of the semantic differences between *need* and *need to* is very similar to when Joos, Leech, Müller, and Dufaye suggest that *need* expresses a more subjective note than the more neutral (and technical) *need to*. Example (194) draws attention to the will of the speaker, whereas example (195) shows that there is no external circumstance that makes the use of the title 'doctor' necessary any longer. We can thus conclude that the subjectivity / objectivity distinction in non-

assertive contexts has some validity, but it is very important to keep in mind that we are only "dealing with *tendencies*" [emphasis added] (Collins 2009a: 58).

Summary

My analysis of the use of *need* in COHA confirms previous findings outlining that *need to* is more frequent than *need* (at least) from the 1960s on. The exhaustive study of 11,688 uses of non-negated[115] *need to* in COHA indicates that it is primarily used in assertive contexts in the last decades of the 20th and the first decade of the 21st century. *Need to* takes over some of the functions formerly fulfilled by *need*, while other uses seem die out. A close analysis of the types of non-assertive contexts in which *need* (n=2,554) and *need to* (n=1,537) appear shows an increase in the use of *need to* in interrogative clauses and in combination with *all* that likely compensate for the decline of the corresponding uses of *need.* However, *need* disappears almost entirely after *hardly* and *scarcely*, negated elements in the noun phrase, and negated objects, whereas the increase of *need to* in similar constructions is minimal. In *before*-clauses and in combination with *little*, *need* is already infrequent at the beginning of the 20th century and appears for the last time in the 1960s and 1970s in the data from COHA, while constructions with *neither / nor* become very rare. At the end of the 2000s, *need* is most frequently found in questions (1.4 w/m) and with *only* (1.2 w/m). It also retains a small foothold in the phrase *if need be* (0.9 w/m). In COCA (spoken) *need* is most common after a negation in the noun phrase. Blend constructions, which still remain somewhat frequent in spoken AmE, become almost nonexistent in written AmE in the course of the last century.

An analysis of the differences between non-assertive *need* and *need to* reveals that in the 20th century both verbs are least frequent in the newspaper section of COHA. Two periods of change should be mentioned: At the beginning of the 20th century, owing to the popularity of the use with the contracted negator *n't* in these text types, *need* is most frequent in fiction and magazines. From the 1930s on, *need* becomes most common in non-fiction. Towards the end of the analyzed period, *need to* drastically increases in use in fiction, magazines, and newspapers. My data indicate that this development is caused by an increase in the use of the contracted forms *don't / doesn't need to* and a rise in other non-assertive contexts. Here primarily the combinations of *need to* with *all* and *just* and the use in questions and *if*-clauses enjoy increasing popularity.

Finally, semantic differences between *need* and *need to* were examined. A distinctive collexeme analysis provided evidence for Müller's claim (2008: 85) that the collexemes of negated *need* often express abstract concepts, while those of *need to* are more concrete and tangible. Müller also stresses that *you need to* designates a condition that has to be fulfilled to achieve a purpose (2008: 85), an idea that is also discussed by Dufaye. According to him (2002), the speaker evaluates the necessity to meet a condition to reach the aim when he uses *need*. By contrast, *need not* indicates that the trace of a positive scenario is still visible, even if reaching this aim is no (longer) a valid

[115] i.e. cases in which the negator *not (n't)* does not (directly) precede the verb.

option. Duffley's (1989, 1994) explanations point towards a distinction between a subjective inconceivability of a need and an objective, factual negation of a real need. There is thus a clear tendency emerging from the literature, which was also put to a test here. An extensive semantic analysis of the use of *need(n't)* and negated *need to*, which I refrained from, would be needed to confirm this distinction. For the moment, my data for *need to* show that the affirmative form of the verb is primarily used to express subjective speaker judgments of what is considered necessary to realize a certain state of affairs in the world (cf. Ch. 6.2.3).

6.1.5. *Ought to*

Ought to is one of the expressions analyzed here with the most pronounced decline between 1900 and 2009. Myhill lists it among the verbs that increased in use after the American Civil War, as the use of *must*, *should*, *may*, and *shall* declined. He considers the decrease of *should* linked to the increase of *ought to* and *better*, modals that express weak obligation (1995: 159). In COHA *ought to* only rises in use between 1810 and the 1820s (measured in average frequencies per decade), but the frequencies drop from that time on (cf. left panel of Figure 33). There is a significant reduction in its use, particularly in recent decades (from 70 occurrences in Brown (1961) to 49/50 in Frown (1991/2), cf. Leech 2003: 238,+/ Degani 2009). The fall is even more pronounced in BrE (104 occurrences in LOB, 58 in FLOB). In both varieties the frequency of *ought to* remains high in D. Religion – a section of the corpus that contains texts "convey[ing] moral values" (Degani 2009: 330-332). *Ought to* also holds its ground in fiction, in AmE particularly in mystery and detective stories, adventures and westerns, romances and tales of love (cf. Degani 2009: 331). The same ranking in genre distribution can be observed in COHA if all forms of *ought to* are considered, with the highest frequency in fiction and the lowest in non-fiction books or academic writing (cf. Figure B.4 in Appendix B.2). This points to a high frequency of *ought to* in speech.

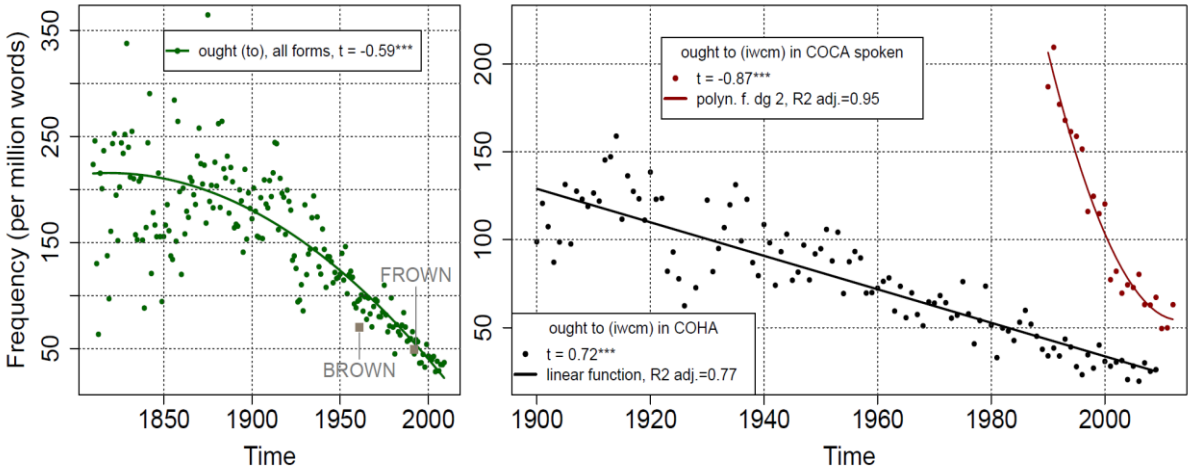


Figure 33 *Ought (to)* in COHA and COCA (spoken)

Ought to is indeed "unexpectedly" frequent in contemporary spoken English (Coates 1983: 70). It is more common in speech than in writing in both BrE (123 w/m vs. 56 w/m in the BNC, cf. Leech 2013: 79) and AmE (69 w/m estimated for LCASE vs. 49 w/m in Frown, cf. Leech *et al.* 2009, 100, 283). The same situation can be found in the two American corpora used here: *Ought to* is a lot more frequent in the spoken language section of COCA than in COHA, particularly in the early 1990s. However, as Figure 33 clarifies, it declines much more rapidly in speech (-71% between 1990 and 2009) than in writing (-41% in the same time span vs. -13% between 1900 and 1919).

It has also been stressed that *ought to* is one of the least frequent modals (cf. e.g. Coates 1983: 23). Jacobsson's claim that it is not about to die out (1994: 169) stands in remarkable contrast to

Harris' belief that the "'old word' *ought* is indeed on its last legs" (1986: 355-356). Harris' conviction is founded on evidence from Svartvik and Wright (1974, 1977) that seems to suggest that *ought to* is destined to disappear entirely. Leech mentions that *ought to* is rare in comparison to *should* (2004: 101), which Harris considers its "irreversibly established […] successor" in both BrE and AmE (1986: 347). However, while it is the case that *should* is much more frequent than *ought to* in written English (39: 1 in Frown, cf. Collins 2009a: 52, 57, 19: 1 in the 2000s in COHA, all forms and contexts), the difference is much smaller in spoken English: *Should* outnumbers *ought to* by a factor of 11 in SBC and by 5.6 in COCA (3.8 if we only look at the contexts analyzed in this study). This seems to suggest that the destiny of the two verbs is more closely linked than Harris imagined. I will examine the relationship between *should* and *ought to* in more detail below when I discuss the semantics of *ought to*.

Morphosyntax

First, let us briefly examine the use of the morphosyntax of this verb. *Ought to* is generally considered a marginal modal like *need*, *dare*, and *used to* (cf. Quirk *et al.* 1985: 138-139, Biber *et al.* 1999: 484), with whom it shares many characteristics such as the lack of 3rd sg. -*s*, the ability to be used with bare infinitives (cf. Harris 1986: 347), or the absence of non-finite forms. Yet Krug, who classifies *ought to* as a peripheral member of the class of emerging modals, shows that 95% of all forms co-occur with a *to*-infinitive (2000: 236, 205). Quirk *et al.* also stress that the *to*-infinitive is the standard form, but admit that *ought* may be treated as a core modal when it is used with the bare infinitive, which is "occasionally [the case] in familiar style […] in nonassertive contexts" (1985: 139). Elicitation tests have shown that omitting *to* is "widely acceptable" and even preferred by some informants in non-assertive contexts (Quirk *et al.* 1985: 139). Speakers can thereby avoid the structural difficulties presented by the "anomalous" forms in (196), which are, according to Harris, proscribed in many pedagogic grammars (1986: 347-348). Dialect speakers often opt for using the main verb pattern, i.e. *do*-support, in the past tense (cf. Quirk *et al.* 1985: 140, Harris 1986: 350).

(196) You oughtn't to go.
Ought we to go?
He ought to arrive soon, oughtn't he? (Harris 1986: 347)

Bolinger observes that the dual character of *ought to* has historical reasons: It was established before the use with *to* became the standard, at a point in time when it was still common to use inversions (1980b: 295). He figures that "[o]ught came in too late to escape the *to* but early enough to carry the inversion" and therefore still occurs with both forms and argues (1980b: 295) that

> the fact that it calls for *to* in most dialects hardly weighs against subject inversion (*Ought they to try?)*, contraction with *not* (*No*, *they oughn'ta*), repetition in the tag (*They oughta do it*, *oughtn't they)* and potential epistemic meaning (*It oughta be about six o'clock)*.

Bolinger reaches the conclusion that "*oughta* is so closely tied to the modals that it seems rather picayune to deny it the status of an auxiliary" (1980b: 295). While epistemic meaning is no argument in favor of core modal status (since semi-modals like *have to* can also express epistemic meanings) and the use of tag questions with *ought* is, with 0.03 w/m in the 2000s in COHA (and an average of 5.7 w/m between the 1960s and 2000s), negligible today, Bolinger is correct in stressing that, unlike *have to*, *need to*, and main verbs, *ought to* is not used with *do*-support in questions and negated clauses.

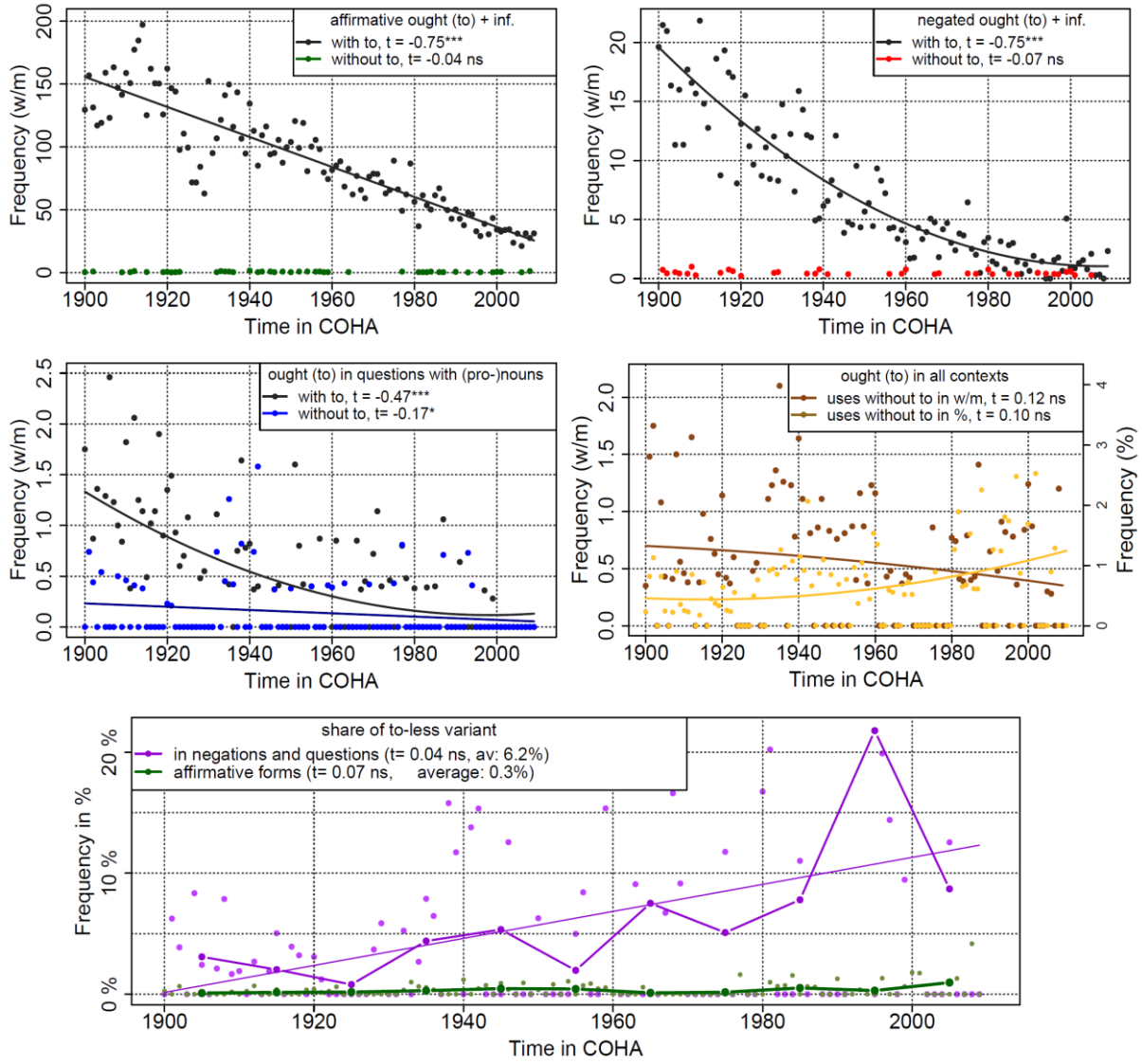


Figure 34 *Ought* with bare / *to*-infinitive in COHA

The data from COHA illustrate the dominance of the *to*-variant (cf. Figure 34): It is preferred in affirmative declaratives, in negated clauses, and in questions (cf. examples (197) to (198) below).

(197) It's awful! You can't help feeling, though you oughtn't to feel for such creaturs. [*sic*] It's his own fault, and he's nobody to blame but himself. (Thomas, F. W. (1835) *Clinton Bradshaw; or*, *The Adventures of a Lawyer*, Vol. 2, COHA)

(198) But tell me; ought I to disclose the whole, in plain terms? (Neal, J. (1822) *Logan: A Family History*, Vol. 2, COHA)

Occurrences with the bare infinitive experience a slight decrease in use, but there is no statistically significant correlation between time and frequency in affirmative (τ = -0.04 ns) and negated clauses (τ = -0.07 ns), only in questions (τ = -0.17*). Due to the general decline of *ought to*[116] the share of bare infinitives increases slightly (from 0.46% to 1.24%, τ = 0.10 ns, cf. dark grey line in the 2nd panel, 2nd row). The last panel of Figure 34 illustrates the share of uses without *to* in questions and negations on the one hand and in affirmative clauses on the other hand, condensing the information given in the other panels. We can see that the *to*-less variant is relatively more frequent in questions and negated clauses. This, in turn, means that about 34% of all uses with bare infinitives in the 1990s and 2000s occur in questions and negations (not depicted here, cf. Figure C.2 in Appendix C.2). The data from COHA thus confirm Quirk *et al.*'s observation that the use of *ought* with the bare infinitive can be found in non-assertive contexts (1985: 139). However, we should also keep in mind that no complete analysis of *ought* + bare infinitives in non-assertive contexts (including uses after triggers of the subjunctive, cases of shifted negation etc.) was carried out and that the share of uses in non-assertive contexts is probably higher than indicated here.

In the spoken language section of COCA, the relative frequency of bare infinitives (1.27%) is almost the same as in COHA between 1990 and 2009 (1.17%, all contexts considered). They are hardly used in affirmative contexts (0.3%), but they are more frequent than the *to*-infinitive in negated clauses (31%) and questions (67%).[117] However, it cannot be excluded that a certain number of transcription errors occurred. In example (199) in COCA (spoken), where two uses of *ought to* occur in the immediate context of one without *to*, a mistake in the transcript seems very likely.

(199) NEWT-GINGRICH-1R: … I think we ought to have -- somebody who wants to be president ought to have the courage to stand up for the truth and ought be prepared to say, if something is wrong, that it's wrong. (2012/01/13, *PBS NewsHour*, COCA)

Unfortunately, this could not be checked since most of the programs were no longer accessible in video or audio format at the time of this study. The source was available in 4 of the 16 cases of non-negated *ought to* in academic writing: *To*-infinitives can be found twice, one in a text from 1788, namely example (200), another in a 2001 reprint of a 1998 article, namely example (201). *Ought* + bare infinitive was actually used twice in the original source. With the exception of one, all other examples in the academic writing section stem from the September Issue 2002 of the *Journal of Instructional Psychology*, which I could not access. With errors even occurring in written

[116] Figure 34 also shows that *ought (to)* is much more frequent in affirmative clauses than in non-assertive contexts. This dominance becomes even more pronounced in the course of the analyzed period: 88.2% of all uses in the 1900s are assertive, but the number amounts to 96.0% in the 1990s and 2000s. The share is identical in COCA (spoken, 96.0%) in the time span (with manually identified non-assertive contexts in the data of "affirmative" *ought to* taken into account). My data thus suggest that Harris might be correct in assuming that positive declarative forms will be the most likely ones to hold their ground (1986: 353).

[117] 7 occurrences in other non-assertive contexts were brought to the fore by a manual analysis of 32 non-negated declarative clauses (22%).

sources, we should definitely keep in mind that the numbers identified for the bare infinitive are probably also too high in the spoken language section of COCA.

(200) "The Virginia Constitutional Convention of 1788 […] called for a Bill of Rights […] to be added to the new constitution, saying: […] according to the dictates of conscience, and that no particular religious sect or society ought (to) be favored or established by Law in preference to others." (Grant, R. (2005) "The Roman Catholic hierarchy: Putting the squeeze on politicians." *Humanist* 65.2: 18-22, COCA)

(201) And with this embarrassment there probably ought (to) be some self-disgust, since our claims to understand and use ethics seek a self-promoting and perhaps unwarranted dignity for what we do (Altieri, C. (1998) "Lyrical ethics and literary experience." *Style* 32.2: 272-298, COCA)

Finally, *should(n't) ought to* – the use of which is attested in dialects "in the north of the British Isles (cf. for example, various entries in Grant – Murison (1931)" and "in the southeast of the USA (Feagin 1979: 153-174)" (Harris 1986: 353-354; cf. also Nagle 2003) – is rare in COHA (32 occurrences in affirmative clauses and 14 in non-assertive contexts). It is primarily found in fiction, the only exception being four uses in a collection of letters. There are only four instances of (negated) *should* followed by *ought to* in COCA, one in the spoken language section (cf. example (202) below), and three in the fiction section. One of these occurrences, example (203), is a representation of mock-broken English. Here *shouldn't ought* may be used to imitate the speech style of one particular character (Zeno). We can thus conclude that this use is negligible in spoken AmE.

(202) He says you are a hypocrite, and he said you just should not ought to have done it. (2001/03/25, "Senator John McCain on campaign finance reform, and a debate on the environment," *CBS Face the Nation*, COCA)

(203) "I dunno about any of that," the tapman insisted. With a sudden access of boldness, he went on, "And it's not me you should ought to be going after if you've got somewhat against our monks. You take that up with the abbot..." (Turtledove, H. (1997) "The seventh chapter." *Fantasy & Science Fiction* 93.2: 111-127, COCA)

Semantics

As in the case of *should*, the predominant meaning of *ought to* is root modality (cf. Table 30 below; for an analysis of the historical development of *ought to*, see Nordlinger and Traugott 1997). Before I explore this any further, let us briefly inspect its other meanings.

Meaning in w/m (n= 704 (887)[118]	1990	2009	Difference	Pearson Residuals	
root	141.8	59.6	-58.3%	-0.16	0.25
epistemic	1.6	0.5	-68.8%	1.04	-1.69
ambiguous	1.4	1.0	-27.2%	-0.10	0.17
total (iwcm)	144.8	61.2	-57.8%	$\chi^2 = 4$, $p>0.05$, $V= 0.07$	

Table 30 Meanings of *ought to* in COCA (spoken)

[118] All occurrences of *ought to* + *do* / *have* / lexical verbs are examined. Additionally, there are 387 occurrences of *ought to be* (excluding progressive forms, questions, and shifted negation), 144 of which in *ABC 20/20*, *Nightline*, *Primetime*, and *PBS NewsHour* were analyzed. The numbers for *ought to* were then extrapolated.

In its epistemic sense, *ought to* expresses tentative inferences (cf. Quirk *et al.* 1985: 227). Example (204), where the political analyst Henican supposes that conservatives enjoy the President's speech, provides an illustration of this meaning.

(204) HENICAN: Listen, there were a lot of audiences for that speech. It was not one that got a lot of applause in Oslo, I noticed. But my conservative friends ought to have their hearts warmed. (2009/12/12, *Fox News Watch*, COCA)

Degani observes that epistemic *ought to* frequently collocates with inanimate subjects and dummy *it* (2009: 339). In my data 5 of 9 occurrences of epistemic *ought to* have inanimate subjects. In example (205), for instance, the speaker estimates that the oil prices will go down by $ 25 per barrel once the crisis is over. Yet the numbers are too small to confirm Degani's finding.

(205) Dr. RAHN: Well, we expect inflation to be coming down gradually. We think that once the Persian Gulf situation is over with and, of course, none of us know when that will be, but oil prices ought to fall back about $ 25 a barrel. That should help bring inflation down (1990/11/25, *CNN Sunday News*, COCA)

Utterances with epistemic meaning often have a deontic element (cf. Huddleston and Pullum 2002: 186-187, Collins 2009a: 55, Cappelle and De Sutter 2010: 95). Coates (1983: 78) as well as Nordlinger and Traugott (1997: 298-299) point to the existence of numerous mergers in PDE. Coates speaks of a neutralization of the root-epistemic distinction and highlights that the speakers may intentionally use these types of utterances (1983: 78-79). A good example is (206). Here Governor Brian Schweitzer observes that it is reasonable to expect 535 people to be able to work on more than just one bill. At the same time, he expresses that they have the duty to do so.

(206) KING: Does that mean they should put health care aside until they figure out the economy and they have more money in Washington? SCHWEITZER: No. I mean, there's 535 members of Congress. They ought to keep one or two balls in the air at the same time. If they're telling me now that they can only keep one ball at a time, then we have the wrong people in the Congress. (2009/11/15, "The last word," *CNN State of the Union with John King*, COCA)

According to Degani, *ought to* displays an increasing preference for mergers (Brown/ Frown: 17% +7%) and epistemic meanings (Brown/ Frown: 14% + 12%) between 1961 and 1991/2 both in BrE and AmE. She considers this evidence for the subjectification of *ought to* (2009: 332-333). In COCA both meanings decline. There is only a slight relative increase in the use of mergers, from 0.3% to 0.9%.[119] That epistemic meanings and mergers are in a much better position to "attack" root meanings in Brown and Frown is once again owed to the particular character of COCA and it may be indicative of a higher frequency of epistemic meanings of *ought to* in written language.[120]

[119] Mergers are considered a subcategory of ambiguous uses and classified accordingly in Table 35.

[120] Sadly, the frequency of epistemic *ought to* in both the spoken and the written parts of C-US is too low to allow us to make any conclusions about the spoken-written ratio (n=8, cf. Collins 2009a 165).

Root *ought to* expresses "duty and obligation of any kind […], what it is proper, correct, advisable, befitting or expected" (Degani 2009: 328). Huddleston and Pullum (2002: 186) observe that the speaker's opinion can be based on morals, such as in example (207), or on sheer expediency, such as in example (208).

(207) Mr. WILLIAMS: I- *crosstalk* If you- if you are concerned about homeless people tonight, you ought to take one home. (1990/03/02, *CNN Crossfire*, COCA)

(208) And- and it was never- in the argot of Wall Street, when you say junk bond, you mean bonds that were issued to help one raider gain corporate control or to help an established management ward off those raiders. That is 90 percent of the market and I think really we ought to restrict our conversation to that (1990/04/23, *CNN Crossfire*, COCA)

Like *should*, *ought to* is often considered a weaker equivalent of *must* (cf. e.g. Rivière 1981, Leech 2004: 100, Collins 2009a: 53). Both verbs tend to be used for the expression of desirable actions (cf. Carter and McCarthy 2006: 661). Quirk *et al.* stress that *should* and *ought to* reflect the speaker's conviction that the suggested state of affairs will in fact be realized (1985: 227). Sweetser claims that utterances with *should* are resistible (1990: 54).

Leech does not discern any semantic differences between *ought to* and *should* (2004: 101-102). To Palmer, both verbs "seem to be largely interchangeable" (1990: 122). Coates states that they are "often synonymous" (1983: 69), both in their root and epistemic meaning, and that they have "virtually identical" root meanings (1983: 81). Huddleston and Pullum similarly observe that "*should* in its most frequent use" is "generally interchangeable" with *ought to* (2002: 186). Harris quotes Visser's comments (1969: §1530) on the long coexistence of both verbs: "That neither of the two has succeeded in ousting the other would seem to justify the conclusion that they never had exactly the same meaning, however closely synonymous they always have been" (1986: 356). He observes that the two verbs have been nearly synonymous since their earliest uses, the only difference being that *ought is* stronger than the "toned down" *should* (1986: 352). Yet examples like (209) and (210) suggest that there must be a difference in meaning between the two verbs or else their co-occurrences would be merely be a repetition for the sake of emphasis.

(209) Yngvesson, Barbara and Maureen A. Mahoney (2000) "'As one should, ought and wants to be': Belonging and authenticity in identity narratives." *Theory*, *Culture and Society* 17.6: 77-110.

(210) Serpong's plan, like those found in many other cities, ignored reality. While plans are prescriptions of what should or ought to be, government officials frequently treat the plan as given, and program infrastructure into areas where there is limited demand. (Dowall, D. E. (1992) "Benefits of minimal land-use regulations in developing countries." *CATO Journal* 12.2: 413-426)

The existence of numerous proposals that have been put forward suggests that the difference between these verbs is more difficult to capture than one might expect. Many authors (cf. e.g. Swan 1980: 550 and Declerck 1991: 377) think that *ought to* is more objective than *should.* Collins clarifies that subjective deontic uses outnumber objective ones in the case of *should* and *ought*, yet the

proportion of objective meanings is higher with *ought to* (2009a: 54). He suspects that this may explain why Gailor believes that *ought to* is more often used for the expression of duties (1983: 348). Declerck stresses that *ought to* allows the speaker to present something as a "law, duty or regulation" (1991: 377, fn. 21). Myhill believes that it is used "as a rhetorical device to try to convince the listener that there really is general agreement from other people" and is thus more group-oriented than the individually-oriented *should*, which speakers choose when they do not want to suggest that others agree or will agree (although this may be the case) (1997: 4, 9). Verhulst *el al.* postulate on the basis of data from the BNC (1,200 occurrences) that *ought to* is much more frequently used than *should* in cases in which somebody other than the speaker profits from the realization of the state of affairs (2013: 216-217, 224). In a multifactorial statistical analysis based on data from the spoken part of the BNC and the written part of the Cobuild corpus, Cappelle and De Sutter identify the absence or the placement of an adverb before the infinitive and right after the auxiliary (as opposed to a position before the modal) as a factor rendering the use of *should* more likely. After expressions of suggestion, advisability etc., i.e. potential triggers of the subjunctive, *should* is nearly three times as likely to occur as *ought* (in BrE). Additionally, *should* is also more frequently used with 3rd person subjects.[121] Cappelle and De Sutter (2010: 111) also note that

> when the modal proposition is not a complement of *think* or a similar expression of cognition, *should* is more than twice as likely to be selected compared to when the proposition is embedded by such an item (as in *I think you { should / ought to } give it a try)*. This effect is highly significant.

If we look at the relative frequency, the situation is different in my sample. More uses of *ought to* (12.4 %) than *should* (11.3%) constitute complements of *I (we) think.* However, the more objective character of *ought to* can be confirmed (cf. Table 31 and Table 22 above): Objective deontic meanings (cf. example (211) below) are more common with *ought to* (7.5%) than with *should* (6.3%) (χ^2= 6.7, φ=0.28, d.f.=1).

(211) No, the Donaldson Doctrine is that all citizens of this country ought to have the protection of the Constitution and what it stands for and that we have courts to help insure that. (1990/04/22, *ABC Brinkley*, COCA)

Meaning in w/m (n= 675 (815))	1990	2009	Difference	Pearson Residuals	
subjective deontic	104.6	38.6	-63.1%	0.60	-0.98
subjective deontic with (possibly) directive function	6.9	3.9	-43.7%	-0.53	**3.25**
descriptive: subjective deontic	23.1	11.8	-48.8%	-0.65	1.06
objective deontic	7.2	5.3	-26.5%	-1.09	1.78

Table 31 Root meanings of *ought to* in COCA (spoken)

[121] All other statistically significant parameters for the selection of *should* concern uses that are not analyzed here: subject-operator inversion, the following word *'ve*, negation, and the absence of past-time reference. Subjectivity is among the factors that are not significant or were not considered because of their correlation with other parameters (cf. Cappelle and De Sutter 2010: 111).

With *ought to*, we also find a slightly higher number of subjective deontic uses, both if we take all meanings (68% vs. 59%) or just all root meanings as the baseline (69% vs. 66%). In examples (212) and (213) the speakers could have easily used imperative forms instead. (Please note that the 11 directives and utterances that can possibly be interpreted as directives are grouped together in Table 31). That there is still a notion of advice discernable in these utterances is probably why Huddleston and Pullum claim that *ought to* is not used in indirect directives (2002: 186).

(212) But if the parent wants to spend the money on a school where they pass out condoms in the cafeteria which they don't do under this plan, but that would be OK with you? BUCHANAN: Well, look, as long as it's not my money going for it- KINSLEY: It is your money BUCHANAN No, no. Not if it's a voucher. It's their own tax dollars KINSLEY Well, you ought to do some thinking. (1990/09/28, *CNN Crossfire*, COCA)

(213) BUCHANAN Michael, Michael. Who was […] responsible for giving us 13 percent inflation when Ronald Reagan took office. […] Mr. BECKEL: You ought to ask your friends. Your friends over there are the ones responsible for it. (1990/04/17, *CNN Crossfire*, COCA)

Both *ought to* and *should* collocate with activity and mental verbs.[122] *Ought to* displays a preference for less frequent verbs: None of its collocates are among the top 50 and 22% are not even among the top 1,000 most frequent verbs in the spoken language section of COCA (whereas 7% of the collocates of *should* are among the top 50 most frequent verbs and only 9 % among the top >1,000).

Both verbs mainly express subjective deontic modality. Still, cases where the speaker has authority over the addressee are rare, especially with *ought to*. One final difference between *should* and *ought to* that needs to be mentioned is that there are no formulaic uses of the latter verb (cf. example (133) above for this sense of *should*). It does not have the same range of meaning as *should*, but is reserved for a specific type of situations in which the speaker refers to an ideal course of action or state of affairs.

[122] However, because of the much higher number of distinctive collexemes of *should* (232 as opposed to 76), the share of activity verbs is much higher in the case of *ought to* (20% vs. 9%).

6.1.6. *Be to*

BE to[123] is rarely mentioned in monographs on modality, the only exceptions being Palmer (1979, 1990), Leech *et al.* (2009), and Collins (2009a). However, interest in *BE to* seems to have awakened in recent years. Articles dealing exclusively to with *BE to* are Sugayama (2005) and Declerck (2010), recently followed by Goldberg and van der Auwera (2012), Chang (2012), and Hundt (2014). Nesselhauf (2006) compares the evolution of *BE to* and *BE going to* in ARCHER. Bergs, who deplores the lack of comprehensive studies of the verb (2010: 226), analyzes expressions of futurity from a construction grammar perspective.

Palmer observes that classifying *BE to* is a "problematic" endeavor (1990: 3), but opts for considering it, at least formally, a modal verb (1990: 164). Declerck is convinced that it is a core modal auxiliary (2010: 36). Smith and Leech highlight its hybrid structure: It shares some of the characteristics with other emerging modals (various forms for person and number, distinct present and preterite forms, infinitive marker *to*), but lacks non-finite forms and cannot co-occur with the core modals. Based mainly on its decline in frequency, they decide that it "fit[s] more readily into the core modal category" (2013: 79).

Denison underlines that contrary to 200 years ago, the verb *BE to* only occurs in tensed verb forms today "(apart from such fossilized usages as *Whatever may be to come)*" and has thus gradually become more like the prototypical modals (2006: 454). Smith and Leech hypothesize that an increase in grammatical restrictions may be partially responsible for the decline in the use of *be to* between 1700 and 1900 that Nesselhauf (2006) documents in her study (2013: 386, 79). For instance, *BE to* no longer occurs in non-finite forms, as illustrated in examples (214) - (216) below (cf. Huddleston and Pullum 2002: 206, Smith and Leech 2013: 386).[124]

(214) for this young lady, this same Miss Musgrove, instead of <u>being to</u> marry Frederick, is to marry James Benwick. (Austen, J. (1818) *Persuasion*, quoted by Smith and Leech 2013: 386)

(215) When a man does all he can, though it succeeds not well, blame not him that did it. <u>Being to</u> advise, or reprehend any one, consider whether it ought to be in public or

[123] Palmer calls the use of *be to* as a cover term for all forms as "a mistake" (1990: 164) and suggests to replace it by *is to*. However, since *is to* is not the most frequent form in my data (it only accounts for 31% of all occurrences of the present tense affirmative uses of *be to* in COHA; 52% are uses of *are to*), making it the cover term here might be misleading. Moreover, the term has not caught on in the literature (the only other studies in which *is to* is used are Perkins 1983 and Goldberg and van der Auwera 2012). *Be to* with lower case letters will serve as a cover term for *is to*, *are to*, and *am to* as well as for the respective short forms in my analysis, *BE to* for studies in which no restrictions to a specific tense were made.

[124] Please note that Hundt argues that *be to* is "nearly always finite" when it has a future (or)/ a modal meaning (2014: 168). She qualifies the counterexamples she finds (e.g. in CNN transcripts, online journals, chat rooms) as "residual uses" (2014: 177). In reference to the first example repeated here, Hundt observes that *being to* has a futurish sense and cannot be replaced by *HAVE TO*, which seems difficult to prove.

(FN 30) They can't change their orientation; and here they are, <u>being to</u> be close to children and it's abominable. (2006/06/27,"Federal Judge greenlights sex offenders living near school bus," *CNN Grace*, COCA, quoted by Hundt 2014: 177)

in private… (1834, "The Washington papers." *North American Review* (October): 467-494, COHA)

(216) You will be to visit me in prison with a basket of provisions. (Austen, J. (1816) *Mansfield Park*, quoted by Denison 2006: 453)

To determine the number of occurrences in COHA, present tense (contracted[125] and full form) uses of *be* directly followed by a *to*-infinitive in the 1930s, 1960s, and 1990s were examined in their entirety (16,004 occurrences; 10,913 cases were irrelevant). The decades were chosen so as to roughly match the compilation dates of the Brown family of corpora. Additionally, as the starting and end points of the period under investigation, the years 1900-1901 and 2008-2009 were analyzed (555 of 1,313 occurrences were cases of *be to*). It should be mentioned though that there are marked fluctuations in corpus size in these years. The total number of words varies between 828,195 words in 2008 (1,345,697 words in 1901) and 3,544,495 words in 1999. Of course, the results are normalized, but this factor should nonetheless be kept in mind. Parallelisms like example (217) as well as sentences in which *BE* is the copula and *to* belongs to an infinitive clause (cf. example (218) below) were disregarded. Examples like (219) are equally not discussed here since they are considered to represent an intermediate stage in which the original meaning of *be* is still tangible. Huddleston and Pullum call them purposive complements because it is possible to use the paraphrase *for the purpose of ...* (2002: 1256).

(217) To run England's Eton is to tutor England's Establishment (1963/03/15, "Kairopractice." *Time Magazine*, COHA)

(218) Well, I'm sure you will agree with me in one thing: The chief task of a librarian is to get people to read. (Lewis, S. (1920) *Main Street*, COHA)

(219) "We're going to set up a drinking fountain in the business square," Fanny explained. "[…] And we're going to have a little low place fixed so's [*sic*] the dogs can get a drink too. This is to prevent hydrophobia." (Reynolds, K. (1919) *Green Valley*, COHA)

In light of comments made by Nesselhauf, who cites their passive meaning (2006: 517), and Declerck, who "intuitively" refrains from considering them as expressions of some kind of necessity, sentences with *blame* (cf. example (220) below) were analyzed separately. Goldberg and van der Auwera classify them as object-raising constructions (in which "the subject argument is semantically the *object* of an active lower clause verb," 2012: 122). Van der Auwera and Plungian observe that these "relic uses of the German-style modal passives [...] [are] vague between possibility and necessity" (1998: 102). *Be to blame* is used in declaratives as well as in interrogative clauses with *who* and *what* (cf. examples (221) and (222) below). Goldberg and van der Auwera also cite an object-raising example with *report* in a *what*-question (i.e. number (223) below), noticing the "Yinglish (Yiddish-English) ring to it" (2012: 123). Other infinitives that are frequently encountered in

[125] Cf. footnote 127 on contractions.

what-questions are, for instance, *do*, *know*, *lose*, and *say.* Example (224) illustrates the use of object-raising *do*. These questions can be rephrased by *What's to be done?*. The use of *BE to blame*, as well as that of other fixed phrases, will be presented in Figure 35.

(220) It's the words' fault! The English language, in all of its elastic, indeterminate obstinacy, is to blame! (Fishburne, R. (2009) *Going to See the Elephant*, COHA)

(221) SMITH: Jack Zimmerman, who's to blame for all of this? (1993/04/20, "Attorneys for Waco cult members support Koresh's behavior," *CBS Morning*, COCA)

(222) I think, after all, the question should be, "What is to blame?" Perhaps it is just one generation piling their hard knocks […] upon the next (1920, *Harpers*, COHA)

(223) With everyone so darned nice, what's to report? (quoted by Goldberg and van der Auwera 2012: 123)

(224) PETER THE SACRISTAN God help us, what's to do? (Marks, J. P. P. (1908) *The Piper*, COHA)

By contrast, *what*-questions with an active meaning (that can be rephrased with *will*), in which "the main clause subjects must be interpreted as the subject of the lower clause" and *BE to* functions as a subject-raising verb (Goldberg and van der Auwera 2012: 112, cf. example (225) below), are included in my analysis. The following extracts from COHA are excellent illustrations: In example (226) the question can be rephrased by *What will/shall happen to these colleges?*. The meaning in example (227) is captured by *What will/is supposed to keep me from being lonely?*

(225) a. The match is to begin at 11 pm.
b. The match begins at 11 pm. (Goldberg and van der Auwera 2013: 112)

(226) But there are scores of small liberal arts colleges over the country […] not prepared for this purpose […] What is to happen to these colleges? (1951/04/12, "Letters." *New York Times*, COHA)

(227) What's to keep me from being lonely? (Akins, Z. (1921) *Greatness*, COHA)

Figure 35 illustrates the frequency of both uses in COHA. Both subject-raising constructions in questions with *what* and *who* (τ = -0.40***) and object-raising constructions in declarative and interrogative clauses with *what* and *who* decrease in use (τ = - 0.09 ns). Overall, constructions with *blame* account for 84% (decade average) of all object-raising constructions and for 2.8% of all occurrences of *be to* in the examined 34 years. The share of passive lower constructions (cf. example (228) below) is much higher. The average in my sample from COHA is 42% – a number that is remarkably close to the 40 % reported in Goldberg and van der Auwera (based on an analysis of 100 instances from LOB, FLOB, Brown, and Frown carried out by a master student). Yet in COHA we witness a clear tendency towards a decrease, from 46% in the 1930s to 37% in the 1990s (τ = -0.46***; cf. also the results of a multiple distinctive collexeme analysis, which point to a stronger association of the *be*-passive with *be to* in the 1930s (attraction: $p < 0.001$) than in the 1990s (repelled: $p < 0.001$), cf. Table 32 below). The decline of the passive voice in clauses with *be to* is thus proceeding quicker than the general decrease of the verb *BE to.* The situation in the spoken language section of COCA will be discussed below.

(228) … it is interesting to note that this end is to be achieved within the present U.N. framework (1962, *NYT Letters*, COHA)

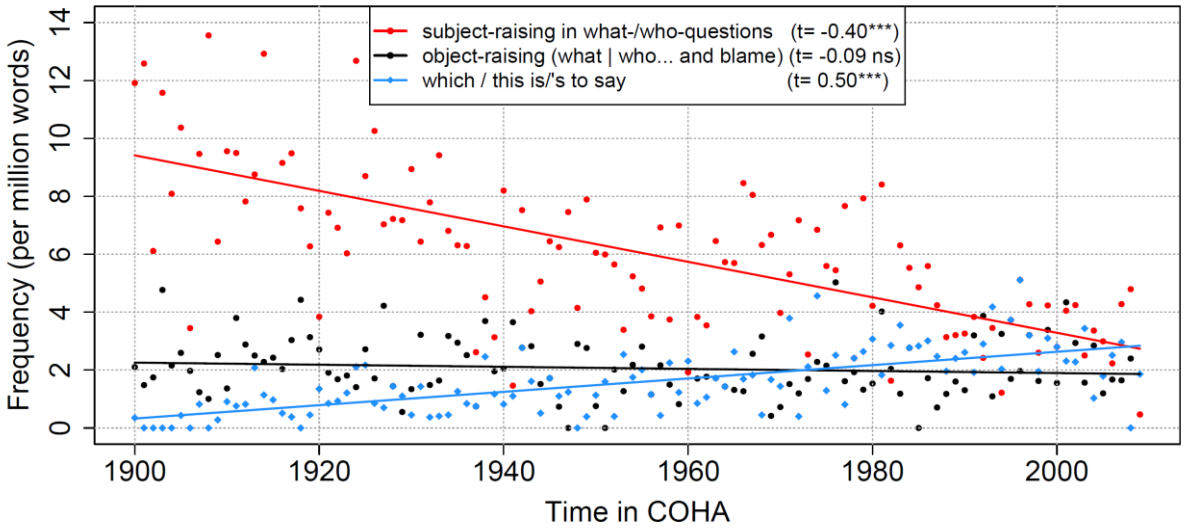


Figure 35 *Which | this is to…*, subject-raising constructions in *what-* and *who*-questions, and object-raising constructions in COHA

Two other uses, which are excluded from the ensuing analysis, are illustrated in Figure 35. Since *this is to say* (cf. example (229) below) is rare, its frequency is – for the sake of simplicity – added to that of *which is to say* (cf. example (230) below), which increases considerably over the course of the century ($\tau_{dec} = 0.78$***).

(229) George was ten years older than I, the child of what in those days was considered our parents "middle age["], as I was the child of their old age. This is to say that Mother was thirty-five when George was born, and forty-five when I was. (Langan, J. (2002) "Mr. Gaunt." *Fantasy & Science Fiction*, COHA)

(230) To run England's Eton is to tutor England's Establishment, which is to say that a man had better respect the customs. (1963/03/15, "Kairopractice." *Time Magazine*, COHA)

The phrase *Who's/is to say*, which occurs 8 times in COHA and 24 times in the spoken language section of COCA, is recognized as an idiom and not included in my analysis. Example (232) is considered to be parallel in meaning.

(231) The world is so full of possibilities, and who's to say polygamy might not come back into fashion? (Hribal, C. J. (1995) "The Clouds in Memphis." *Triquarterly*, COHA)

(232) Mr-COHEN: So putting a million dollars into an apartment, there is a lot of nervousness that, you know, what's to say this can't be worth $700,000 in a year from now? (2005/01/23, "The money issue; get real!; Real estate boom not confined to the country's coasts," *CBS Morning*, COCA)

Figure 36 shows the number of *if-/unless*-clauses with *be to* in COHA. Present tense uses such as example (233) below – equivalent to Nesselhauf's *if* (purpose)-type of occurrences (2006: 519-

522) and to Declerck's closed and open conditions (2010: 285-288) – decline towards the end of the century after a peak that can only be roughly situated between 1903 and 1930. Even though the analysis does not retrace the development over the whole century, we still get a more fine-grained picture than with the data from ARCHER-M (AmE), where we only have two data points for 1900-49 and 1950-99 for the same period of time as analyzed here. Note that in BrE, however, there is an in-crease in the use of *if*-sentences between 1900-49 and 1950-99 (cf. Nesselhauf 2006: 521-22).

(233) Developing countries say they need strong financial commitments if they <u>are to</u> achieve sustainable development. (Diring, E. (1997/06/20) "5 Years after Earth Summit, leaders take stock; little progress toward lofty goals." *San Francisco Chronicle*, COHA)

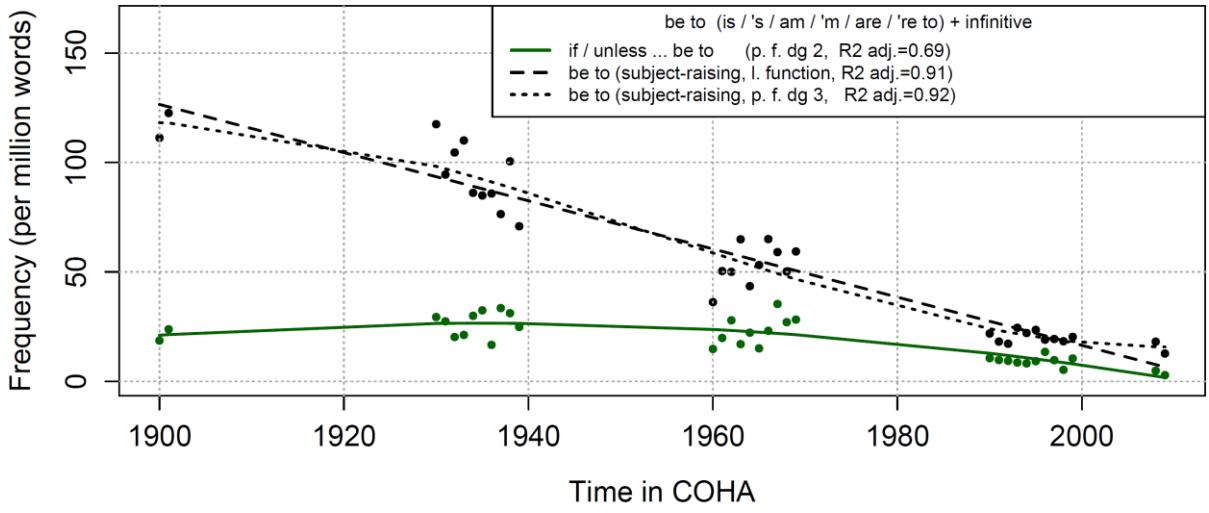


Figure 36 Present tense affirmative *be to* (iwcm) in COHA[126] (excluding *be to blame*)

The frequency of all remaining uses is also illustrated in Figure 36. Subject-raising and object-raising constructions in interrogative clauses headed by the pronouns *what* and *who* as well as object-raising constructions with *blame* in both declarative and interrogative clauses are excluded. Occurrences of *be to* in *if*-clauses are displayed separately. Between 1900-01 and 2008-09, *be to* declines by about 87%. This particularly steep decline in relative frequency is closely paralleled only by that of *ought to* (-80%), whereas the changes in the use of *must* and *should* are dwarfs in comparison. I will consider possible causes of this radical development when I discuss the semantics of *be to* below.

An analysis of the infinitives (including passive forms) occurring with *be to* tells us that the type frequency decreases by about 60%, from 236 in the 1930s via 180 in the 1960s to 94 in the 1990s. The number of hapax legomena (passive forms not included) also declines by almost 60%, from 142 in the 1930s to 111 in the 1960s and to 57 in the 1990s, suggesting that *be to* becomes

[126] See Appendix C.2 for further information about the fit chosen as a basis for the calculation of the frequency of *be to* in the years that are not analyzed here.

more restricted in its usage. The results of a MDCA (cf. Gries 2014), presented in Table 32, show that *be to* is increasingly associated with *be*, *blame*, and a few passive forms (i.e. 5 as opposed to 13 in the 1930s and 12 in the 1960s).

	1930s	1960s	1990s
attracted ($p \leq 0.05$)	*be*-passive, *have*, *go*, *look*, *pay*, *speak* passives: *divide*, *make*, *consider*, *remember*, *marry*, *note*, *send*, *drop*, *issue*, *think*, *give*, *charge*, *follow*	*work*, *call*, *die*, *take*, *accompany*, *appear*, *give*, *say*, *know* passives: *worship*, *introduce*, *compare*, *fill*, *construct*, *contrast*, *enjoy*, *stain*, *withdraw*, *achieve*, *find*, *pity*	*be*, *blame* passives: *replace*, *associate*, *believe*, *confine*, *pursue*
repelled ($p \leq 0.05$)	*be*, *blame*, *work*, *know*, *call* passives: *worship*, *commend*	*be*, *have* passives: *divide*	*be*-passive, *go*, *receive*, *pay*, *make*, *appear*, *have* passives: *fill*, *observe*, *take*, *regret*, *congratulate*, *keep*, *note*, *hold*, *see*, *make*, *find*

Table 32 Distinctive collexemes of affirmative *be to* in COHA

We should also consider the frequency of *be to* in the different sections of COHA. It is often argued that *be to* is a rather formal modal or, to quote Goldberg and van der Auwera, that it "has a slightly formal or higher register flavor to it" (2012: 115). Whereas Curme, arguably outdated today, still claimed that *be to* is preferred in everyday language (as opposed to *shall*, the "favorite in higher diction," 1931: 397), Leech observes that *be to* is "unusual, compared with other semi-modals, in being rather formal in its style" (2004: 104). Carter and McCarthy consider it more typical of formal than of informal conversation (2006: 664). Comparing data from nine different registers, Nesselhauf is the only one to bring substantial evidence into the discussion by showing that *be to* is most frequently used in newspapers in 1750-99 before it declines considerably, while the number of uses stays low in drama and fiction conversation in all three time periods (1750-99, 1850-99, and 1950-90) (2006: 525; to my regret, no information about the use in different text types in AmE is provided.

Decade averages in w/m	Fiction	%	Magazine	%	Newspaper	%	Non-fiction	%
1930s (n= 2265)	46.3	9.3%	92.1	18.4%	187.3	37.5%	174.2	34.9%
1960s (n= 1170)	32.0	11.5%	39.5	14.2%	87.1	31.3%	119.6	43.0%
1990s (n= 550)	14.7	15.6%	20.4	21.7%	18.4	19.6%	40.5	43.1%
decline in %	-68%		-78%		-90%		-77%	

Table 33 *Be to* in three decades in COHA

The texts in which *be to* most frequently occurs in COHA in the 1930s also come from newspapers (and non-fiction books), whereas *be to* is least frequent in fiction (cf. Table 33 below). The distribution changes in the 1960s, with *be to* now being more common in non-fiction books than in newspapers. As in Nesselhauf's data, the most pronounced decline occurs in newspapers (-90%), of which *be to* seems to have been characteristic (cf. Close's (1970: 44-45) observation, quoted by Bergs (2010: 226), that *be to* is frequently used in newspapers when plans, decisions, and orders

indicate that an event will occur). In the 1990s, non-fiction, the text type reputed to be the most formal of the four, accounts for almost half of all occurrences (43%). In non-fiction books we also find the lowest share of contracted forms[127] (2.8% of all occurrences vs. 4.5% in magazines, and 3.6% in newspapers), which are most common in fiction (30.1%). Overall, they only account for 11% of the uses (with a slight tendency towards an increase, $\tau = 0.22$ ns), which is a rather low share compared to the 37% in the case of present tense affirmative *be supposed to* and the 24% of *be bound to*. This fact as well as its frequent use in non-fiction can be taken as signs of the formality of *be to*.

Semantics

Among all the verbs studied here, *BE to* is the one with the greatest number of meanings enumerated in the literature. Carter and McCarthy observe that utterances with *be to* can function as directives or can refer to future events "which are fixed, desirable or hypothetical" (2006: 664). Nesselhauf (2006: 519) lists eight different uses (i.e. simple future including destiny, arrangement, obligation, possibility, two types of *if*-clauses and two past uses) and gives us information about their frequency of use.[128] In Declerck's very fine-grained analysis (2010: 277-280), eight different necessity-related meanings of *be to* alone are identified. Goldberg and van der Auwera distinguish four senses: prearrangement, predetermination, indirect commands, and suitability or advisability (2012: 112-115). In the following, I will consider these different senses in turn, starting with ability, conditionals, destiny, and future, before moving on to root senses.

According to van der Auwera and Plungian, it is often claimed that the modal infinitive only expresses necessity in English, "in particular predetermination or deontic necessity" (1998: 102), but counterevidence to this claim is presented by Blanchon (1988: 175) and Declerck (2010: 284) for passive infinitives and by Goossens (1992: 64) for active infinitives that can also express possibility (cf. van der Auwera and Plungian 1998: 102). The following examples, in which it is possible to use *can* in a paraphrase (cf. also Declerck 2010: 284; Leech 2004: 104, Collins 2009a: 84),

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[127] Identifying all contracted forms of 3rd person *be to* + infinitive proved to be difficult. When it expresses obligation, *'s to* + infinitive can be the short form of both *be to* and *have to* such as in example 31 below. There were in total 16 such cases, three of which are found in example 32. I decided to include only the one case in the above count of *be to* in which the context seemed to make a use of *be to* more likely, i.e. when *be to* is used in the same sentence as in last example below.

(FN 31) "…him to the hospital down there, and they put a bandage on. He's to stay in bed for twenty-four hours." (Geras, A. (1993) *Golden Windows and Other Stories of Jerusalem*, COHA)

(FN 32) "She wants to know how to please a non-Chinese. […] And tell her that you are going to teach her English. Immediately. Tell her no one's to know you're teaching her. No one's to know she can speak English. In front of others she's to speak Chinese only, or pidgin, which you'll also teach her…." (Clawell, J. (1966) *Tai-Pan*, COHA)

(FN 33) "I'm to see that we both have wood, exactly enough, and it's to come off your land, and you to get the first load." (Doneghy, D. (1931) *Border: A Missouri Saga*, COHA)

[128] Collins only finds 15 uses of *be to* in his C-US corpus (2009a: 83). His numbers are thus too small to make meaningful comparisons to my data.

are taken from COCA and van der Auwera and Plungian (1998: 102). In the spoken language section of COCA, this sense is very rare and its use is restricted to negated clauses (which are not included in this study).

(234) A man of quite ordinary strength is to lift this crate easily. (van der Auwera and Plungian 1998: 102)

(235) Some of the greatest treasures in Florence are not to be found in museums or galleries. (1994/03/19, "Sister Wendy Beckett brings Art's Numina to television," *NPR Weekend*, COCA) (=*cannot be found...*)

BE to is frequently encountered in conditional constructions (cf. Table 34 below and Collins 2009a: 83). Declerck distinguishes closed (actualization considered certain), open (actualization considered uncertain), and tentative (actualization considered unlikely) conditions (2010: 285-289). Nesselhauf (2006) only differentiates between purposes (present tense) and hypothetical conditions (past tense). Past tense conditionals (cf. example (236) below) are, with 22.7 w/m (1990-94) and 16.9 w/m (2005-09), much more frequent than present tense conditionals (cf. example (237) below, 3.1 w/m and 1.1 w/m, cf. Table 34 below).

(236) Whereas if McCain were to win it, he'll march into South Carolina with a big head of steam 2008 (2008/01/15, "What's at Stake Tonight in Michigan and Later This Week in South Carolina?" *Fox - The Big Story with John Gibson*, COCA)

(237) Wherever the money comes from, child care advocates say it needs to come quickly if the nation's child care system and its teachers are to stay afloat. (1991/09/03, *PBS NewsHour*, COCA)

Speakers / writers also choose *BE* when something is believed to come true with God's consent or considered to be destined to take place. The act is presented as "the inevitable outcome of events or as the natural result of a development" (Curme 1931: 397). Declerck calls this use "destiny" (2010: 278). Naturally, past tenses uses (cf. examples (238) and (239) below) seem to be more prototypical (1.1 w/m in 1990-94 and 0.4 w/m in 2005-09) than present tense uses (0.05 w/m in 1990-94 and 2005-09, cf. examples (240) and (244) as well as Table 34 below).

(238) He was born as the son of an impoverished cab driver but was to become one of the wealthiest business new page down men in the city. (Declerck 2010: 282)

(239) Prof-SCHVEY: … And he [Williams] worked out his ideas in short story form and in poems, and they form the germs of what were to become his major plays. (2005/04/ 13, "Interview: Professor Henry Schvey discusses the discovery of an unpublished Tennessee Williams poem found in a New Orleans bookstore," *NPR Talk of the Nation*, COCA)

Declerck claims that the sense of destiny is "usually backgrounded" in present tense uses with future reference and that the future actualization of the situation seems inevitable (2010: 282). Yet there is one example in my data sample in which the notion of destiny is clearly present (cf. example (240) below); in others, the idea is still palpable. Nesselhauf observes that some uses are "coloured by connotations of destiny, predestination or divine arrangement" (2006: 519, cf. example

(241) below), but decides against distinguishing two separate categories (as Jespersen did). A pertinent illustration of the existence of a cline and the fluidity of the border is afforded by example (242). Here the speaker might have a higher power steering her fate in mind.

(240) If (unintelligible) doesn't have a child, whatever you are to be, the Lord will make you to be. I believe in God. (2006/02/18, "A painful struggle over Nigeria's abandoned children," *NPR Saturday*, COCA)

(241) Then will our posterity rejoice in the larger Christ who is to be (19xxcadm.h8, quoted by Nesselhauf 2006: 519)

(242) SONYA We all have secrets; don't we? I mean, you meet the most interesting people, all of whom have secrets. And in a way, could we ever be who we are to become, if we didn't have those experiences and those secrets? (1993/05/28, *CNN Sonya*, COCA)

A good paraphrase for the following example is *more are bound to follow*, which mirrors the sense of inevitability associated with the passing of the latest trade deal. Example (244) seems to be an expression of pure futurity, but it is theoretically possible that the speaker thinks that the future is determined by destiny. Simple future is expressed in examples (245) and (246).

(243) In the last four years, we have shipped nearly three million manufacturing jobs overseas. That's three million jobs that paid a living wage to working Americans, providing for their families. They are gone. And more are to follow if Congress passes the latest trade deal, CAFTA, in the next few months. (2005/03/04, "Martha's next move?," *CNN Crossfire*, COCA)

(244) Rep-NORTON: So, you know, I don't contemplate that the world will fall apart before I die or that the better things are to come. (2008/11/14, "Nation's capital braces for record inaugural crowds," *NPR Tell Me More*, COCA)

(245) So it would seem that we are to have a fully-satisfied population. The problem in Peru is that we have a very young population. (2006/04/08, "Peru faces choices in presidential vote," *NPR Saturday*, COCA)

(246) You need economic circumstances that are to propel you to achievement. (1994/10/26, "Comments on the New Jersey senate race, debate between Senator Kennedy and Mitt Romney and estimates what a candidate spends per vote they receive," *Independent Limbaugh*, COCA)

Expressions of futurity with *yet* and *still*, as identified by Declerck (2010: 283), are not covered by my search for *be to* + infinitive. Likewise, the numbers for questions are not included in the results presented in Table 34, but a quick analysis of interrogative sentences headed by *who* and *what*, as discussed above, suggests that these questions almost exclusively convey futurity. This can be seen in examples (247) and (248) from COCA as well as in example (249), given by Declerck, who qualifies it as an expression without a "clear idea of necessity" that equally has a pure future meaning (2010: 281-283).

(247) But there is a whole other group of people, and these people can't feel remorse or are unable to feel the pain of another person, and don't feel guilt. Now, what's to stop those types of people from doing it again? Those types of people are the

dangerous ones… (1993/01/28, "Living with cancer," *CNN Sonya*, COCA) → *What will stop those types of people…?*

(248) I think this president is trying to stay with us so that he can set expectations, give the American people a flavor of what's to come. (2009/02/15, "The roundtable; will stimulus work," *ABC This Week*, COCA) → *a flavor of what will come*

(249) Water for all – who is to pay? (Cobuild, quoted by Declerck 2010: 283)

Almost half of the (embedded) questions with *who* and *what* (n=193, excluding *who is/'s to say*), have future meanings. If they were included in the occurrences subjected to semantic analysis, futurity would account for 26.9% of meanings (3.28 w/m in 1990-94 and 1.14 w/m in 2005-09, -22.4%). This high share of future meanings illustrates why Smith and Leech call *be to* "a borderline modal of futurity" (2013: 79).

Meaning in w/m (n= 357)		1990-94	2005-09	Difference	Pearson Residuals	
conditionals		3.14	1.09	-65.3%	**2.15**	**-2.56**
future	destiny	0.05	0.05	0%	-0.16	0.19
	pure future	0.32	0.30	-6.7%	-0.22	0.26
	plan	1.09	0.89	-18.4%	-0.12	0.14
root		4.87	4.80	-1.4%	-1.14	1.35
indeterminate		0.05	0.20	+335.3%	-1.13	1.34
total (iwcm)		9.51	7.33	-22.9%	$\chi^2 = 17.5$, p_{fe}=0.0003, $V = 0.13$	

Table 34 Meanings of *be to* in COCA (spoken)

Declerck distinguishes necessity meanings with a source (or "M-origin" in his terminology) in an arrangement, plan, agreement, or decision (cf. in examples (250) and (251) below) from "futurish" uses of *be to* (cf. example (252) below). The source of the necessity, which can be "an official arrangement, plan, decision or order," is bleached in the latter, "so that the hearer's attention is directed to the future actualization" and the emphasis shifts away from the origin of the necessity or obligation, making it indiscernible at times (Declerck 2010: 281-283).

(250) Helen is to appear on television. (Declerck 2010: 278)

(251) Last week it was announced that Sheila Gunn, a Times diarist and former political correspondent, was to join the Smith Square press office. (Cobuild, quoted by Declerck 2010: 278)

(252) Nelson Mandela is to address the Irish parliament today and will have talks with Prime Minister Charles Haughey before travelling to London, where he's to meet Mrs. Thatcher on Wednesday. (Cobuild, quoted by Declerck 2010: 283)

In a similar vein, Nesselhauf observes that in many future time expressions, arrangements are semantic features (2011: 123), yet she does not make a distinction between uses that are closer to the future and others that are closer to necessity, but categorizes all of them as expressing arrangements. In ARCHER this meaning is dominant in all periods in both varieties (cf. Nesselhauf 2006: 520-522). A look at my data reveals that plans or schedules and the resulting arrangements for future realizations are closely related and difficult to disentangle. I thus also opted for the use of a single category for arrangements, plans, and intentions, and only separated unequivocal cases of future

meaning such as example (253). Example (254), where a meeting of the UN Security Council is planned and w*ill* and *be to* alternate, and example (255), where an exchange of gifts is scheduled, are all categorized as plans.

(253) They continue to modernize and continue to deploy new weapons systems. So what we're betting on is to come, of Soviet intentions remaining constant, and I think there is no guarantee that, that there is no future coup, that the current set of leaders will always be there […] (1991/10/01, *PBS NewsHour*, COCA)

(254) It's before the big meeting of the nuclear club at the end of next week, when the Security Council of the UN, which is Yeltsin and Bush and the British and French and the Chinese -- the big nuclear powers – are to meet, and we expect they're going to be discussing the possibility of further major cuts in -- in -- in nuclear arms. (1992/01/25, "News of the week: Abortion / acquired immune deficiency syndrome conference," *NPR ATC*, COCA)

(255) PLANTE: There's an exchange of gifts scheduled to take place about now, Connie. The president, the king and the prime minister will give each other commemorative gifts, and then five Israeli generals and five Jordanian generals are to exchange gifts symbolically on the stage. (1994/10/26, "Signing of the Middle East peace agreement," *CBS Special*, COCA)

Nesselhauf also observes that the distinction between arrangements / plans / intentions on the one hand and obligation meanings on the other hand is very difficult to make (2006: 521). In example (256) it is very likely that police officer Joey has been given the order to attend the lecture, yet the plan to attend the lecture is foregrounded. This example is accordingly classified as a plan.

(256) We tell Joey that he has the gun to defend himself and others, but later in the day. POLICE-OFFICER-1M# All right. Let's get rolling here, guys. DIANE-SAWYER-1-AB# (*Voiceover*) For now, he's to attend a lecture class on protective gear. He has no idea what will happen here, nor that there are hidden cameras in the lecture hall. (2009/04/10, "Guns in America; could being armed save you in a shooting?," *ABC 20/20*, COCA)

References to rules and regulations (cf. example (257) below) account for about 11% of all uses, reported orders (cf. example (258) below) for 9%. Directives uttered by the speaker (cf. example (259) below) are a little less common, making up for 7% of the occurrences of *be to*.

(257) Well, Texas state law says that if your employer illegally withholds your wages, you are to send your complaints here, to the state capital, and the Texas Employment Commission. (1991/03/14, "L.A. law," *ABC Primetime*, COCA)

(258) The President, in making the invitation a few days ago, made it quite clear that he did not intend this to be an negotiation of any sort. In fact, I was left with the distinct impression that he simply wants to deliver a message to you that you are to take back to President Saddam and that the message is a fairly tough one. (1990/12/07, "An interview with Tariq Aziz," *ABC Nightline*, COCA)

(259) Unidentified Judge: *(In-court)* You are to be discharged from this jury. (2007/03/06, "Murder on the cape; police close in on suspect in murder case of fashion writer Christa Worthington," *CBS 48 Hours*, COCA)

Finally, uses in which the speaker merely voices an opinion are very common. When descriptive meanings are included, they account for 31 % of all uses. Yet this high share of subjective deontic uses is owed to the frequent use of *be to blame* in this sense (cf. examples (260) and (261) below). There are only 10 uses with other verbs, one of which is example (262).

(260) But I do think there's an absence of leadership and I think there's an intellectual community, the academic community is to blame too. (1991/03/19, *PBS NewsHour*, COCA)

(261) ELIZABETH-PALMER: Many Iraqis believe radical Islamists are to blame for these double suicide attack [*sic*]; working hand-in-hand with disaffected Sunnis, former Baath party members, who resent Iraqs [*sic*] Shiite-dominated government. (2009/ 10/26, *CBS News Morning*, COCA)

(262) PINKERTON: I think both candidates are to be admired for participating in that very moving event at Ground Zero on 9/11. (2008/09/13, *Fox News Watch*, COCA)

In the sample of 100 uses of *be to blame* in 1990-94 and 2005-09, only two references to collective opinions that become laws are found: examples (263) and (264).

(263) In 1970, California became the first state to enact a no-fault divorce law, which means no one is to blame. (1990/02/22, "Divorce," *ABC Primetime*, COCA)

(264) Mr. MERIDOR: I don't know of any change of our government resolution of some days ago. After all, the resolution already decided that we are to blame. They condemned us. (1990/10/18, "The strain in U.S.-Israeli relations," *ABC Nightline*, COCA)

Meaning in w/m (n= 204)	1990-1994	2005-2009	Difference	Pearson Residuals	
subjective deontic	1.09	1.54	+40.6%	-1.44	1.72
subjective deontic with directive function	0.41	0.64	+57.2%	-1.08	1.28
descriptive: subjective deontic	1.41	1.14	-19.3%	-0.11	0.13
descriptive: directive utterance	0.86	0.69	-19.8%	-0.07	0.09
objective deontic	1.09	0.79	-27.5%	0.12	-0.14

Table 35 Root meanings of *be to* in COCA (spoken)

We can thus say that, excluding uses with *who* and *which is to* + infinitive, *be to* is a verb with a rather strong modal force, with more than 50% of all root uses being directive utterances and another 37% objective deontic uses in which the source is a rule or law. This quality may have played a decisive role in the decline in the use of *be to* in COHA described above (cf. Figure 36).

Nesselhauf observes a decrease of all meanings of *be to* between 1750-99 and 1950-90 in the American texts in ARCHER (2006: 521-22). In my data all meanings except subjective deontic uses (*blame*) and objective deontic uses decline in use, but as pronounced as the changes in normalized frequency are, there are no major changes in the distribution over time.

6.2. Semi-Modals

6.2.1. *Have to*

HAVE to is arguably the best-studied semi-modal, mainly because of its close relationship to *must*. It "reached a highly grammaticalized status only in the last 100 or so years" (Krug 2000: 76), rising considerably in frequency in the 19th and 20th century (as the data from ARCHER indicate, cf. Biber *et al.* 1998: 208 and Krug 2000: 77-79).[129] Figure 37 shows the use of the lemma and the frequency of the verb in contexts in which it can be interchanged with *must* in COHA and in the spoken language section of COCA. It is even more frequently used in COCA than in COHA (please note the differences in scale between the left and the right panel). The difference between the two sets of values, that is, the share of in contexts that are excluded here (i.e. non-finite forms, uses in the past tense, in negated clauses, in questions, and in combinations with perfect *have* and the core modals, cf. Ch. 4.7), is very high compared to other semi-modals like *need to* and *have got to*..

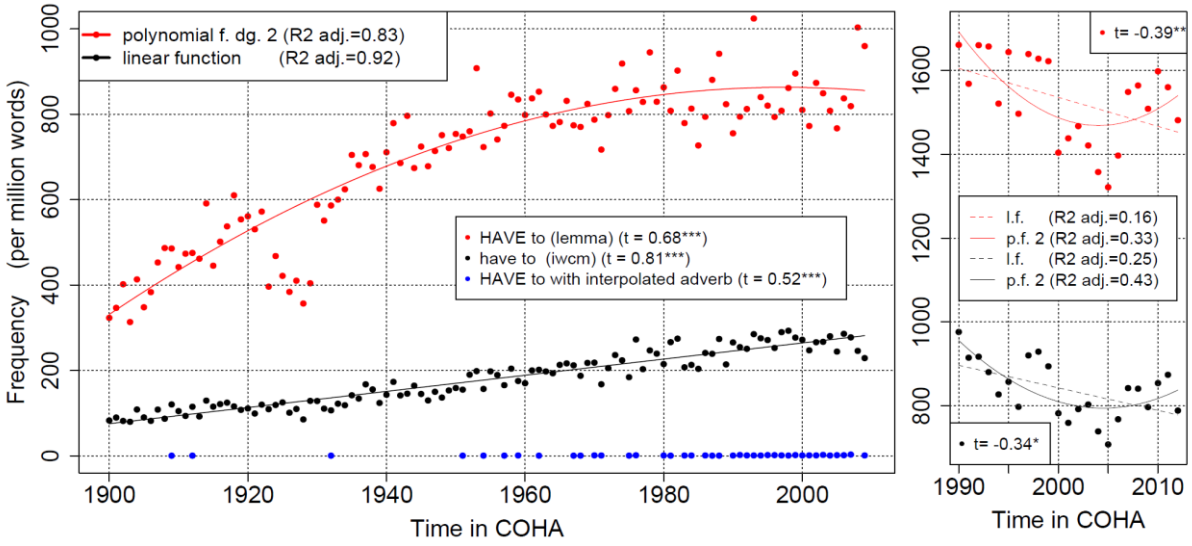

Figure 37 *HAVE to* and *have to* in COHA and COCA (spoken)

In reference to LOB and FLOB, Smith observes that the use of "HAVE TO appears to have flattened off" (2003: 250).[130] In COHA the values stay fairly constant towards the end of the 20th and the beginning of the 21st century (cf. the curve of the 3rd degree polynomial function in the 2000s).

[129] Krug observes an increased bondedness between *HAVE* and *to* since adverb interpolation of *really* and *actually* is less likely than between *HAVE* and *to* than between *HAVE to* and the infinitive in the spoken BNC (2000: 58). In COHA we see that the number of adverbs interpolated between *have* and *to* does indeed decrease (τ = -0.52***, cf. Figure 40), as adverbs are increasingly placed outside of the unit formed by *have* and *to* (τ = 0.54***). The only exception is the increase of the idiomatic phrase *HAVE yet to* (τ = 0.60***). Since *have yet to* is an idiomatic phrase with particular semantics which should not be considered counterevidence to Krug's finding because of its particular semantics.

[130] Seggewiß, who analyses data from LOB, FLOB, and DCSPE, similarly observes that "[*h*]*ave to* and *have got to* seem to have reached a saturation point because they don't increase in frequency any longer" (2013: 74). Moreover, she draws attention to the importance of the context in which the verb is used and confirms Close and Aarts' finding (2010) that the use of *have to* increases in contexts in which it can be used interchangeably with *must* (2013: 151).

However, there is a negative correlation between frequency and time in the spoken language section of COCA (τ = -0.34***, cf. right panel of Figure 37 as well as Johansson 2013: 374). In non-fiction books in COHA, the lemma *HAVE to* declines from the 1970s on, while the use in fiction almost stagnates between the 1950s and the 1990s (cf. Figure B.5 in Appendix B.2). Smith observes that the proportion of direct speech in the fiction section may be a determining factor for the frequency of *HAVE to*, given that *HAVE to* is more likely to appear in contexts in which direct speech is rendered (2003: 253). Yet there is no easy way of determining whether there is a decrease in the use of direct speech in COHA.

Smith also demonstrates that in those contexts in which it is syntactically required[131], *HAVE to* is particularly frequent in the second half of the 20th century, but it decreases by 3.9% between 1961 and 1991 (LOB to FLOB, 2003: 255). Myhill's study of American plays written between 1824 and 1947 suggests that syntactically required *HAVE to* is the earlier form and that it considerably increased in use at the turn of the 20th century and "was strongly dominant […] until the most recent period" (1947-1984, 1995: 171-172). As Figure 38 illustrates, the situation is quite similar in COHA.

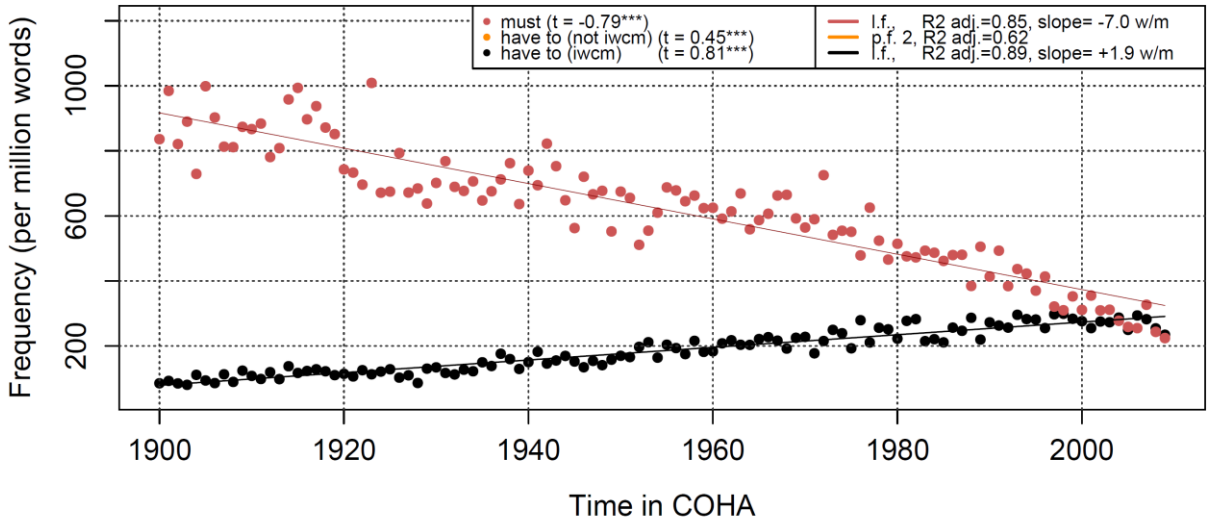

Figure 38 *HAVE to* in different contexts in COHA

Contexts in which *have to* cannot be replaced by *must* are much more common (ranging between 230 w/m and 737 w/m, with a mean of 506 w/m)[132] than those in which this is not possible (ranging

[131] Syntactically motivated are: non-finite forms, negated forms, and past tense uses (except instances of (free) indirect speech and thought, which prove to be particularly difficult to identify in cases with a backshift of tense (cf. Smith 2003: 254-255) and were not excluded in my search in COHA).

[132] As usual, present tense non-negated uses are considered interchangeable with core modals. Code uses are – exceptionally – included here to ensure similarity to Smith's study. Occurrences of the phrase *X has / have to do with* were subtracted. Non-catenative internal complements (as in the example below) were not manually identified and subtracted. An exploratory search for the string noun (≠ common noun) + pronoun + *have to* + infinitive ([nn] [p*] *have to* [v*]) showed that they are rare (0.55% =12 occurrences in the 1900s, 0.23% = 6 in the 1910s).

(FN 34) Meanwhile, the longer the development's delayed, the more Dolan loses. And the more time we have to raise money. (Roberts, N. (2004) *Birthright*, COHA)

between 84 w/m and 330 w/m, with a mean of 197 w/m). For decades, the increase has also been much more pronounced in the latter. Yet in the late 1990s and early 2000s, the frequency of *have to* in contexts in which it is not interchangeable with a core modal seems to stagnate (cf. Figure 38). By contrast, the use of *have to* steadily increases in those contexts in which such an exchange would be possible ($\tau = 0.81$*** vs. $\tau = 0.45$*** in all other contexts). The recent decline of *HAVE to* is thus caused by a (relative) reduction in the use of non-finite forms, past tense forms, and negated forms, while affirmative present tense *have to* continues to encroach on the territory of *must*. Semantic differences between these two rivals will be investigated below.

Semantics

The analysis of the meanings of *have to*[133] confirms what has already been asserted in other studies. Collins (2009a: 59), Leech *et al.* (2009: 109), and Close and Aarts (2010: 178) show that in both spoken and written BrE and AmE (1990s), *HAVE to / have to* is a serious rival of root *must*, but not of epistemic *must*. If we look at the frequency of these meanings compared to the overall frequency of both verbs, the same is also true in COCA (spoken): *have to* has a share of 1.7% epistemic meanings, whereas *must* has a share of almost 20% (14.9% in 1990 and 24% in 2009). Yet with a ratio of 1:4 in 1990 (13.9 w/m vs. 55.5 w/m) and 1:2.4 in 2009 (9.4 w/m vs. 22.7 w/m), the absolute frequency of epistemic *have to* is no longer as far from epistemic *must* as in other studies (e.g. 1:7.5 in Collins 2009a: 34, 60). For the moment, epistemic *have to* is a respectable alternative to *must*, but my data suggest that it is not unlikely that *have to* will one day become an even more serious contender as epistemic *must* declines.

Meaning in w/m (n= 503 (735))	1990	2009	Difference	Pearson Residuals	
root	881.6	472.5	-46.4%	0.32	-0.40
epistemic	13.9	9.4	-32.1%	-0.17	0.22
formulaic	30.4	35.8	+17.7%	-1.30	1.66
total (iwcm)	925.9	517.8	-44.1%	$\chi^2 = 4.8$, $p < 0.10$, $V = 0.05$	

Table 36 Meanings of *have / has to* in *ABC Primetime*, *Nightline*, *20/20*, and *PBS NewsHour* (COCA)

Formulaic uses are already much more frequent with *have to* (35.8 w/m, cf. Table 36) than with *must* in 2009 (7.3 w/m in 2009, 45.0 w/m in 1990). Yet the share of formulaic uses of *must* is still slightly higher than that of *have to* in the 2009 data (7.7% vs. 6.9%). Like *must*, *have to* collocates with *say*, *tell*, *admit*, and *promise* ($p < 0.05$, cf. Table F.6).

(265) WALLACE You know, you say that they're hoping for somewhat more favorable coverage, […], Ted, but I have to say that the first American reaction to your reports

[133] Both forms of *have to* and *has to* are included, yet because of the large number of uses in 1990 and 2009 the investigation was restricted to *ABC 20/20*, *ABC Nightline*, *ABC Primetime*, and *PBS NewsHour* (cf. Ch. 4.1 above). All 222 uses of *have to* with infinitives of lexical verbs in 2009 were examined; a sample of slightly more than 11% of the 1,670 occurrences was considered adequate for 1990. Since uses with *be*, *do*, and *have* are particularly common, the database was further narrowed down to *ABC 20/20* and *ABC Primetime.* All 107 occurrences of *has to* and *have to* as well as uses of *has to* with a lexical verb were analyzed. *Having to* was not included (cf. Ch. 6.2.4).

was to the news that they're not going to allow any Americans out. (1990/08/14, "First report from Baghdad," *ABC Nightline*, COCA)

It is often claimed that *have to* is more objective (e.g. by Leech 2004: 83) and neutral (cf. Coates 1983: 55) than *must*. Curme already observes that *have to* describes objective necessities arising from the circumstances. According to him, it is also "not infrequently used to indicate that the objective necessity lies in the will of another." It thus allows the speaker to present his/her wish as an objective necessity (1931: 395). Westney stresses that it refers to "an external, existent obligation that can be perceived or described independently of the speaker" (1995: 151). Collins summarizes that Coates (1983), Perkins (1983), and Palmer (1990) all agree that in contrast to *must*, the meanings of *have to* are "skewed towards the objective (Palmer's 'external') end of the subjective/objective scale" (2009a: 60). He asserts that even though there are instances of deontic *have to* in which "a general requirement or obligation" is the source and the subjective / objective distinction cannot be applied, his data confirm a tendency for *have to* to express more objective meanings than *must*. (Unfortunately, though, he does not provide any numbers of objective and subjective uses.) Tagliamonte and Smith also observe that objective deontic modality is most frequently expressed by *have to* (and not by its rivals (*have) got to* and *must*) in BrE dialects (2006: 363).

A comparison between the meanings of *must* and *have to* in the spoken language section of COCA confirms that the absolute frequency of objective deontic meanings is higher in the case of *have to* (90.9 w/m vs. 33.4 w/m). However, the relative frequency of objective deontic *must* is higher than that of *have to* (16.8% vs. 12.8%, cf. Table 37, which condenses the findings of Table 20 above and Table 38 below). One illustration of an objective deontic meaning is example (266). Here the rules of the Catholic Church for acquiring the status of a saint are explained.

(266) There are two basic qualifications for sainthood. You have to be a martyr and literally die for the faith or you must demonstrate extraordinary virtue and holiness during your lifetime. (1990/12/21, "Hidden messages; searching for a miracle; the greatest gift of all," *ABC 20/20*, COCA)

Meaning in w/m	*must*			*have to*		
	average 1990, 2009	% of root uses	% of all uses	average 1990, 2009	% of root uses	% of all uses
subjective deontic	**62.5**	45.7%	29.4%	**328.1**	48.5%	43.2%
subjective deontic with directive function	5.0	3.6%	2.9%	**30.5**	4.5%	4.6%
objective deontic	33.6	24.5%	16.8%	**90.9**	13.4%	12.8%
dynamic	**16.7**	12.2%	8.3%	**152.5**	22.5%	21.3%
epistemic	**34.1**		19.5%	**11.6**		1.7%
formulaic	**26.0**		11.2%	**33.1**		5.2%
ambiguous (root / epistemic)	**2.2**		1.2%	**0**		

residuals higher than |2| are marked in bold print, p≤0.001, d.f. = 8; only statistically significant differences shown

Table 37 Comparison between the meanings of *must* and *have to* in COCA (spoken)

By contrast, *have to* has a stronger tendency to express dynamic meanings, which are void of any subjectivity, than *must.* Whereas 22.5% of all uses of *have to* express dynamic meanings, the same can be said only about 12.2% of all occurrences of *must* (the shares are almost reversed in the case of objective deontic meanings, cf. Table 37 below). An illustration of a dynamic use can be found in example (267). Here the weather and the geographical conditions of the land make it necessary for men and animals to travel further to find water.

(267) Pastoralism remains the best use of this arid land, but, as herders from different communities and tribes have to travel further to find water and pasture, they encroach on each others [*sic*] land. (2009/10/13, *PBS NewsHour*, COCA)

Must is still the favored choice for the expression of subjective deontic modality. In Tagliamonte and Smith's data, however, *have got to* and *have to* are invading the territory of *must* (2006: 363). *Have to* is the more common expression of subjective deontic modality in the spoken language of COCA – a fact that may be linked to the particular character of this database. It might also be indicative of a tendency for *have to* to take over former functions of the declining verb *must* in recent spoken AmE. If we only look at root uses, the share of subjective deontic uses is almost the same for *must* and *have to* (cf. Table 37). As in the case of *must*, the hedge *I think*, which "indicates pragmatic weakening," is frequently used (Collins 2009a: 61, cf. example (268)).

(268) I think the President has to make that before he can expect to have the people follow him, and I don't think just the rhetoric is going to be sufficient. (1990/10/31, "War clouds: Real threat or smoke and mirrors?" *ABC Nightline*, COCA)

Whereas Coates goes so far to argue that root *have to* is never subjective (1983: 55), Collins demonstrates that there are indeed subjective meanings of *have to* in which the speaker orders somebody else to perform a certain action (2009a: 60-61). Such uses are very rare in COCA. In example (269), for instance, *have to* alternates with *got to* and *have got to*, expressing strong obligation. Tyann calls Jessie urging her to leave her current location, where she is in danger of being hurt by the storm. In example (270) the word *mandate* is explicitly used to describe the order given by Treasury Secretary Paulson to the banks. What all these uses seem to have in common is that there is a reference to some external cause (such as a storm or the good of the entire financial system).

(269) SAM-CHAMPION-1-AB# (*Voiceover*) […]At the Pizza Ranch, assistant manager Jessie and his co-workers are pulling people into the only possible safe place, a small restroom. Since Tyann is home, all she can do is listen helplessly on the phone as she tries to stay connected to Jessie. TYANN-LESTER# He was like, "You got to go. We've got to go now. You have to move." (2009/08/14, "Blown away: Twisted terror; storm spotters track monster tornado" *ABC 20/20*, COCA)

(270) Many of them [banks] didn't want to take the money in the first place and did so only because Treasury Secretary Paulson gave them, you know, basically a mandate and said, "You have to take this money for the good of the financial system." (2009/04/14, *PBS NewsHour*, COCA)

If we look at the relative frequency, directive utterances with *have to* are slightly more common (4.6%) than those with *must* (2.9%). In absolute terms, *have to* has overtaken *must* by far (30.5

w/m vs. 4.3 w/m). The share of possibly directive utterances and descriptive (i.e. reported) directive utterances and subjective deontic readings, is almost the same for both verbs (*have to*: 11.2%, *must*: 12.3%, not listed in Table 37 above).

Meaning in w/m (n=499 (689))	1990	2009	Difference	Pearson Residuals	
subjective deontic	455.6	200.7	-56.0%	1.07	-1.36
subjective deontic (possibly directive function)	45.6	43.4	-5.0%	-1.05	1.34
subjective deontic with directive function	30.7	30.3	-1.1%	-0.94	1.20
descriptive: subjective deontic / directive function	34.7	26.5	-23.7%	-0.48	0.61
objective deontic	115.9	66.0	-43.1%	0.04	-0.05
dynamic	199.2	105.8	-46.9%	0.30	-0.39

Table 38 Root meanings of *have / has to* (iwcm) in *ABC Primetime*, *Nightline*, *20/20*, *PBS NewsHour* (COCA)

Utterances in which the speaker invites the listeners to mentally focus on a particular statement (here included in the category of directive utterances) are rare, both with *have to* (1.8%) and with *must* (1.6%, n=31). There are only five occurrences of this use with *have to* in 1990 and eight in 2009. The infinitives *remember*, *understand*, *realize*, and *recognize*, which lend themselves to making the speaker concentrate on the following information, belong to the group of strongly attracted distinctive collexemes of *have to* ($p \leq 0.001$, cf. Table F.6 in Appendix F).

Both *have to* and *must* collocate with mental, communication, and activity verbs. There is a higher number of relationship verbs (such as *look*, *stand*, *live*, and *relate*, $p<0.01$) among the many distinctive collexemes of *have to* (372 vs. 86). As in Tagliamonte's study of BrE (2004: 49), most collexemes of *must* ($p<0.001$) – unlike those of *have to* – refer to non-durative events, but there are notable exceptions, for example the two most strongly attracted infinitives *work* and *write* as well as *wear*, *watch*, and *feel*. Yet in my data less than 20% of the distinctive collexemes of *have to* ($p \leq 0.001$) are punctual verbs.

In contrast to *must*, its "regular surrogate" (Talmy 2000: 449), which, as Tagliamonte claims, "remains entrenched for readings with strong obligation" (2004: 52), *HAVE to* is believed to be "resistible" under certain circumstances (Sweetser 1990: 54). Comparing sentences with *must* and *have to*, Radden and Dirven postulate a difference in the gravity of circumstances (with *have to* being less compelling, 2007: 249). Tagliamonte, who analyzed factors such as animacy, type of verb, and grammatical person in a multivariate analysis of *have to*, *gotta*, and *must* in northern BrE, observes that *must* also exhibits a preference for non-generic subjects, whereas *HAVE got to* is often used with generic subjects (*have to* is neutral in this respect). She thus concludes that "there is little evidence to suggest that the process involved here is a simple substitution of *HAVE to* for *must*" (2004: 49). My analysis of the semantics of *must* and *have to* in COCA (spoken) demonstrates that *have to* is used in many contexts in which *must* also occurs, yet both verbs still have distinct preferences in meaning (e.g. as far as dynamic meanings are concerned).

6.2.2. *Have got to*

HAVE to and *(HAVE) got to* are sometimes treated together, but will be dealt with separately here because of their different formal properties. In contrast to *HAVE to*, *HAVE got to* does not have any non-finite forms and cannot co-occur with other modals (**to have got to*, **having got to*, **will have got to* (cf. e.g. Coates 1983: 52, Palmer 1990: 114, Collins 2009a: 68).[134] Both *gotta* and *have to* are often considered monoclausal forms, whereas *have got to* is biclausal (cf. Tagliamonte and Smith 2006: 373). Krug calls *HAVE got to* a success story of English grammar in the 20th century (1998: 187, 2000: 63), referring to the fact that *HAVE got to* and *gotta* are more than 1.5 times as frequent as *must* and *HAVE to* in the spoken part of the BNC (2000: 63, 266). They are surprisingly less frequent in spoken AmE: The frequency in the SBC is only half of that in ICE-GB (BrE, 2009a: 168). With an average frequency of 350 w/m in 1990-94 (not depicted), thus in roughly the same time period analyzed in Collins' study, *HAVE got to* is less frequent than *HAVE to* (1,637 w/m) in COCA, but more common than *must* (327 w/m).

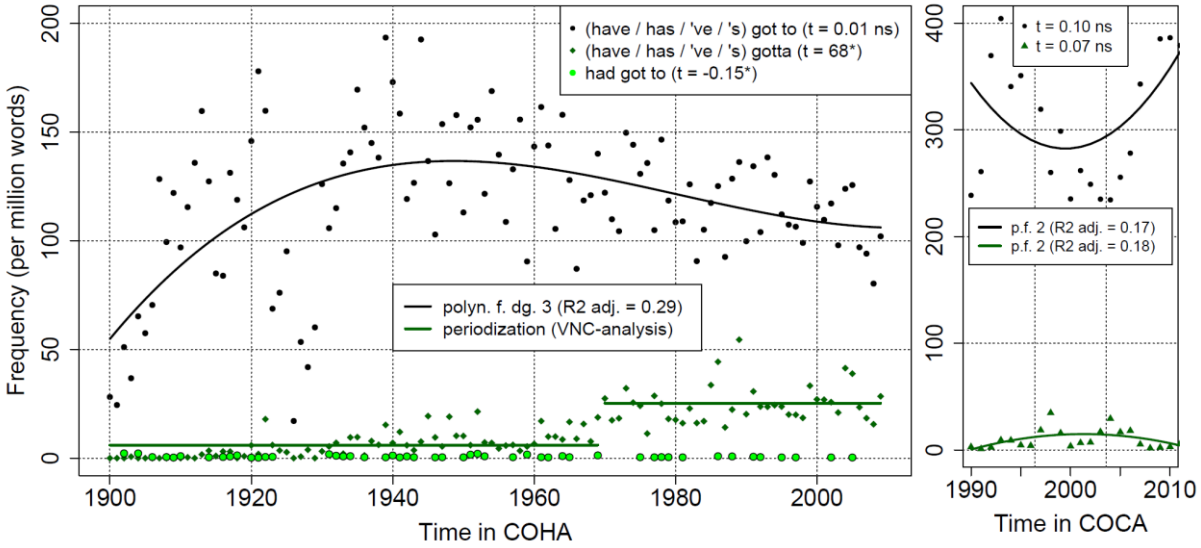

Figure 39 *HAVE got to* (iwcm) and *gotta* (iwcm) in COHA and COCA (spoken)

Figure 39 illustrates that *have got to* is more frequent in the 'spoken' section of COCA than in the written texts of COHA (305 w/m vs. 111 w/m on average between 1990 and 2009), but that it does not, as Palmer claims, almost exclusively appear in spoken language (1990: 114). Past tense uses are rare (cf. Figure 39, which shows that *had got to* is very infrequent and even declines towards the end of 20th century (τ = -0.15*); cf. also Palmer 1990: 114) – which explains why Curme claims that *HAVE got to* is restricted to the present tense (1931: 395) and why Collins (2009a: 68) finds no uses of *had got to* in his 1990-94 data. The lone occurrence in COCA (spoken) is example (271).

[134] Krug claims that deontic *HAVE got to* is younger than deontic *HAVE to* (2000: 53). Tagliamonte and Smith object, arguing that *have to* is the "latest renewal of the deontic modal category" (2006: 373). They suggest that the social evaluation of these forms is involved in the rise of this verb. Women started to prefer *have to* over the structurally complex, biclausal *have got to* and the monoclausal, but socially stigmatized *got (to)* (cf. Tagliamonte and Smith 2006: 373).

(271) JERRY-SPRINGER-1' "Well, you know, in fairness, all the other professionals, they had got to dance with people that, one, knew how to dance, where in their 20's, or 30's, you know. …" (2006/10/30, "Dance, Jerry, dance!" *ABC Good Morning America*, COCA)

(272) Ef we git into trouble, all we've gotta do is to back out,' remarked Baldy, as a sort of apology for continuing his advance.' (Ellis, E. S. (1870) *The Huge Hunter. Or, the Steam Man of the Prairies*, COHA)

In Figure 39 we also see that *gotta*, which first occurs in COHA in 1870 (cf. example (272) above), rises considerably in frequency in the course of the 20th century, particularly from the late 1960s on. The average frequency of *got to* declines after the 1940s, and *gotta* ($\tau_{1956\text{-}2009}$= 0.2***) increases in use, particularly from the late 1960s on. Lorenz, who takes a closer look at movies and dramas in COHA, considers the late 1960s a "linguistic Woodstock moment," a time of rapid increase in the use of contractions[135] (2013: 120). This period also marks a change in the entire corpus, which can be seen in Figure 39 above: Here the end point of the first period identified via VNC-analysis is 1969 (cf. also the share of *gotta* in Figure C.6). My data show that the decline in the use of contracted forms is less steep than that of full forms (cf. Figure 40).

Collins notes that *gotta* accounts for 67.8% of all uses of the lemma in the early 1990s. In my data, where knock-out contexts are excluded, the averages for 1990-1994 are much smaller: 33.6% in COHA, 1.8% in COCA (spoken). This low frequency might be explained by the social stigma attached to the form (cf. Collins 2009a: 72 or Lorenz 2013: 22, who finds the labels 'informal' and 'colloq. or vulgar' in current reference dictionaries) since its first appearance (cf. Krug 1998: 184) or by transcription practices (cf. Ch. 4.1.) In academic texts, it is exclusively used in direct or indirect speech until 2012.

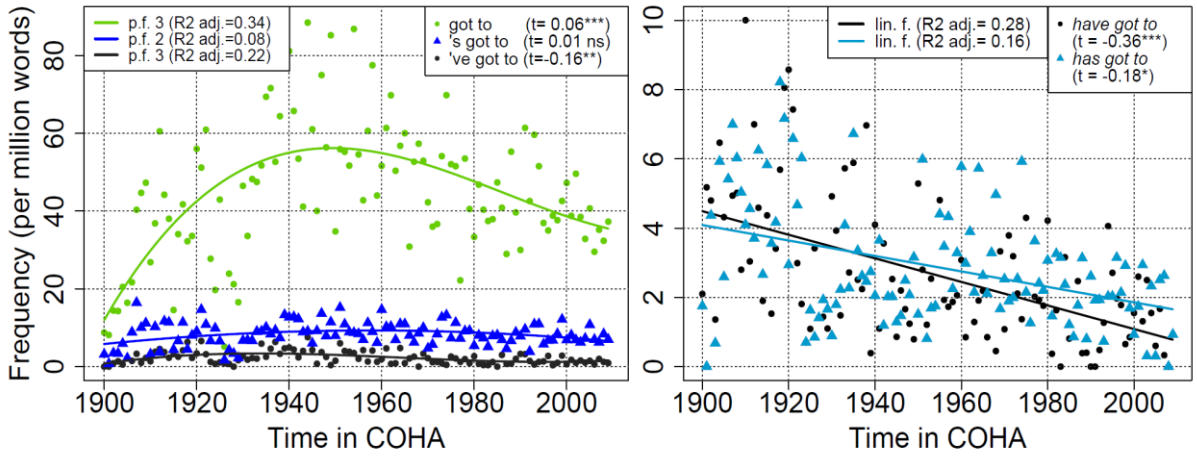

Figure 40 Contracted vs. full forms of *(have) got to* in COHA

[135] It needs to be emphasized that Lorenz analyzes the use of the univerbation *gotta* as opposed to *HAVE got to* (including reduced and zero forms). The frequencies of the reduced forms *'ve / 's got to* and the zero form Ø *got to* peak much earlier, at the beginning of the 1940s (cf. Figure 40 (w/m) as well as Figure C.6 (%)).

Figure 40 illustrates that reduced forms of *have* and the zero form (left panel) are much more common than full forms (right panel). While *Ø got to* experiences a rise in frequency at the beginning of the century, is particularly common in the 1950s, but declines towards 2009, the use of *'s got to* remains relatively stable ($\tau = 0.21$ ns). The full forms are much rarer and continually decrease between 1900 and 2009 ($\tau = -0.36$***, $\tau = -0.18$*).

Semantics

Since *have got to*[136] is a frequently used verb, the semantic analysis was restricted to 1990 and 2009. Only in the case of *gotta*, which just occurs 17 times in these two years, were the years 1991-94 and 2005-08 also taken into account. *'ve got*, however, was too frequent in 1990 and 2009 to be analyzed in its entirety. (It accounts for 76% of the occurrences of the lemma, i.e. 660 of 789 occurrences in 1990 and 470 of 619 occurrences in 2009.) Hence, only every fifth use was included in the sample. The results were extrapolated.

They show that like *have to*, *have got to* primarily expresses root modality (cf. Table 39). Formulaic meanings are rare (3.1%) and exclusively occur with *have got to*, *'ve got to*, and with the infinitive *tell.* Other verbs that are prone to this type of usage, such as *say*, *ask*, and *admit*, are not used in this sense in my sample and are even identified as repelled verbs in the MDCA carried out here ($p \leq 0.05$, cf. Table F.7). A use that deserves special mention is the saying *you gotta do what you gotta do* which occurs seven times in 1990 and 2009 in COCA (spoken).

Meanings in w/m (n= 882 (1,644))	1990	2009	Difference	Pearson Residuals	
root	184.9	160.1	+30.3%	0.25	-0.27
epistemic	9.1	11.0	+21.2%	-0.97	1.08
formulaic	6.3	5.7	-9.0%	**4.14**	0.08
total (iwcm)	200.3	176.8	-11.7%	$\chi^2 = 19.4$, $p < 0.001$, $V = 0.16$	

Table 39 Meanings of *(have / has /'ve /'s) got to / gotta* in COCA (spoken)

Lorenz observes that (*have*) *got to / gotta* frequently expresses epistemicity, "suggesting a possible semantic niche for the declining variant cluster" (2013: 89). However, epistemic meanings (as in example (273) below) are rare in my data.[137] They are mostly found in uses of *'s got to be*, but almost never with the low-frequency item *gotta*. Evidence for a relative increase in the use of epistemic meanings (which make up 4.5% of all uses in 1990 and 6.2% in 2009) was indeed found. With an average share of 5.4%, they are as frequent in the case of *have got to* as in the case of *have to* (1.7%, cf. Table 40).

(273) He has come up with a plan, and the plan includes him shooting eight more people. That has got to generate a lot of interest because it is not a random thing. (1990/07/12, "New York's Zodiac killer," *ABC Nightline*, COCA)

[136] For the sake of simplicity, *have got to* is used as a cover term for *have got to*, *has got to*, *'ve got to*, *'s got to*, *Ø got to* as well as *have gotta*, *has gotta*, *'ve gotta*, *'s gotta*, and *Ø gotta* in the following discussion.

[137] The use of progressive forms with *have got to*, which overwhelmingly express epistemic meanings from the 1960s on, particularly in the phrase *got to be joking/ kidding to*, is not included here (cf. Appendix D).

Have got to is often qualified as more colloquial and emphatic than *have to* (cf. e.g. Curme 1931: 395, Westney 1995: 151). Westney adds that *have got to* has a sense of urgency and even requires immediate realization under particular circumstances. He considers it more speaker-based and thus closer in meaning to *must* than to *have to.* Most of the results from COCA (spoken) support this: The MDCA shows that *have got to* is associated with verbs denoting activities (21 of 86 collexemes are activity verbs, i.e. 24% vs. 8% of all collexemes of *have to*). There is also a higher share of subjective deontic meanings with (possibly) directive function (6.7%) than with *have to* (4.6%).

Meaning in w/m (iwcm)	*have got to*		*have to*	
	average 1990, 2009	%	average 1990, 2009	%
subjective deontic	**119.9**	63.6%	**328.1**	43.2%
subjective deontic with (possibly) directive function	**12.6**	6.7%	**30.5**	4.6%
objective deontic	**24.1**	12.8%	**90.9**	12.8%
dynamic	**9.6**	5.1%	**152.5**	21.3%
epistemic	**10.1**	5.3%	**11.6**	1.7%
formulaic	**6.0**	3.2%	**33.1**	5.2%

When the residuals are higher than |2|, the frequencies are in bold print, $p \leq 0.001$, d.f. = 7

Table 40 Comparison between the meanings of *have got to* and *have to* (statistically significant differences only) in COCA (spoken)

By contrast, dynamic meanings are much more frequent with *have to* (21.3%) than with *have got to* (5.1%). The aim is often specified, but in (274) the necessity arises simply from the circumstances: It is a fact that nuclear waste cannot just vanish into thin air. Objective deontic meanings (cf. example (275)) account for 12.8% of all occurrences. This is the only root meaning that undergoes a highly significant decline in relation to the other meanings ($p < 0.01$, cf. Table 41).

(274) But how do you respond to the question, "There is this nuclear waste, it's got to go somewhere, where does it go?" (1990/04/05, "Nebraska nuclear waste dump fight," *ABC Nightline*, COCA)

(275) FLATOW: When will we see the bill will make it to the floor for a vote, do you think? Rep-BARTLETT-: Oh, I have no idea. It's got to go through the Energy and Commerce Committee. (2009, *NPR Science*, COCA)

Meaning in w/m (n=789 (1,626))	1990	2009	Difference	Pearson Residuals	
subjective deontic	124.6	115.2	-7.5%	-0.49	0.54
subjective deontic (possibly directive function)	2.3	3.3	+41.9%	-0.76	0.85
subjective deontic with directive function	8.7	10.9	+25.6%	-1.06	1.18
descriptive: subjective deontic	6.3	6.3	-1.0%	-0.28	0.31
objective deontic	34.3	14.0	-59.3%	**3.37**	**-3.75**
dynamic	8.8	10.5	+19.9%	-0.91	1.02

Table 41 Root meanings of (*have / has /'ve /'s) got to / gotta* (iwcm) in COCA (spoken)

Almost all meanings decrease in use. Only possibly directive subjective deontic utterances and dynamic uses are more frequent in 2009. Overall, (*have / has /'ve /'s) got to / gotta* declines by nearly 12% between 1990 and 2009 ($p \leq 0.01$, cf. Table 39 above).

6.2.3. *Need to*

As was already shown in Ch. 6.1.3 on *need* and in the summary of previous studies in Ch. 3, a considerable increase in the use of *need* to has been observed in recent decades (cf. e.g. Leech 2003, Smith 2003: 248-252, Mair and Leech 2006: 327, Johansson 2013, just to name a few). This "remarkable rise" (Leech 2003: 230), which seems to take place in both BrE and AmE (cf. Leech 2003: 228-29), has been linked to the particular semantics of *need to* (cf. e.g. Smith 2003). Like *have to* and *have got to*, *need to* is much more frequent in speech than in writing. The left panel of Figure 41 shows that *need to* starts increasing substantially in COHA in the 1960s after a period of relative stability. This is mirrored in the results of the VNC-analysis. The first of the five periods that are identified[138] goes from 1900 to 1967, the last from the end of the 1990s to the end of the 2000s. In the spoken language section of COCA, where the verb is already more frequent than in COHA (average frequency 1990-2009: 329 w/m vs. 148 w/m), the increase between 1990 and 2009 is less drastic (+ 63%) than in written language (+ 116%).[139]

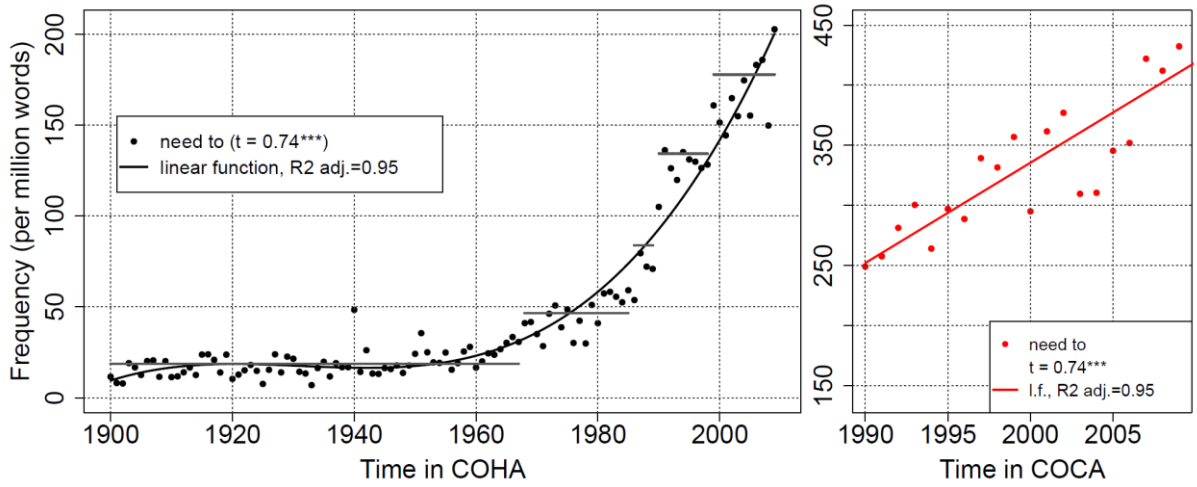

Figure 41 *Need to* in COHA and COCA (spoken)

The contracted form *needta*, which has received a lot of attention on web pages and has even been the subject of study in children's speech (cf. Gerhardt 1991), can also be found in COCA, but the number of uses is almost negligible. In all three cases, spoken language is imitated: in two movie transcripts and in a work of fiction (cf. example (276) below). Since my semantic analysis is restricted to the spoken language section of COCA, these uses are not part of the database. 3,603

[138] If we were to consider the values for 1987-1989 as outliers, the periods would practically be the same (1900-67, 1968-86, 1990-97, 1998-2009).

[139] This calculation is based on a 3rd degree polynomial function in COHA and a linear function in COCA. If we look at the actual frequencies, the relative changes are +73% and +93% (cf. Ch. 4.3 above for a discussion of the merits of using the functions instead of the actual values).
Unlike in the BNC, where *NEED TO* is particularly frequent in the business domain and in more formal spoken registers in general (cf. Nokkonen 2012: 131), the comparison between data from COCA (*NEED* (v.) *to:* 327 w/m in 1990-94) and the SBC (670 w/m, cf. Collins 2009a: 77, cf. also next footnote), which is mainly based on recordings in more informal settings, does not support the thesis that *need to* is more frequently used in (rather) formal than in informal conversation. The difference may be due to regional variation.

occurrences of non-negated *need to / needs to* followed by an infinitive were identified in two searches restricted to 1990 and 2009. After the elimination of irrelevant cases (e.g. when *need* is preceded by a modal verb, occurs in a question, or belongs to an infinitival clause), 796 uses in 1990 and 1,398 uses in 2009 remained. Their meanings were manually analyzed.

(276) Shit, it ain't hard to play pool. I can teach you everything ya needta know (1993, *Kalifornia*. Movie Script, COHA)

In about 2.2% of all cases in 1990 and 2009, existential *there* is used with 3rd person pl. subjects, or, more often, with 3rd person subjects and *be.* Its use increases from 4.5 w/m in 1990 to 7.7 w/m in 2009 (p>0.05, d.f. =1). Like almost all uses with existential *there*, example (277) expresses the speaker's personal opinion (subjective deontic meaning), whereas somebody else's point of view (and not the speaker's) is rendered in example (278) (descriptive subjective deontic meaning). Example (279) is a rare case of existential *there* in an utterance with objective deontic meaning. It refers to a collective belief in a prophecy that announces the end of the world.

(277) I wish we would see the police. They are welcome. And so the truth is - I think there needs to be higher visibility. (2009/10/ 13, "When 'Don't snitch' is a matter of survival," *NPR Talk of the Nation*, COCA)

(278) You've got the congressional black caucus and other leaders saying, yes, there needs to be a targeted approach because during the Bush and Clinton years, you know…. (2009/12/13, "The round table; this week's politics," *ABC This Week*, COCA)

(279) BECK: OK. So if I may put this in Christian terms, if you're somebody who believes in end-times prophecy, you know, that Jesus is coming and the 7-year tribulation and everything else. […] That's what they believe, that there needs to be great chaos here, and - ROSENBERG: That's right. (2009/04/14, *Fox Beck*, COCA)

Semantics

In the sample collected from COCA, there are no formulaic uses of *need to.* The majority of the utterances express subjective deontic meanings, i.e. advice and personal opinions, such as in example (277) above. In about 10% of all cases, the necessity originates in a rule, a law, or a collective agreement. In example (280) it is less likely that there is a general rule, but more probable that the government ordered the bank to proceed this way in this particular case, after UBS's agreement to hand over a list of US tax evaders to the US government. The speaker in example (281) reports being told, under threats of violence, to give the babies to a home. Described or repeated orders like this one account for 1.6% of the total number of occurrences of *need to*.

(280) JEFFREY-BROWN: […] Kwame mentioned UBS, the Swiss bank that reached a settlement, and -- and was going -- and gave -- and giving about 4,000 names of clients. […] DOUGLAS SHULMAN: […] UBS is still working to produce a list that they need to get to the Swiss government, which will be turned over to us. (2009/10/15, *PBS NewsHour*, COCA)

(281) We have -- I personally have had threats that these babies need to be placed in other homes. (2009/03/26, *CBS Early*, COCA)

Meanings in w/m (N= 2,190)	1990	2009	Difference	Pearson Residuals	
directive	3.3	23.2	+602.2%	**-3.86**	**2.92**
subjective deontic	120.0	195.2	+62.7%	**2.30**	-1.74
subjective deontic (p. directive function)	14.1	44.5	+214.9%	**-2.67**	**2.01**
descriptive: subjective deontic / possibly directive function	12.7	38.9	+205.4%	**-2.36**	1.78
objective deontic	20.3	29.9	+47.3%	1.47	-1.11
dynamic	16.3	26.0	+59.9%	0.92	-0.69
total (iwcm)	187.7	358.9	+91.3%	$\chi^2 = 56.6$, $p < 0.001$, $V = 0.07$	

Table 42 Meanings of *need to* in COCA (spoken)

Gifford's utterance in example (282) is not a simple assessment that a towel is needed, but actually functions as a request to bring one. Utterances like these, which function as directives, make up about 4.7% of all the utterances. This number is very close to the average frequency of 4.8% (N=400) the strongest deontic uses (of type 1) in Nokkonen's analysis of (un-)scripted speech and interviews in the business genres (context-governed part) of the BNC. This category may have a similar extent, but it is not identical to my category (cf. Nokkonen 2012: 146; note that the share of deontic uses of type 1 is, with 16.5%, much higher in business meetings, *mc*). Finally, the dramatic increase in the use of utterances that seem to function as directives (+600%) deserves mention since it surpasses all other changes in meaning in amplitude.

(282) GIFFORD: OK. You're sweating so much. You... SCHIRRIPA: No, no, no. GIFFORD: We need to get a large towel for this man, please. (2009/08/27, "Items to help with Steve's sweating problem," *NBC Today*, COCA)

In a large number of cases, it is difficult to tell whether the speaker has the authority to instruct others to act according to his or her wishes. Such a case is example (283). Here it can be assumed that the British Secretary of State for Energy and Climate Change Ed Miliband is in a certain position of power, yet it remains doubtful whether he can really get the government to focus on a small number of issues such as radical emission cuts. Utterances of this type are characterized as possibly directive. They account for 8% of all the occurrences of *need to* in my sample, with a tendency towards increase (+214%) between 1990 and 2009. This ties in with the finding that speakers often opt for pairing *need to* with activity verbs. However, there are fewer mental verbs and communication verbs among the attracted distinctives collocates of *need to* (cf. Table F.8 in Appendix F) than among those of *should* and *have to* (cf. Table F.2 and F.6).

(283) On the two key issues of emissions cuts by rich countries and financial help for the poor, theres [*sic*] either blank spaces or options left to be decided later. ED-MILIBAND-SEC Narrowing down is what we need to do at this stage. The task remains very urgent. And we need to keep our eyes on the prize, which is big emissions cuts, … (2009/12/11, *PBS NewsHour*, COCA)

Utterances in which the speaker encourages the listeners to mentally focus on a particular statement (cf. example (284) below) are extremely rare (0.7% of all occurrences) compared to *must* (1.6%) and *have to* (1.8%). They are not listed separately in Table 42, but are included in the count of

possibly directive utterances. *Recognize* ($p<0.05$) and *understand* ($p<0.001$) are two of the attracted collexemes of *need to* (cf. Table F.8 in Appendix F).

(284) JUDY-WOODRUFF: But, Paul Light, when you overlay the economic crisis over this, it makes it even worse than it looks, does it not? PAUL-LIGHT: Absolutely. One thing we need to recognize is that Tim Geithner is not wandering down a deserted hallway waiting for Norman Bates to jump out at him. (2009/03/09, "President Barack Obama moved [on] Monday to remove limits on funding for embryoni[c stem cell research]," *PBS NewsHour*, COCA)

Dynamic uses account for about 8% of all occurrences – which is a smaller share than in the case of *have to* (22%). References to internal physical needs (such as nutrition in example (285)), to internal psychological needs (cf. example (286)), or to the laws of science (such as the mechanisms of AIDS transmission, cf. example (287) below), are more often found than in the case of *have.* Likewise, external circumstances also constitute sources of necessity.

(285) BAO-CHENG-Far: Rare earth is the countrys [*sic*] resource, but small people like us need to eat, too. We live on farming, but the crops no longer grow, and we will go hungry. (2009/12/14, *PBS NewsHour*, COCA)

(286) You know, and they're very silly and they are making fun of death and scary things. And do you think that's kind of - was brought in or affected, especially in the Halloween time of year with monsters and all this? And people maybe psychologically need to be able to make fun of things that frighten them. (2009/10/15, "Maurice Sendak & our favorite monsters," *NPR Talk of the Nation*, COCA)

(287) AIDS is not a contagious disease. You need to have a direct transmission into the blood for AIDS. (1990/06/20, *CNN Crossfire*, COCA)

However, *need to* is not used in an epistemic sense in my data – which is not surprising given that epistemic meanings of *need to* have only been reported to occur in negative and interrogative contexts (cf. e.g. Sweetser 1990: 62, Müller 2008a, Loureiro-Porto 2013: 180-181). Similarly, Collins observes that clear cases of epistemic *need to* are rare.[140] Nokkonen claims that instances of epistemic *need to* exist in the BNC (2012: 134), even in affirmative clauses (cf. example (288) below).

(288) Sue Monica's section is, I don't know how fair it is, but a lot of the pressure that was previously on Steve and before him on Margaret has actually gone to Gail's <-|-> post. […] <-|-> Because <-|-> it's the peripheral thing isn't it?<-|-> It's, it's the, the <-|->
Kevin <-|-> it's the follow up it's the phone calling Sue Yeah.
Kevin and the follow up of cases Sylvia Yeah.
Kevin that needs to be <unclear> <-|-> time consuming <-|->
(697-708, 04/23/1993, Careers Service: Meeting, 7 partics, 891 utts, *BNCweb*)

Yet Nokkonen's opinion of what should be considered epistemic slightly deviates from the view adhered to here (cf. Ch. 2.2.1), despite her declaration to adhere to the standard definition (2012:

[140] In the example he cites, *need to* is preceded by a modal. Other contexts not analyzed here but included by Collins are negated, past tense (*needed to*), and progressive forms (2009a: 75 / 33). *Need to* may be more prone to expressing epistemicity in these contexts.

133; 2010: 49).[141] Example (289), which she classifies as epistemic, makes this contrast clearer. The expanded context (Nokkonen only cites the last two utterances) shows that the participants in the meeting talk about planning some sort of competition in the future. The speaker, Mr. Fremantle, believes that the realization of a specific state of affairs is desirable and necessary, that it needs to be realized in the future, not that it will in all likelihood be realized then. The necessity to include a tiebreaker in the event is repeated in the last sentence of example (289), uttered by Mr. Ingall, which is in the present tense. The standard paraphrase (cf. Coates 1983: 41) *It is necessarily the case that X* (here: *there is a tiebreaker*) cannot be applied here.

(289) Mr. I.: And so they've got to they they'll be asked the question rather, and they know the answer's going to on the stand that they go to.
Mr. F.: Right so so they get the answer. And when they get the answer they pick up the <-|-> the tro-- treasure the treasure <-|-> .[…] And now how do we decide the winner?
Mr. I.: The winner is decided erm on the total correct entries and if I'm right there is a slogan to fill in. But that's all done by N F U,, you need have no part of that unless you want to have.
Mr. F.: Right yo-- I w-- no I was just gonna say th-- th-- there's there would need to be a tiebreaker <-|-> of some sort presumably <-|-> .
Mr. I.: <-|-> There needs to be a tiebreaker.
(446-457, 01/20/1994, Meeting (Busn), 6 partics, 1221 utts, *BNCweb*)

It plays an important role here that the realization of the SoA is supposed to be situated in the future. As we have seen above (cf. Ch. 2.2.1), epistemicity is generally associated with present and past time references. Yet the characteristic temporal simultaneity (or anteriority) that pertains to *must* and *have to* (cf. Verhulst 2009), the identity of the moment of utterance and the state of affairs that is allegedly realized, is not given here. However, it might be argued that uses with *need to* do not conform to this (prototypical) time constraint. To shed light on this issue, let us analyze the only other clear example of epistemic *need to* in affirmative contexts that Nokkonen gives (2006, 2010, 2012). In example (290), the necessity to realize something in the future is stressed (in the process of creating the dictionary) and the writers do not evaluate the likelihood of the existence of more than one PIW at the moment of the utterance nor do they assess the likelihood of a future creation of more than one PIW. Thus, currently, to my knowledge, there are no known examples of epistemic *need to* with future reference in the literature. It therefore seems safe to assume that the time constraints identified for *must* also pertain to *need to.*

(290) The NPL Russian-English automatic dictionary is organised on a stem-paradigm basis wherein there is for most nouns and adjectives a single entry for all their inflected forms and for most verbs only one or two entries. […] Thus each stem

[141] Nokkonen's different understanding of epistemicity also explains why she believes in the existence of dynamic utterances "which imply an epistemic meaning as well" (2010: 49). A need may originate in particular external circumstances, it may be recognized as such, and it can be formulated as a demand by a speaker, but that does not make the utterance itself epistemic. Epistemicity is understood here as being based on the speaker's conclusion that a particular state of affairs exists or has existed at a certain point in time, not that the circumstances (or somebody's wishes, rules, or regulations) compel the addressee to realize a certain state of affairs.

> entry in the dictionary contains a computer word, known as the paradigm indicator word (PIW), which indicates by a binary pattern the paradigm of that stem. […] The masking pattern referred to above we call the role indicator word (RIW) for the given affix. Some affixes have significance with more than one of the PIW formats, and for these there will need to be more than one RIW e.g. И has significance for and appears in each of the four PIW formats, so it will have four RIW. (McDaniel and Whelan 1962: 364-369)

Finally, it needs to be added that cases that Nokkonen qualifies as epistemic / dynamic are considered dynamic here. According to her, example (291) "demands an epistemic reading, though probably a dynamic interpretation is more natural" (2010: 58). A similar case is example (292).

(291) Joy: Well there ain't much that'd be fourteen to twenty, twenty calories is <-|-> there? No. <-|-> <unclear> You've got fourteen er fourteen options. <unclear> <pause> You need to be a mathematician to sort this bugger out. (2933-2936, 26 convs rec. by `Joy' (PS0GM) between 13 and 19 Mar 1992, BNCweb, quoted by Nokkonen 2010: 57)

(292) O'REILLY: But there's a gazillions things that Americans don't know about because this bill is just - how many pages long was the thing? ROVE: 1300 pages. […] O'REILLY: It's crazy. […] ROVE: you need to be an Egyptologist, you know, to figure that out. (2009/10/13, "Talking points memo and top story," *Fox O'Reilly*, COCA)

Again, temporal simultaneity is not given. (291) and (292) are typical examples of conditional or teleological (dynamic) necessity (*you need to fulfill this criterion or else you cannot "sort this bugger out" / "figure that out"*). They can be paraphrased by inserting *in order to* or with an *if*-clause (cf. Depraetere and Verhulst 2008: 8 as well as the section "alternative classifications" in Ch. 2.2.2.3). Undeniably, though, there is some sense of conclusion present in the examples that Nokkonen considers to express epistemicity. We are facing a pre-transitional stage which paves the way for epistemic meanings, but is still primarily dynamic (cf. Ch. 2.4).

In conclusion, we can establish that no epistemic examples are found in my sample from the spoken language section of COCA, yet this might be due to the restriction to affirmative present tense uses of *need to* made here. If more contexts are considered, (more) epistemic uses might be found in spoken AmE, especialy as *need to* grammaticalizes further over time.

6.2.4. Progressive Forms of *Have to* and *Need to*[142]

The size of COHA and COCA makes it possible to examine another interesting phenomenon. Recently progressive forms of *have to* and *need to* have emerged in contexts in which the simple form would have been acceptable. In the following the frequency of these uses and the development of related constructions that might have led the way are retraced in COHA. Furthermore, the contexts in which progressive *have to* thrives and the particular shades of meaning it expresses are discussed. A comparison to the simple form illustrates the different intentions speakers have when choosing this particular construction.

In studies of semi-modals, the progressive is generally only mentioned in passing – if it is discussed at all.[143] The only noteworthy exception is an early study by Liliane Haegeman (1980). She devotes five pages to progressive *have to*, stressing that the form should not be overlooked (cf. also Coates (1983: 56), who takes issue with Haegeman's analysis of the meaning of the construction). In a separate publication about grammar and the use of corpora, Haegeman observes that progressive *have to* is "never mentioned in current handbooks," but that data from corpora like the *Survey of English Usage* (1955-1985) "serve as an eye-opener" (1982: 251). There, the form is primarily used in spoken language. Quirk *et al.* only provide an example of progressive *have to* to demonstrate that the verb has non-finite forms (1985: 145). Jacobsson mentions the existence of progressive *have to*, suggesting that it is a recent innovation and "still comparatively rare" (1979: 310). The earliest example he cites is from 1958 (cf. example (293) below). In their discussion of the progressive, Leech *et al.* (2009: 130, cf. also Smith and Leech 2013: 89) list *have to* among the stative verbs[144] of "having and being" that can be used in the progressive and give an example, also from 1958, without making any further comments.[145] In a recent study of the "demise of the *being to* + V construction," Hundt mentions the existence of the progressive construction in the Chadwyck Healey Nineteenth-Century Fiction corpus (2014: 182 and example (294) below).

(293) 'I'm glad that pictures are safe, and that you won't <u>be having to</u> worry about them' he said, enjoying himself thoroughly. (Wain, J. (1958) *The Contenders*, p. 100, quoted by Jacobsson 1979: 310)

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[142] I would like to thank my colleagues Matthias Eitelmann for drawing my attention to this form and Svenja Kranich for her valuable comments on this chapter.

[143] Evidence from the Internet as well as from the 10-million-word *Corpus del Español* suggests that the Spanish equivalent *estar teniendo que* (cf. example 35) is also rare and mainly confined to new books (many of which are translations), digital media (such as an article in MSN Encarta found in the *corpus del español*), and informal webpages. We might thus be witnessing the early stages of a colloquial use.

(FN 35) "Perdona, pero en ese caso nada puedo hacer. Tal vez no me creas, pero también yo <u>estoy teniendo que</u> encarar ese no…" (Machada, A. M. (2003) *El mar nunca desborda.* Bogotá: Grupo Editorial Norma.) (Excuse me, but in this case, I cannot do anything. Maybe you do not believe me, but I also have to face this, right…., *my translation*)

[144] Huddleston and Pullum (2002: 111) also mention progressive *have to* in their discussion of stative *have*, observing that stative *have* can occur "as a catenative verb with a *to*-infinitival complement," similar in meaning to *must*.

[145] There are three other occurrences of progressive *have to* in FLOB, one in LOB, and two in Brown (cf. also Leech *et al*. 2009: 292). Progressive *need to* is not used.

(294) And at this moment, too, when he is perhaps having to bear a heavy blow. (Eliot, G. (1861) *Silas Marner*, NCF, quoted by Hundt 2014: 182).

One explanation for the scarcity of information about this use might be, as corpus data suggest, that we are dealing with a "newcomer." The first occurrence of progressive *have to* in the 'obligation' sense in COHA can be found in 1896:

(295) "But our dishes are not so sacred, and our Bridgets break them regularly. We are always having to buy new ones as it is. ..." (Various Authors (1896) *Holiday Stories for Young People*, COHA)

(296) …realizing that if he wasn't a miserable pauper Danny would not be with them, and he wouldn't be having to have this shoved down his throat. (Farrell, J. T. (1936) *World I Never Made*, COHA)

The left panel of Figure 42 below shows that progressive *have to* starts becoming more frequent in the 1920s. There are 230 affirmative uses in the 20th century. Like example (296), five of them are cases of negated obligation (occurring in 1936, 1939, 1976, 2006, and 2009). The average frequencies per decade increase considerably until the 1970s (1.5 w/m), but stay below that level in the last three decades analyzed here (1.2 w/m in the 2000s).

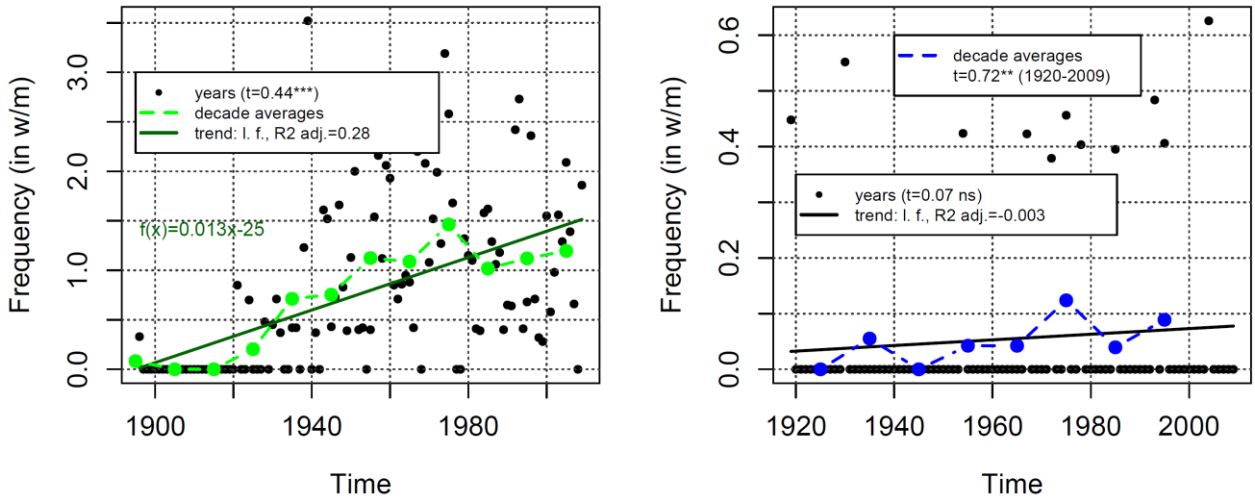

Figure 42 *BE (*) having to* (left panel) and *BE (*) needing to* (right panel) in COHA

There are also 13 instances of progressive *need to* in COHA, primarily in fiction – the earliest in 1919 (cf. example (297); two of these forms are negated, one in 1975 and one in 2004). Yet in contrast to progressive *have to*, the numbers remain very low (cf. right panel of Figure 42). Even in the spoken language section of COCA, there are only 20 occurrences, all between 2000 and 2010.

(297) And ain't he got a funny way of just talking about nothing special, only being pleasant, and then letting you find out weeks after that he did tell you something that you'd been needing to know? (Reynolds, K. (1919) *Green Valley*, COHA)

(298) "No he has a housekeeper; been with him some years, ever since he moved there. She's made him a home. I can thank her for that." Rob waited to see if she'd come to an end. Then he said "So can I." It cost him nothing. "You won't be needing to see him though." (Guthrie, A. B. (1975) *Last Valley*, COHA)

Two developments in the same time period might have influenced the spread of progressive *have to* and *need to*. First, gerund-participles[146] of both *have* and *need* also rapidly rise in frequency (cf. examples (299) and (300) below). They are used more often and much earlier than the progressive forms. There are two occurrences of *having to* in 1815. The average frequency later amounts to 6.6 w/m in the 1900s and 21.3 w/m in the 2000s ($\tau_{1815\text{-}2009}$= 0.76***).The earliest use of *needing to* is found in 1820 ($\tau_{1820\text{-}2009}$= 0.41***).

(299) We this day commenced watering; but, after having to roll the casks about 500 yards, found great difficulty in getting them from the beach, on account of the heavy surf. (1815, "Journal of a cruise to the Pacifick [*sic*] Ocean, by Captain D. Porter." *North American Review:* 247-275, COHA)

(300) "[…] when there were two of us, we never liked David's having to pass through our room to get to his." (Sedgwick, C. M. (1837) *Live and Let Live*, COHA)

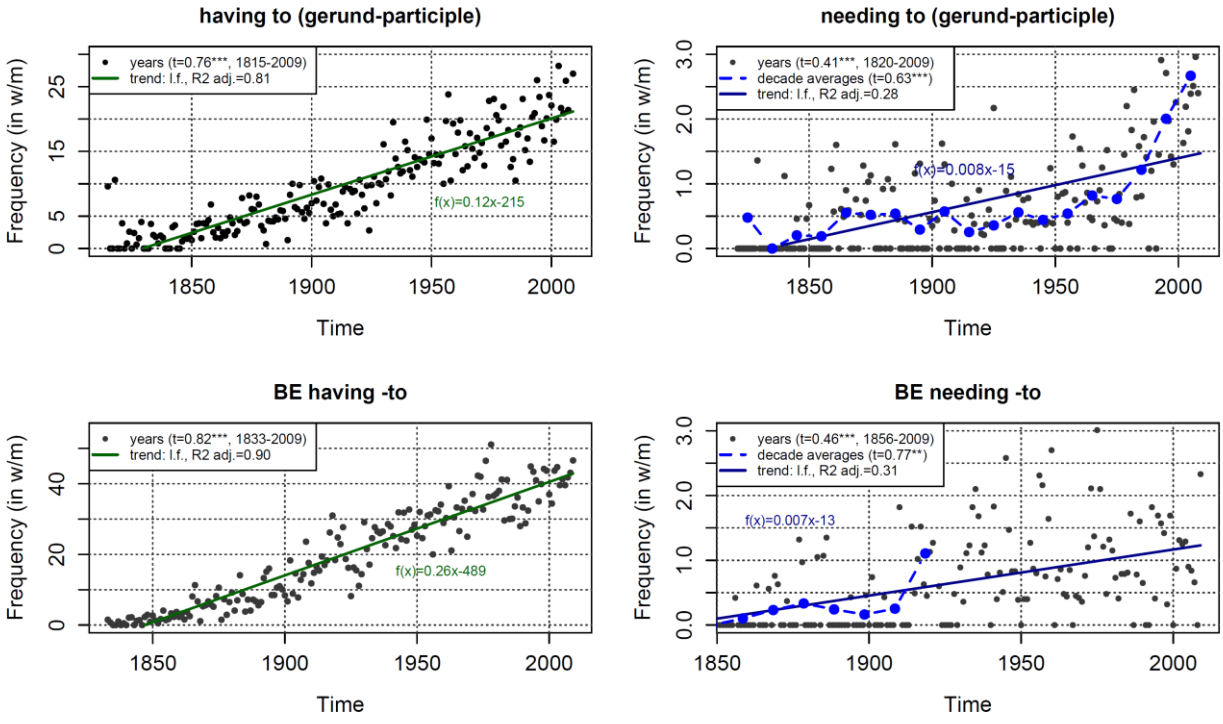

Figure 43 Gerund-participles (*have to*, *need to*) | progressive *have* and *need* in COHA

Second, progressive *have* shows the same tendency towards an increase. It is already found in the 1830s and reaches average frequencies of 13.3 w/m in the 1900s and 41.1 w/m in the 2000s ($\tau_{1833\text{-}2009}$ = 0.82***), thus being almost 40 times as frequent as progressive *have to.* Aarts *et al.* speculate that an increase with *need*, a verb with high stativity (Mufwene 1984: 36), may be seen in the future

[146] Gerund-participles have also received very little attention in studies of modal expressions. Westney mentions the existence of gerunds and participles in the *Corpus of English conversation* (cf. Svartvik and Quirk 1980), but does not make any comments about their frequency (1995: 141-142). Hundt examines the hypothesis that *having to* might have replaced *being to* (with modal meaning), observing that "information about the text frequency … across time shows that there is no real competition between the two constructions" and that *being to* "is not ousted by" *having to* (2014: 180-181, 183). She concludes that the rise of *having to* "cannot explain the disappearance of *being to* V" (2014: 185), but stresses that the function of *being to* is taken over by *having to V.*

(2010: 163). Figure 43 illustrates that after the earliest occurrence in 1856 (cf. example (301) below) progressive *need* becomes indeed more common ($\tau_{1856\text{-}2009}$= 0.77***), with an average of 2.0 w/m in the 2000s (yet in COCA the frequency is rather low, only 0.41 w/m).

(301) Maybe ye were [*sic*] needing somebody to nurse ye, and ye lying alone here with no hand to give the medicines? (Smith, F. I. B. (1856) *The Elm Tree Tales*, COHA)

The increase in the use of stative verbs has been considered a factor that "may have contributed" (Aarts *et al.* 2010: 162) to the overall rise in the use of the progressive aspect. This general spread of the progressive in the 19th and 20th century is documented in numerous studies (cf. e.g. Mair and Hundt 1995: 114, Hundt 2004: 58, Smitterberg 2005: 62, Leech *et al.* 2009: 122, Kranich 2010: 169-172, 191-193, Aarts *et al.* 2010: 157-164, Hundt and Dose 2012: 80, Aarts *et al.* 2013: 21[147]; cf. also Biber *et al.*'s observation (1999: 462) that it is more frequent in AmE than in BrE in conversation transcripts and newspaper texts of LSWE). Yet Smith and Leech find that the increase in the use of these verbs is below the level of statistical significance (2013: 90).[148] The rise of the progressive aspect has been attributed to the evolution of "a rather complex meaning, or set of meanings" (Smith 2005: 2, quoted by Aarts *et al.* 2010: 161) such as the interpretative or the modal progressive (cf. Smitterberg 2005: 231, Kranich 2010, and Smith 2005: 196, who observe an increase of interpretive meanings in CONCE (19th century English), in ARCHER, and in LOB and FLOB), or the progressive futurate (cf. Nesselhauf 2007: 196). These meanings will be discussed below.

Various experts suggest that normalizing the frequency of the progressive per million or one hundred thousand words might be misleading. Since the number of verb phrases may not be constant over time, Smitterberg proposes the use of what he calls the 'S-coefficient,' i.e. the number of finite progressives as a proportion of finite verb phrases (excluding the *going to*-future, demonstrations, performatives, simple imperatives, and stative situations, 2005: 45-46), to measure change (cf. also his discussion of Nickel's K-coefficient (1966) and Sume's V-coefficient, 2005: 42-48). Aarts *et al.* choose a similar approach, taking the number of VPs that could potentially occur in the progressive as a baseline, yet they do not exclude stative verbs, demonstrations, and performatives (2010: 156) from the set of "progressiviable" verbs. Given the size of the database used here, it is virtually impossible to inspect all verb phrases manually in order to determine all the situations in which the progressive could be used but is not. It is, however, feasible to consider the increase in the use of progressive *have to* in relation to the spread of the progressive and to the development of the lemma *HAVE to*.

[147] Levin (2013) confirms the growing use of *BE being* + adjective and of the progressive with ten private verbs.

[148] A quick look at COHA suggests that there seems to be a considerable increase in the use of the stative verbs listed by Leech *et al.* (2009: 129-130). *BE being*, which accounts for ~ 24% (sd = 11%), however, declines from the 1940s on, which might explain why the overall change is not statistically significant. The development of *want to*, a verb of intermediate stativity, also seems to be at odds with the general trend. It is most frequent at the beginning of the 19th century (the yearly average in the 1820s is 4.19 w/m), but slightly declines between 1900 and 2009 (from 1.22 w/m in the 1900s to 1.06 w/m in the 2000s, τ = -0.09, ns).

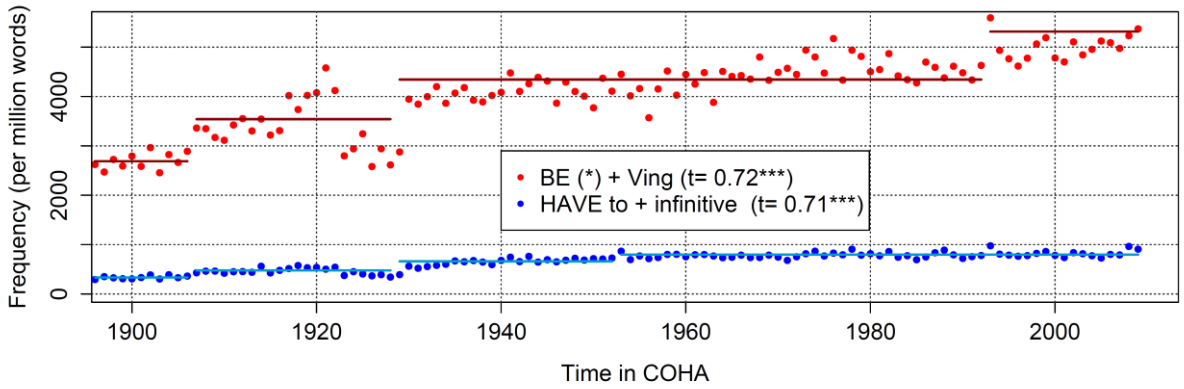

Figure 44 The progressive and the lemma *HAVE to* in COHA (with VNC)

Figure 44 shows the development (τ =0.72***) of the progressive, i.e. of (*BE (*) Ving* to be more precise, in COHA between 1896 and 2009. (These numbers exclude *BE going to*, which is also increasing in use (t=0.45***), but include catenative verbs such as (*BE (*) trying to*, *beginning to*, *waiting to* + infinitive, the use of which has doubled in the course of the 20th century). As discussed in Ch. 6.2.1 above, *HAVE to* has also experienced a remarkable rise, which seems to have slowed down in the last decades (possible reasons are equally discussed above). The stagnation in the increase of *having to* in the last decades could thus be related to a similar development of the lemma in general. The question then is whether the development of progressive *have to* is indeed parallel to these two developments. In order to find an answer, the frequency of *BE (*) having to* is divided by the frequencies of the progressive and of *HAVE to*. The results are displayed in percentages in Figure 45 below. We can see that the increase of progressive *have to* is very much in line with both developments: It is only slightly higher than the average increase of *HAVE to* and marginally higher than that of the progressive in general.

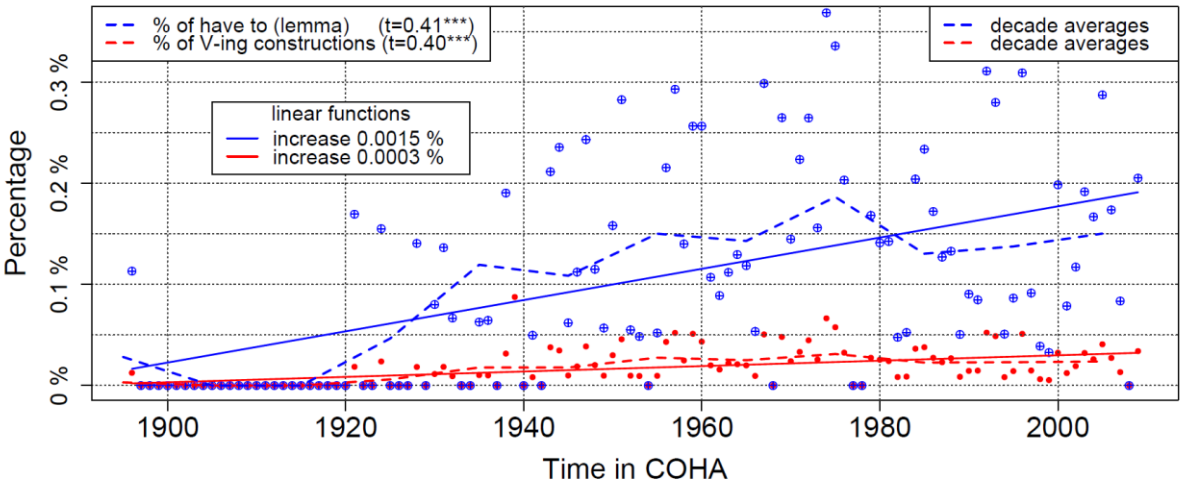

Figure 45 The use of progressive *have to* in relation to the development of the progressive aspect in general and to the development of the lemma *HAVE to*

Before looking at the meanings progressive of *have to*, let us consider its distribution across text types. Many studies (e.g. Hundt 2004: 61, Leech *et al.* 2009: 123, Collins 2009b: 119, Hundt and Dose 2012: 99[149]) have demonstrated that the progressive is particularly frequent in fiction, a text type that easily incorporates colloquial features – depending on the sources less (cf. Leech *et al.* 2012: 74) or more quickly than newspapers (cf. Biber and Gray 2012: 319[150]). In COHA progressive *have to* (cf. Table 43) and *need to* (10 of 12 occurrences) are common in fiction, but surprisingly, the rate of use of progressive *have to* is even higher in newspapers. In non-fiction books, i.e. in scientific writing, it is very rare (cf. also Biber and Gray 2012 for the progressive in general).

Corpus Section (COHA)	Raw Frequency	Frequency in w/m	Word Total in Section
fiction	113	0.83	140,569,360
magazine	44	0.66	67,985,326
newspaper	64	1.77	37,130,879
non-fiction books	7	0.19	36,450,674

Table 43 Frequency of affirmative *BE (*) having to* in the different text types of COHA

A comparison with COCA shows that the frequency in the spoken language section (6.1 w/m) is higher than in newspapers (1.8 w/m).[151] The share of the contracted forms of progressive *have to* undergoes an impressive increase over time (from an average of 5.7% between 1944 and 1989 to 57.9% between 1990 and 2012). The same tendency is found by Leech *et al.* in the press sections of LOB (4.7%) and FLOB (10.9%, 2009: 290). The rise (of contracted forms) of progressive *have to* could be taken as sign of a trend towards informalization in newspapers and magazines, of a "wish to avoid impersonal and detached language" (Farrelly and Seoane 2012: 396; cf. also Hundt and Mair 1999, who demonstrate that newspaper language is particularly receptive to changes).

Time Span[152]	COCA	COHA			
	Spoken	Fiction	Magazine	Newspaper	Non-Fiction Books
1944-1989		53.3% (n= 15)	12.5% (n= 12)	5.7% (n= 18)	0% (n= 0)
1990-2009/12	55.2% (n= 489)	59.3% (n= 12)	16.7% (n= 16)	57.9% (n= 35)	0% (n= 0)

Table 44 Share of contracted forms of present tense *be having to* in COCA and COHA

It is also conceivable that *having to* is so frequent in newspapers because there is a lot of direct speech in this text type or because reporters want to emulate an oral style. To test this hypothesis, the use of progressive *have to* in different types of speech and narration is analyzed. In newspapers *having to* + infinitive is indeed very common in direct speech – as is the case in fiction and in magazines. In newspapers and magazines, it is also often found in reports or 3rd person narration

[149] Smitterberg (cf. 2005: 2005: 67) finds higher frequencies in trials and letters in his 1870-1900 data, Kranich (2010: 101) in drama in ARCHER-2. These fluctuations are very likely due to differences in corpus composition.
[150] Note, however, that there are differences in corpus size in their study: ~8.2 million words from fictional novels vs. only 160,000 words from *The New York Times* (2012: 316-317).
[151] The numbers are even higher in the BNC: 13.7 w/m in newspapers vs. 12.0 w/m in spoken language.
[152] In 1944 contractions start becoming more frequent. The period 1990-2009/12 corresponds to the years in COCA.

(cf. Table 45 below). Leech *et al.* similarly observe that the progressive is frequent in the reports of the press subcorpus (2009: 123). Here the number of occurrences is higher (4,000 w/m) than in the press genre overall (3,000 w/m).

	Total	Fiction	Magazine	Newspaper	Non-Fiction
direct speech	86 (38%)	42 (37%)	15 (34%)	29 (45%)	
reported speech	11 (5%)	3 (3%)	2 (5%)	5 (8%)	1 (14%)
1st person narration	37 (16%)	22 (20%)	11 (25%)		4 (57%)
3rd person subjective narration	40 (17%)	38 (34%)	2 (5%)		
3rd person report	54 (24%)	8 (7%)	14 (32%)	30 (47%)	2 (29%)
total	228 (100%)	115 (100%)	44 (100%)	64 (100%)	7 (100%)

Table 45 Affirmative *BE (*) having to* in different contexts in COHA (1896-2009)

Particularly in fiction (20%) and in magazines (25%), there is a considerable number of uses of *having to* in 1st person narration. Subjective 3rd person omniscient narration, where the narrator has insight into the state of mind of a person (cf. example (302) below) and seems to present the events from her/his perspective, occurs almost exclusively in fiction. The only two exceptions are excerpts from stories reprinted in magazines. By contrast, reports in the 3rd person (cf. example (303) below) are more neutral and objective. In almost all of these cases, the full auxiliary form is used; the only occurrence of a contracted form is example (303) below.

(302) Alan kicked a piece of wood across the floor. He wasn't receiving rational arguments now, he was having to combat this old feeling that Chicago was the hub of the universe. (Bowman, H. (1939) *All Your Born Days*, COHA)

(303) … tech firms from Cisco to Seagate Technology are plunging into the consumer market, even though they 're having to make big, painful changes to do so. The reason: Consumers are their best chance for growth. (Kessler, M. (2006/03/13) "Tech giants build bridge to consumers." *Houston Chronicle*, COHA)

In a next step, it is worth investigating what motivates the use of the progressive form. Does it have a subjective note? Is there a dramatic effect to be achieved? Does progressive *have to* signal urgency or imply actualization? In the following, I will examine the meanings progressive *have to* can have, looking for any particularities that might explain its increase in recent decades.

Semantics

The main function of the progressive is to express aspectual meanings (cf. Leech *et al.* 2009: 119, Kranich 2013: 12), i.e. to "indicat]e] a happening IN PROGRESS at a given time" (Quirk *et al.* 1985: 197, cf. example (304) below). "Derived aspectual meanings" (Kranich's terminology, 2013: 13) are found in the progressive futurate (cf. example (305) below), the progressive with *will* or *shall* (cf. example (306) below), and the progressive in combination with the perfect (cf. example (307)).

(304) Pauline Maury showed the first signs of irritation. There was a party going on, in fact almost over, and the hostess was having to spend too much time in the kitchen. (Baker, D. (1943) *Trio*, COHA)

(305) This letter was not meant to be a tear jerker, just wanted to say I'm. [*sic*] glad you are in [college]. God bless you and guide you in all the rough times ahead, and the decisions you are having to make. (Goulden, J. C. (1970) "Voices from the silent majority." *Harpers* (April): 67-72, 77-78, COHA)

(306) "Get up, you lazy chit. You'll be having to make up for the chores not done the two days you be gone." (Woodiwiss, K. E. (1972) *The Fame and the Flower*, COHA)

(307) Since the' 70s, the working American (taxpayer) has been having to take cuts in salaries, health and welfare benefits, retirement benefits… (Various Authors (1995/ 12/11) "Viewpoints." *Houston Chronicle*, COHA)

Moreover, the progressive can have subjective or experiential meanings. In an early study of the modal progressive, Wright (1994: 468, 470, 480) recognizes a

> *foregrounding* function […] where it [the progressive] is used to focus on an experience from the point of view of the subject (or narrator […]. [I]t effectively provides an interpretation of the speaker's attitude and perspective of the situation, […] a verbal window on the soul of a speaker.

Killie observes that the rise of the progressive has been linked to its increased use as a marker of subjectivity (2004: 27; cf. Ch. 2.4 above on the concept of subjectivity). She believes that the presence of adverbs such as *always*, *continually* etc. is a sign of subjectivity (2004: 29). Yet she herself is unable to make any statements about the development of the frequency of subjective uses with *always*-type adverbials in the *Early English Prose Fiction* corpus (1500-1700, lacking information about the number of words, 2004: 30; cf. also next footnote). Retracing the history of the progressive with *always* from Old English to PDE, Kranich documents that this use "has clearly become subjective over time" (2007: 131). By using the progressive with *always*, *at all times*, *constantly*, *continually*, *forever* etc. (cf. Leech *et al.* 2009: 134), the speaker often evaluates an activity negatively, expressing her/his annoyance or frustration (cf. Kranich 2007: 130, Elsness 1994: 19, or Leech's comments about a notion of "colloquial exaggeration" and "amused disparagement," 2004: 34). Kranich (2007: 131) goes so far to suspect that the negative attitude has become a generalized invited inference, but remains cancellable. This is well evidenced in example (308), where the work of the addressee is now seen in a positive light.

(308) I'm always enjoying your work because you're constantly bringing something new to the plate. Keep at it. (ro-deviantart.com, quoted by Kranich 2007: 130)

Determining when a progressive form should be characterized as subjective is admittedly a tricky business. Kranich (2013) reserves the label solely for those occurrences that definitely do not have any aspectual meaning, observing that they account for about 1% of all progressives in ARCHER-2 (1950-1999, BrE). Smitterberg's explanation that "the continual recurrence of the situation is a source of irritation" for the speaker or writer in cases of what he calls the "solely-not-aspectual progressive" (2005: 210), however, seems to suggest that he believes a progressive form can be categorized both as having an aspectual function and a subjective note.

A closer look at the occurrences of progressive *have to* with adverbs of frequency in COHA confirms the impression that the speaker generally not only indicates that a situation is recurrent (cf. examples (310) below) or going on for a prolonged period of time (cf. example (309), which is a clear exaggeration), but also that s/he is discontent with that particular situation. The only exception in which *always* only has a purely temporal meaning is example (311), which is merely a neutral, scientific description of astrophysics.

(309) Jill is forever having to translate the culture of her life for Jack, and it is exhausting. (Valdes-Rodriguez, A. (2006) *Make Him Look Good*, COHA)

(310) My husband, particularly at first, was always running home with whatever troubles or problems we had. It annoyed me. He was always having to consult his mother. He used to go to her about every detail. (Burgess, E.W., Locke, H.J. (1960) *The Family*, COHA)

(311) MICHAEL-OPPENHEIMER: Ozone is a renewable resource in that sunlight high in the atmosphere continually recreates ozone from oxygen. The trouble is that chlorofluorocarbons are destroying ozone faster than it's recreated. That's why the levels are going down. And as we pump up chlorofluorocarbons, it will destroy ozone faster yet. In other words, the sun is always having to play catch up and never quite can catch up. (1991/06/10, *PBS NewsHour*, COCA)

As in Smitterberg's analysis (2005: 213), the adverb of frequency that progressive *have to* most frequently co-occurs with is *always* (cf. Table 46), but the progressive is also found with other adverbs such as *constantly*, *continually*, or *forever* (cf. example (309) below).

Have to	Occurrences	Years
always	23	1921,1930,1931,1932,1935,1939,1943,1949,1960,1961,1964, 1965,1966,1974,1976,1983,1985,1993,2004,2006,2007
constantly	2	1979, 2006
continually	1	1975
forever	2	1943, 2006
Need to	Occurrences	Years
forever	2	1954, 1995

Table 46 Progressive *have to* and *need to* with adverbs of frequency in COHA

Another special type of subjective progressives are so-called interpretative or interpretive uses. Quirk *et al.* note "that the event described has an interrelationship or identity with another simultaneous event" (1985: 198). This event can be mentioned explicitly (as in example (312) below) or it can be inferred from the context (cf. Leech *et al.* 2009: 134, Kranich 2013: 18).

(312) When Paul Gascoigne says he will not be happy until he stops playing football, he is talking rot. (quoted by Leech *et al.* 2009: 134)

Smitterberg (2005: 231) detects an increase of interpretive uses in the course of the 19th century (CONCE), arriving at an average of 5% of all progressives between 1870 and 1900. Kranich documents that there is both an absolute and a relative increase of interpretative progressives in ARCHER-2 between the second half of the 18th century and the second half of the 20th century. She finds that interpretive meanings account for 4% of all progressives in the first half of the 19th century and 11% in the second half (2010: 223), thereby contributing considerably to the overall increase of the progressive in this time frame (cf. also 2010: 247). Smith and Leech estimate that the number of interpretive uses almost doubles in BrE between 1961 and 1991, but they remark that "the number of indeterminate cases encountered in each corpus is frustratingly high (approximately 200-300 in LOB and FLOB)" (2013: 91; their conservative estimate corresponds to 5.3% and 7.6% of all present tense progressives (2013: 296); cf. also Smith 2005: 196 and Leech *et al.* 2009: 136). Smitterberg (2005: 231) finds 6% interpretive progressives in CONCE (1870-1900), whereas Collins gives us the information that in C-US 53.4% of all special uses of the progressive (i.e. subjective and politeness uses as well as future meanings and "matter-of-course' uses," that is, combinations with *will*, *shall*, or *be going to*) are interpretive (2009b: 121). Data from COHA suggests that the number is lower in the case of progressive *have to.* The following examples are two of the few possible candidates for interpretive meanings from COHA. Their scarcity suggests that they do not play any important role in the increase of progressive *have to.*

(313) It was curious, the way she was having to comfort Jimsy for not being Carter, and Carter for not being Jimsy. (Mitchell, R. (1921) *Play the Game!*, COHA)

(314) Jerry Hoffman of ASI International: "Normally, the crime hasn't impacted on the tourist areas. […] But what we see now, in Florida, is it's happening in (those) areas. […] # For Jackson, the Houston woman headed to Orlando, the trend is sad: "It's a sorry state that we're having to live in this much fear." (Sloan, G. (1993/04/08) "Steering clear of violence." *USA Today News*, COHA)

There are also subjective occurrences of the progressive without any *always*-type adverbial or any explanation of a previous or simultaneous event. Tentative meanings are not found with progressive *have to*, but in many cases of *be needing to*, particular emphasis is placed on the utterance or on the situation itself (cf. Kranich 2013: 18). In example (315) the speaker feels the necessity to repeat his plea to take action, stressing the stakes and alluding to adverse consequences. Emotions sometimes run high or the situation is intense (cf. Smitterberg 2005: 219), for instance in example (316). Here the moderator uses the interjection to calm everybody down and bring order into a heated discussion about the murder of a little girl.

(315) … We're needing to address the issue. We need to address this at the federal constitutional level. And it would be great if we didn't have to, but the courts are engaged and the courts are pushing this. And if we don't address it you'll have a redefinition of marriage done by the courts without the people speaking (2004/07/14, "Same-sex marriage amendment fails," *CNN Dobbs*, COCA)

(316) … Patsy, you waited four months before you came and talked to the Boulder Police Department and answered questions. P. RAMSEY: No, Steve, I did not THOMAS Well, tell me when. […] P. RAMSEY: Were you in our home that day? Were you in our home the day JonBenet was missing? J. RAMSEY: Let's read the papers. *cross-talk* KING: Whoa, whoa, we're having to talk over each other. (2001/04/28, "Encore presentation: Who killed JonBenet Ramsey?" *CNN King Weekend*, COCA)

We have very little information about the actual frequency of this use.[153] Kranich talks about 1% of all progressives is in ARCHER-2 (1950-1999, BrE), yet the number seems to be a lot higher in the spoken language section of COCA (where many subjective deontic statements in which the speaker solely uses the progressive for emphasis are found, cf. below), but not necessarily in COHA. (Purely subjective uses seem rarer in COHA and thus less likely to play a major role in the increase of progressive *have to*.) I do not presume to be able to make any reliable claims about the frequencies of these uses, given that my discussion of the progressive aspect is an excursion and not the main focus of this study, but merely wish to have shown that progressive *have to* can have both aspectual and subjective meanings. As usual, however, the source of the obligation is determined for all present tense affirmative uses of progressive *have to* and *need to* in the spoken language section of COCA. The analysis is restricted to 1990-1994 (99 occurrences, i.e. 4.5 w/m) and 2005-2009 (97 occurrences, i.e. 4.8 w/m).[154] Table 46 shows that the progressive aspect is mostly used in the present and the past tense, whereas future references and conditionals are rare.

Affirmative uses only	COHA (1896-2009)		COCA (spoken, 1990-2012)	
	BE (*) having to	*BE (*) needing to*	*BE (*) having to*	*BE (*) needing to*
present	0.46 (117)	0.009 (3)	1.35 (367)	0.12 (12)
past	0.37 (92)	0.015 (5)	0.27 (66)	0.05 (5)
future	0.02 (6)	0.009 (3)	0.11 (9)	0.04 (4)
conditional	0.02 (5)	0.003 (1)	0.01 (1)	

Table 47 Present, past, future, and conditional uses of progressive *have to* and *need to*

Haegeman stresses that progressive *have to* also "gives even more prominence to the actuality" (1980: 4). It is clear that the events actually take place. This description seems to be fitting in the COHA data. Moreover, according to Haegeman, whoever uses progressive *have to* underlines that s/he is not responsible for the imposition of the obligation. Comparing examples (317) a-c., she observes that *must* signals that the speaker agrees with the proposed action (s/he "could not go on to express disagreement with the imposition of the obligation," as in "*but I strongly disapprove of*

[153] Smitterberg does not manually check the meaning of potentially experiential occurrences. He modifies Wright's (1994: 472) five criteria for identifying "potentially experiential progressives," selecting present tense forms (non-modal auxiliary, no perfect form) in the main clause with 1st or 2nd person subjects in which the progressive is part of a 'stative situation.' He notices an increase in the use of these forms (2005: 221-222). The criteria are discussed (e.g. by Killie 2004) and refined by Fitzmaurice (2004a, b) and Smitterberg in 2004. However, Kranich demonstrates that only a few subjective uses identified in her analysis of ARCHER fulfill (many of) these criteria (2010: 210).

[154] Interestingly, there are also a number of occurrences of *X has (sth.) to do with Y* in the progressive in COCA:

(FN 36) … the personal attacks on President Clinton? They seem to be having to do with what happened in Arkansas and other things. (1994/09/13, "Should we invade?; At what cost?; Conversation - Clinton presidency," *PBS NewsHour*, COCA)

such actions obligations") and that *have to* is neutral, i.e. the speaker may or may not agree, but that using *having to* enables her/him to "disclaim[…] any commitment as to the imposition of the obligation," signaling to the listener or reader that the obligation does or did not "originate[…] with the speaker" (1980: 3). Haegeman justifies her claim by pointing to three other examples from the SEU in which the speakers do not impose the obligation upon themselves (1980: 4). We cannot be sure that this is generally the case.

(317) a. My children must eat an apple after their meals.
b. My children have to eat at an apple after their meals.
c. My children are having to eat an apple after their meals. (Haegeman 1980: 3)

In a similar vein, but with reference to the use of the progressive core modals such as *will* and *shall*, Smith and Leech observe that "the absence of volition or intention on the part of the speaker" is stressed. The event does not seem to be portrayed as being in progress, but as occurring naturally and as expected (2013: 88, cf. also Mair and Leech 2006: 324, Celle and Smith 2010).

It is indeed the case that the majority of uses (progressive *have to:* 70%, progressive *need to:* 69%) in COCA are dynamic (cf. Table 48). External circumstances or situations such as in example (318) – and not the speaker – are responsible for the necessity or obligation. (There is also one case of an internal, natural necessity, cf. example (319) below.) The share of dynamic *having to* is even higher than in the case of the simple form *have to* (79% vs. 21% if formulaic meanings are disregarded). In these cases, it seems natural that the speakers often express criticism or discontent with the existence of an obligation or a necessity.

(318) But nothing is draining support for Mr. Bush and his party more than the political fallout from skyrocketing gas prices. […] While millions of Americans are having to cut corners to fill their gas tanks, oil company profits are at an all-time high. (2006/04/26, *MSNBC Scarborough*, COCA)

(319) A recent survey found that more than two-thirds of asthma patients were being prescribed bronchodilators for daily use. "If you're needing to use a bronchodilator to relieve your symptoms that often, you need to talk to your doctor," urges Dr. Stoloff. (Perrine, S. (1993) "Running out of breath." *Men's Health* 8.7: 86-89, COCA)

Meaning in w/m (N= 197 | 12)	Progressive *have to* in COCA (spoken)					Progressive *need to* in all text types of COCA	
	1990-94	2005-09	av.	Pearson Residuals		1990-2000	2001-2012
objective deontic	0.36 (8)	0.59 (12)	10%	-0.65	0.65		
subjective deontic	0.96 (21)	0.32 (18)	20%	0.32	-0.32		0.03 (3)
dynamic	3.19 (79)	3.37 (68)	70%	0.08	-0.08	0.04 (4)	0.05 (5)
total	4.51 (99)	4.85 (98)		$\chi^2 = 1.4$, $p > 0.05$, $V = 0.59$		0.04 (4)	0.09 (8)

Table 48 Meanings of progressive *have to* and *need to* (iwcm) in COCA

There are only a few cases in which a rule or regulation (cf. example (320) below) seems to be the origin of the obligation or in which the speaker expresses his or her opinion about the best course of action (cf. example (315) above). The comparison between *have to* and *be having to* shows that

subjective and objective deontic utterances are much more frequently expressed by *have to* (43% and 13%%) than by *be having to* (20% and 10%).

(320) Mr. HAYS: … I do believe that, in order to cut health insurance costs, we need to cut the costs of […] medical services. A method of doing that, I think, is a little less regulation. The President mentioned physicians are having to do additional tests. This increases the cost ... (1992/09/06, *ABC Brinkley*, COCA)

Coates criticizes Haegeman's position, arguing that when *have to* is used, be it in the simple or the progressive form, the speaker is never the source of obligation (in her data); hence, there would be no need for the speaker to distance her-/himself from the contents of the utterance. Yet, as we saw in example (270)[155], *have to* is indeed used as a device for the speaker to issue a directive, even if these cases are rare. This renders one part of Coates' argument moot. However, there are no clear occurrences of progressive *have to* in which a directive is expressed. Example (321) is arguably only a situation in which the speakers announce what they intend to do or believe needs to be done (cf. example (315) above for *need to*). Then again, it is only natural that any orders to take action refer to punctual events and not to durative situations.

(321) Rep. FAZIO: Well, I guess everybody feels that there's a different approach to the solution of the same problem. We're having to sort that out, but I think you're going to see more than just a solution to middle income tax people's problems (1991/11/25, *CNN Crossfire*, COCA)

Coates' second point is that the distinction between simple and progressive forms of *have to* is aspectual. Citing an example given by Haegeman (repeated as example (322) below), she observes that the reason why *must* could not be used here is that only *have to* can express such a habitual meaning (such as "it is necessary for them to do (habitually) a tremendous amount of work," Coates 1983: 56). The analyzed data suggest that progressive *have to* does indeed frequently express aspectual meaning (cf. examples (304) and example (323)), often with subjective overtones. Cases in which it only has a subjective meaning are rare (cf. e.g. examples (315) and (316) above).

(322) But let us face it, although we got nearly two million votes at the last election, we've got six members of Parliament and the burden on those is tremendous, they're having to do a tremendous amount of work and there are very few of them. (S.5.5./ 1.45.26, quoted by Haegeman 1980: 4).

(323) Hampton couldn't have been more opposed to up-armoring the Humvees and warned his superiors. He even e-mailed his wife from Iraq. "Hey Babe," his e-mail read. "Just a little aggravated with the bureaucracy. It is simply beyond my comprehension why we're having to go through such (an ordeal) to order confounded hard vehicles. (Eisler, P.; Morrson, B. and T. Vanden Brook (2007/07/16, "Pentagon balked at pleas from officers in field for safer vehicles." *USA Today*, COCA)

[155] Example (270) reads:

(FN 37) Treasury Secretary Paulson gave them, you know, basically a mandate and said, "You have to take this money for the good of the financial system." (2009/04/14, *PBS NewsHour*, COCA)

As Kranich outlines, the absolute increase of aspectual uses of the progressive is still more pronounced than that of subjective uses (although the latter gain in relative importance) in the 20th century (2010: 168). She attributes this to an increasing use of the progressive "in contexts where it has long been established" and where its use is possible but not obligatory (2010: 242). Stative verbs or stative situation types, for instance,[156] can be found as early as in the second half of the 17th century (cf. Kranich (2010: 193) / the beginning of the 18th century (cf. Mair 2006: 93-94) and become more frequent while already established aspectual meanings expand in use (cf. Kranich 2010: 193).[157] Progressive *have* and *need* belong to this category, with sporadic uses in the 1830s and 1850s / 1860s and increasing frequencies ever since. Their expansion, paired with the concomitant increase of gerund-participle forms, seems to have paved the way for the rise of progressive *have to* and *need to*. The latter can be considered to belong to a group of new progressive forms that have come into use "to fill the few remaining niches in the verbal paradigms" (Mair 2006: 89) and have markedly different semantic profile than *have to* and *need to.*[158]

[156] Another example is the use of the core modals in combination with *be V-ing*, which dates back to at least Middle English (cf. Leech *et al.* 2009: 139). The use of all core modals and semi-modals of obligation, including *HAVE to + be V-ing*, increases in COHA in the 20th century (cf. Figure D.4 in Appendix D). Whereas root uses of *must* and *(have) got to be* V-*ing* are often used in phrases with verbs of movement, indicating that the speaker wants to signal that s/he is obliged to leave / go etc., no specialization in meaning is found in the case of *have to be* V-*ing.*

[157] Compared to that, the contribution of subjective uses of stative situation types (~ 14% in the 20th century) is minor.

[158] Mair lists the present / past perfect passive (1 use in COHA, cf. example 38 below), the future / conditional / modal passive progressive (19 uses, e.g. example 39), and the future / conditional / modal perfect passive (1 use, i.e. example 40), but stresses that they are too infrequent to have any noteworthy influence on the overall frequency of the progressive (2006: 90).

(FN 38) …the discovery that they <u>have been being spied</u> on for several years. (1960/06/06, "Letters." *Time Magazine*, COHA)

(FN 39) Even now we <u>might be being driven</u> far out to sea. (Walker, C. L. (1927) "Innocents Aboard." *The Atlantic Monthly* (June): 735, COHA)

(FN 40) He <u>might have been being skinned</u> alive. (Beagle, P.S. (2006) "El Regalo." *Fantasy & Science Fiction* 111.4/5 (Oct. / Nov): 51-88, COHA)

6.2.5. *Want to*

The verb *want to* mainly expresses volition. Only fairly recently did a deontic use develop, which is of particular interest for this study. Before discussing this in detail let us first look at the overall development of *WANT to*. This verb has experienced a remarkable rise in frequency in the last one hundred years. Collins observes that there are nearly as many volitional uses of *want to* as volitional uses of *will* in his US-data (in which *want* is much more frequent than in BrE or AusE), which suggests that *want to* is on the heels of *will*.[159]

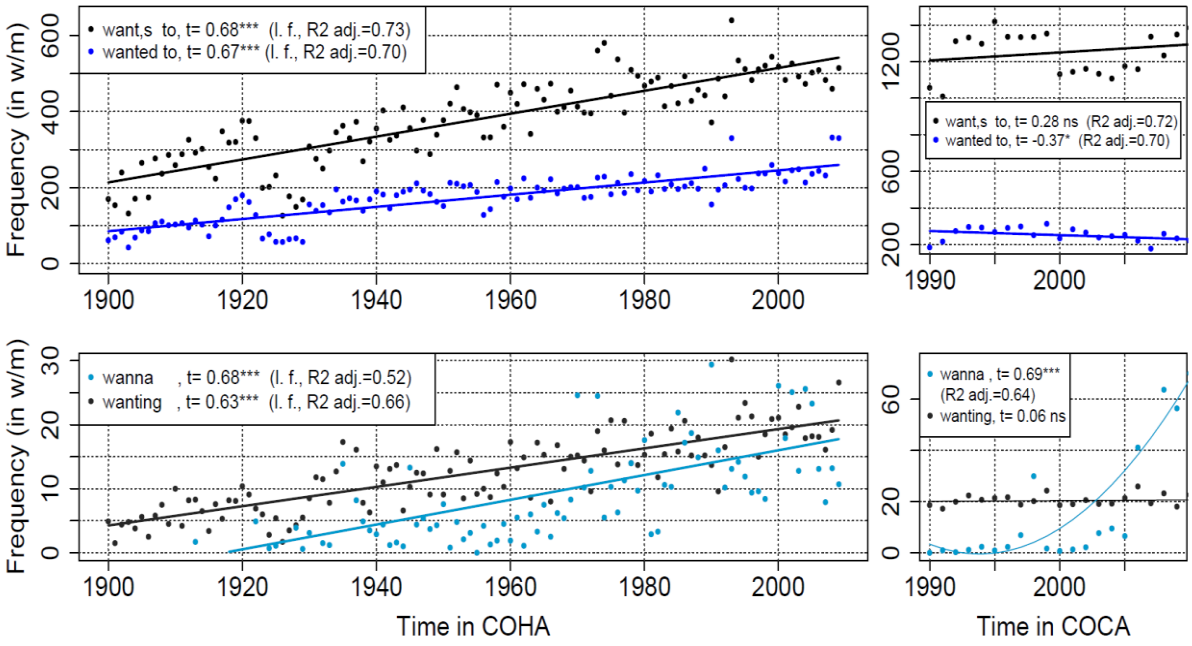

Figure 46 *Want to* and *wanna* in COHA and COCA (spoken)

Both present tense and past tense forms rapidly rise in frequency in COHA. The use of the contracted form *wanna*[160] also increases towards the end of the 20th century (cf. Figure 46). The earliest[161] examples of a <wanna> spelling in COHA are from 1896 (cf. example (324); the same information is given in the OED) and represent non-standard English and spoken language. From 2006 on, *wanna* is more frequent in COCA (spoken) than in the written texts of COHA.

(324) I see he had a still on, an' I didn' wanna give 'im no stuff. (OED, Crane, S. *Maggie*)

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[159] *Will* outnumbers *want to* by a factor of about 2.7 in C-US (3,950 w/m: 1,425 w/m). Volitional (i.e. in Collins' terminology dynamic) uses of *want to* (1,390 w/m) are nearly as frequent as volitional uses of *will* (1,564, Collins 2009a: 125, 179, 183).

[160] *Wanna* was the subject of heated discussions about trace theory (cf. e.g. Chomsky and Lasnik 1978, Bolinger 1980b). Postal and Pullum mention it in their "exhaustive list" of verbs with contracted forms (*gonna*, *hafta*, *oughta*, *gotta*, *sposta*, *usta*, *wanna*, 1978: 2; cf. Pullum 1997: 87-90: "the seven therapy verbs"), which has, of course, been criticized as being incomplete (e.g. by Bolinger 1980b).

[161] There are two <wanna> spellings earlier, but in both cases the meaning is 'will not', e.g. in the following example:

(FN 41) I hope ye wanna be offended at me, as I didna ken that you only wanted to pay a debt o' frien'ship. (McHenry, J. (1824) *O'Halloran; or The Insurgant Chief. An Irish Historical Tale of 1798*, Vol. 1, COHA)

(325) UNIDENTIFIED-MALE: You wanna talk about conspiracies, I'll tell you about conspiracies. (2009/19/03, "Talking points memo and top story," *Fox O'Reilly*, COCA)

The right panels in Figure 46 illustrate the frequencies of all these forms in the spoken language section of COCA.[162] (Please note the different scales.) Here, however, we find no significant trend in the present tense, whereas *wanted to* decreases in use (τ = -0.37*). The combined numbers for *want / wants to*, *wanted to*, *wanting to*[163] and *wanna* are lower than the 2,309 occurrences per million words estimated by Leech *et al.* (2009: 100) for *WANT to* in the *Longman Corpus of Spoken American English* (LSCAE) (based on a representative sample of analyzed concordances). The difference might be due to the composition of the corpora: Much like the spoken demographic component of the BNC, LSACE consists of recordings of everyday conversations (cf. Stern 2005: 1), whereas the data in COCA stem from TV and radio shows. There seems to be a stronger focus on personal volition in spontaneous, private conversations, which is in accordance with Verplaetse's observation that volitional occurrences of *want to* in political radio interviews are surprisingly infrequent (2008: 1).

Compared to BrE corpora, the frequency of *want to* in COCA seems high, that of *wanna* relatively low. The relation between *want to* and *wanna* is roughly 1.5:1 in the spoken demographic subcorpus BNC (*mc*, Verplaetse 2008: 119), 3.3: 1 in the entire spoken component of the BNC (*mc*, Krug 2000: 154) and 4.5:1 in the *Switchboard Corpus of Spoken British English* (*mc*, Boas 2004: 481). However, in COCA (spoken) it ranges between 1,151:1 in 1990-94 and 20:1 in 2005-09. This finding is astonishing considering recent claims that the use *wanna* is exclusively restricted to AmE (cf. Pullum 1997: 97) and only recently appears in BrE (cf. Krug 2000: 154-155). It is thus unlikely that the difference between COCA and the BNC is mainly due to regional variation, but more probable that it is caused by differences in corpus composition or in transcription practices. As mentioned above, the data in COCA (spoken) is often produced in a much more official studio setting and thus less spontaneous than the utterances in the demographic component of the BNC. Another factor might be that phonologically reduced forms are not always transcribed as such in COCA. Whereas the BNC data is transcribed for linguistic purposes, the transcripts in COCA were made by companies which might have preferred using the full forms to avoid the impression of informality. Sometimes not heard properly or subconsciously corrected, variations in pronunciation of *wanna* (five are identified by Desagulier (2005: 378, 385), four by Krug (2002: 132)) may

[162] A manual inspection of the 1990-94 and 2005-09 data showed that *wanna* is always followed by an (inserted adverb +) infinitive or an interruption. Whereas Verplaetse found lots of cases in which *wanna* is followed by a noun or an article in the BNC spoken demographic component (2008: 5, cf. example 42 below), the only case in this sample in which *wanna* is not followed by an infinitive is example 43. Here the speaker refers to *a holiday.*

(FN 42) Do you wanna sweet? (BNC – KE6, quoted by Verplaetse 2008: 5)

(FN 43) PUBLIC-ENEMY: What's a smiling face / When the whole state's racist / Why I want a holiday / Damn it,' cause I wanna. (1992/10/20, "Public enemy's 'Arizona': Fantasy or exploitation?", *ABC Nightline*, COCA)

[163] For information on the progressive aspect with *want to* and other private verbs see Levin (2013: 199-214).

be substituted by the "ideal" graphematic representation <want to>. Using <wanna> is sometimes also avoided because it is considered a stigmatized form (cf. Desagulier 2005: 384-385). Given that this study is based on transcripts, the influence of these practices should not be underestimated.

Semantics

Since the beginning of the 21st century, many studies have drawn attention to the use of *want to* + infinitive with an obligative meaning (e.g. Krug 2000, Bourdin 2003, Desagulier 2003, Verplaetse 2010).[164] In this sense, illustrated in example (326), *want to* is synonymous with *must*, *should*, or *ought to*, but it is more face-friendly than the alternatives (cf. Krug 2000: 148). Leech *et al.* (2009: 113) observe that deontic *want to* is also a potential competitor of *need to*.

(326) DURAN: "You wanna put cartons on Argentina and Mexico, then we can talk! (1994/ 02/19, "Seeing prison life from the other side of the bars," *NPR ATC*, COCA)

(327) You want to keep your eyes open in the city or you will be taken in (Kirchner 1940: 129)

As early as 1927, Krapp mentions that *want to* can be used in the sense of 'ought' or 'should,' as in example (327) – a sentence later also quoted by Curme (1931) and Kirchner (1940). It is classified as colloquial (e.g. by Lurie (1926), Krapp (1927), and Kirchner 1940: 135) and popular (cf. Kirchner 1940: 129-130 and Pound 1932: 450). Kirchner stresses that it is no longer called dialectal in the new compilation of the *Universal Dictionary* (1931). He suggests that because of the contact between soldiers during the First World War, educated speakers started using it as well (1940: 133), pointing to its appearance with an inanimate subject in *The Times* in 1937 (cf. example (328)). Yet the characterization of this use as informal is, as Krug stresses, still found in various dictionaries even though he believes that the label 'informal' can be replaced by 'incoming' (2000: 148).

(328) the entrance wants to be no larger than to permit the grey squirrel to get in (1937, *The Times*, quoted by Kirchner 1940: 135)

Pound claims that the use of *want to* "in the sense of 'should' or 'ought' is quite possibly an amalgam of *want* in the sense of 'wish' and *want* in the sense of 'need' or 'lack'" (1932: 451). Aarts and Aarts (1995: 178) argue that projected volition lies at the heart of utterances of advice, whereas Langacker (2006) considers *want* to reflect a force dynamic experience that is mentally extrapolated to the interlocutor. Desagulier, referring back to personal communication with Langacker, talks about a mental scene[165] that the speaker presents to the addressee. In this scene, the speaker wants to bring about a certain state of affairs. It seems only natural that the addressee will eventually come to the same conclusion as the speaker because it is in her/his own interest to do so. Verplaetse uses this idea of a mental scene to explain that the expression of advice in *You want to be careful* can be analyzed simultaneously as *I want you to be careful* (necessity – obligation) and purely volitional

[164] Yet Bertschinger (1941), who analyzes the various senses of *want* and retraces the history of the verb in an entire monograph, does not mention the obligation use.

[165] Langacker later uses the term 'mental extrapolation' in reference to epistemic modals (2006: 22, cf. also 1991: 274).

second person *you want to be careful*. Speaker volition and addressee-volition can, but must not be present at the same time (2010: 41). Krug stresses that "obligative readings are at least partially invited by politeness inferences: what somebody has to do in his or her own interest is what he or she is willing to do" (2000: 148). Since utterances with deontic *want to* constitute indirect speech acts, they are less face-threatening than *must* and create a weaker constraint than *need to.* With *want to* the speaker signals the addressee that s/he recognizes his or her authority (cf. Desagulier 2005b: 91-92).

However, believing that mental space blending only takes the semantic development of *want to* into account and does not represent morphosyntactic blends such as *wanna* (2003: 96), Desagulier goes one step further to integrate both the morphosyntax and the semantics of a structure into the same model. He suggests that 'grammatical' in 'grammatical blend' be understood in the sense of 'constructional.' The theoretical framework he uses is Construction Grammar. Here constructions are defined as pairings of syntax and semantics that can impose particular interpretations on expressions containing verbs that do not themselves lexically entail the given interpretations (cf. Goldberg 1995: 20). According to Desagulier, deontic *want to / wanna* constitutes a new form-meaning pairing. The volitional, transitive structure X WANTS (TO) Y and the ditransitive structure S WANTS TO Y with deontic meaning function as inputs for the constructional blend X WANTS TO Y with deontic meaning (cf. Figure 47). A univerbation is possible. Deontic meaning[166] has been and continues to be expressed by the much more frequent ditransitive structure S WANTS X TO Y. Here a univerbation to *wanna* is blocked by the object between verb and infinitive. S wants Y to be realized in this construction, but s/he wants it done by X. We thus have two primary participants. In X WANT (TO) Y, however, there is only one participant. Formerly only used to express volition, the transitive structure X WANTS TO Y can now also express deontic meaning. The reasons for the speaker to prefer deontic X WANTS TO Y over deontic S WANTS X TO Y lie in the indirectness of the construction: S, who is the deontic source, is not explicitly mentioned and the action is presented as being in the interest of X (cf. Desagulier 2005a: 454-456).

The new schema is characterized by a certain flexibility. Depending on the context, different areas of the blend are activated, while others are only marginally relevant. If, for instance, advice is expressed, the volitional sense of input 1 is almost irrelevant. The indeterminacy and the flexibility of this constructional blend are typical of constructions that are in a process of conventionalization (cf. Desagulier 2005a: 457). Desagulier stresses that *wish to*, *intend to*, and *desire to* are not as flexible as *want to* in this respect and have thus not undergone similar processes of grammaticalization (2005a: 464).

[166] Desagulier himself uses the term 'modal' (in opposition to non-modal volition) in these carefully phrased passages: The modal (i.e. deontic) sense conventionally associated with S WANTS TO Y is hidden (2005a: 455).

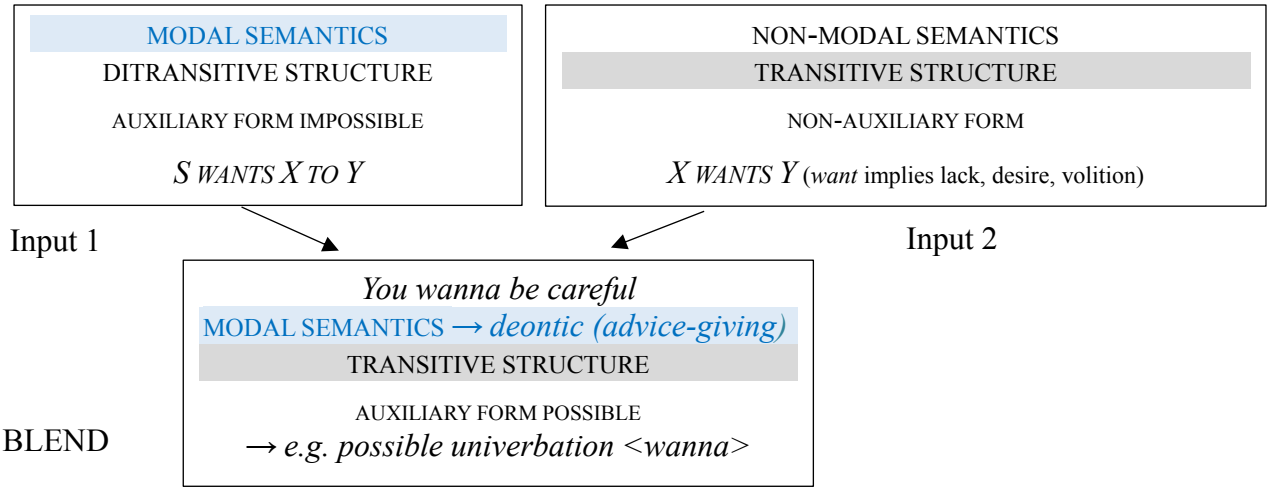

Figure 47 Schematic representation of deontic *want to* (Desagulier 2005c: 35)

While many studies discuss the development of the deontic meaning of *want to*, very few statements have, however, been made about the actual frequency of this use. Kirchner claims that "it is by no means of rare occurrence to-day" (1940: 129). Krug observes that the directive sense of *want to* is not the dominant sense and has not found full acceptance in written language yet (2002: 144). He gives some examples that were "gathered unsystematically" (2000: 147), stressing that further research is needed. Leech *et al.* (2009) observe that there are at the most 20 occurrences of deontic *want to* in the Brown family of corpora. Without adducing any empirical evidence, Desagulier claims that *want to* "is more and more used in advice-giving contexts" (2003: 91). Apart from Collins (2009a: 151), who finds three uses of deontic *want to* in 2,177 occurrences in C-US, Lorenz is the only study of AmE with concrete numbers.[167]

In his analysis of dramas and movies in COHA, Lorenz retraces the semantic development of *going to*, *(have) got to*, *want to*, and the contracted forms *gonna*, *gotta*, and *wanna*. There is a small (but statistically insignificant) increase in the use of deontic *want to* between 1910-1969 and 1970-2005 (cf. Lorenz 2013: 182, cf. Table 49).

Time Span (n= max. 75 occ. per decade)	Meaning	*Want to*	%	*Wanna*	%	*p*-value
1910 - 1969	volition	439	97.6%	149	96.8%	p=0.594
	deontic	11	2.4%	5	3.2%	
1970 - 2005	volition	285	95%	289	96.3%	p=0.424
	deontic	15	5%	11	3.7%	

Table 49 Meanings of *want to*/*wanna* in COHA Drama & Movie (adapted from Lorenz 2013: 182)

As Table 50 shows, the relative frequency of deontic meanings of *wanna* (18%) is higher than that of *want to* (9%). Lorenz suggests that this development from the original volitional meaning to the

[167] More information can be obtained for BrE: Verplaetse finds that 12.6% of 500/2,000 non-generic second person uses (2 samples) express advice; 4 of 212 occurrences of 3rd person sg. uses have a deontic meaning (2008: 165/186).

more grammaticalized one may be interpreted as a sign of on ongoing process of emancipation of *wanna* from *want to*, but it could also derive from the informal character of *wanna*, which "favors its use for (indirect) advice in conversations of a more casual tone" (Lorenz 2013: 67).

Meaning	*Want to:* N (w/m, *mc*)	%	*Wanna:* N (w/m, *mc*)	%	% *Wanna*
volition	80 (321.3 w/m)	91%	226 (907.6 w/m)	82%	74%
deontic	8 (32.1 w/m)	9%	50 (200.8 w/m)	18%	84%

Table 50 Meanings of *want to/wanna* in SBC (adapted from Lorenz 2013: 67)[168]

Lorenz' finding also ties in with Desagulier's observation that the contracted form highlights pragmatic factors that favor a deontic interpretation (2005: 398). Comparing examples (329) and (330), Desagulier observes that both a deontic and a volitional interpretation of example (329) are possible, whereas this is no longer the case in example (330). Yet, without more information about the context, it is very hard to tell which reading is intended.

(329) You want to be careful. (Desagulier 2005: 398)

(330) You wanna be careful. (Desagulier 2005a: 398)

Krug stresses how difficult the identification of obligative meanings of *want to* can be. He analyses entire works of fiction in order to obtain more information about the context than is usually given in a corpus (2002: 133-134). The context in COCA was usually limited to ~160 words, but it could be manually expanded by a second search, which was often necessary. All 1,006 relevant occurrences of *wanna* were taken into account. 2,047 occurrences of non-negated *want to / wants to* (iwcm) in 1990 and 2009 were examined, because of the large number of occurrences only those appearing in *ABC 20*, *ABC Nightline*, *ABC Primetime*, and *PBS NewsHour* (cf. Ch. 4.1).

Meaning in w/m (N= 2,047)	1990	2009	Difference	Pearson Residuals	
deontic (directive function)	8.3	9.4	+25%	-0.23	0.56
formulaic	58.9	52.8	-11%	-0.12	0.28
volitional	620.8	516.5	-17%	0.06	-0.15
total (iwcm)	688.0	578.7	-16%	$\chi^2 = 0.5$, $p > 0.05$, $V = 0.11$	

Table 51 Meanings of *want/s to* in *ABC Primetime*, *Nightline*, *20/20*, *PBS NewsHour* (COCA)

Meaning in w/m (N= 1,006)	1990-1994	2005-2009	Difference	Pearson Residuals	
deontic (directive function)	0.0	1.7	+ 100%	0.53	-0.07
formulaic	0.0	0.5	+ 100%	-0.41	0.05
volitional	0.7	46.8	+6,337%	-0.06	0.01
total (iwcm)	0.8	49.0	+6,230%	$\chi^2 = 0.5$, $p > 0.05$, $V = 0.02$	

Table 52 Meanings of *wanna* in COCA (spoken)

Table 51 and Table 52 show the meanings of *want/s to* and *wanna.* There is an increase in the use of volitional (+6,340%) and deontic meanings (+25%) meanings of *wanna* and of utterances that function as directives (+100%). Like in Lorenz' data (cf. Table 55 above), the relative frequency

[168] The calculation in this table relies on the assumption that all occurrences in SBC (249,000 words, cf. Lorenz 2013: 42) are analyzed by Lorenz.

of deontic meanings of *wanna* (4.5%) is higher than that of *want to* (1.8%, *want/s to:* 1.4%) in COCA (spoken). The comparison to his data from SBC shows that deontic meanings are less common in COCA, which may be due to corpus composition. Note also that in contrast to Lorenz, I analyzed occurrences of 3rd sg. *wants to* (iwcm), but I found no expressions of deontic meanings among them. Unlike Lorenz, I also separated volitional uses from formulaic ones (cf. example (331) below), in which the speaker could just as easily have used *must* or *need to* instead. These uses account for 20% of all occurrences of *want to* but only 1% of *wanna.*

(331) PRESIDENT-BARACK-O# Well, I think that - first of all, I want to say that Mr Walters has been very cooperative (1990/06/24, "Questions for the President; prescription for America," *ABC Nightline*, COCA)

As mentioned above, the identification of those instances in which the speakers give advice or orders is often tricky, particularly when core modals are used with *want to*. The number of deontic uses and utterances that can function as directives thus has to be seen as a close approximation, and it might be possible to argue in favor of an alternative reading in some of these cases.

Bourdin tries to identify the conditions that have to be fulfilled for an utterance with *want* to be interpreted as a piece of advice or even as an order. He draws attention to the role of contextual clues (such as *for just a second*, which is typically used with requests), standard expectations of people's behavior, and the importance of control over the action. All other things being equal, it is more likely that the interpretation is deontic if the speaker has more control. If, however, the addressee has greater control, a volitional interpretation seems favorable. Clauses in which the grammatical subject is *you* lend themselves to a deontic interpretation if they are not questions or assertions because it is unlikely that the speaker knows something about the mental state of the addressee. Most of the occurrences of deontic *want to* in my sample have a 2nd person non-generic singular subject (70%, cf. example (332)). Occasionally, you also find generic subjects (cf. example (333)), but there is not a single occurrence of deontic *I want to*.

(332) KOPPEL Let me introduce another gentleman who's been sitting- Lieutenant Rockman, you want to stand up there for a minute while I introduce you? (1990/02/14, "A town meeting in South Africa," *ABC Nightline*, COCA)

(333) ERIC-HOLDER-: Well, again, we used the protocol there to decide, individualized determinations, looking at -- in trying to apply normal criminal law, you want to hold trials generally in the place where the crime has occurred. (2009/11/13, *PBS NewsHour*, COCA)

Bourdin believes that a person is best equipped to be aware of his/her own feelings (such as sadness or anger) the 'Inner State Accessibility' (ISA) constraint. This principle, however, may not apply if the speaker signals his or her understanding or knowledge of the addressee's feelings or emotions, as illustrated in example (334), e.g. by using *I can see*, *I understand*, and *deep down* (2003: 338). Sentences introduced with *I hope*, *I know*, *I regret*, *I'm aware* etc. seem to constitute a "particularly

hostile environment" for deontic interpretations (Bourdin 2003: 354). However, as Bourdin recognizes himself (2003: 353), some of the expressions that show the speaker's understanding cannot only function as assertions but also as hedges, which means that a deontic interpretation remains likely. *I think* in example (335) is a case in point. Here it is obvious that the speaker, Lynn Paltrow, is suggesting that the *ABC Nightline* Crew should interview Gina again.

(334) KOPPEL -forgive me for interrupting you, we have to take a break. Professor Rubin, I know you want to jump in. We'll continue our conversation with you when we come back (1990/08/22, "Jordan closes its Iraqi border," *ABC Nightline*, COCA)

(335) At the very end, when I asked her [Gina] what would have happened if she had known that she was facing prosecution, she said she probably would have gone for treatment at that time. In other words, her response is, in a sense, the idea works. LYNN PALTROW, ACLU Staff Counsel: Well, what Gina actually said is she thinks it would work. I think you might want to go back and talk to her again, because I think in terms ofher [*sic*] own life and what's really going on out there, is that Gina never had that choice. She never had the choice to go into treatment. (1990/06/19, "Jailing pregnant drug users: Does it help or hurt?" *ABC Nightline*, COCA)

With reference to 1st person plural subjects, Bourdin observes that deontic readings can only occur if the addressee is part of the group denoted by the pronoun *we.* It would seem odd if the speaker were to tell the addressee(s) what they both/all want. However, "specifically including oneself in the group that is on the receiving end of the recommendation is a more polite way of issuing it than excluding oneself by using *you*" (2003: 352). Utterances with *we* are often ambiguous, as in example (336). When we consider (336) to be a case of reported thought – which would mean that the original addressee was not present at the moment of the utterance –, a volitional interpretation seems very plausible. It is, however, also conceivable that a deontic meaning is intended (cf. (337).

(336) I should think at that time the employers thought, Well we don't want to be arguing about wages every five minutes during this WAR business you know […] (*Nottinghamshire Oral History Project*. BNC FYH 749, quoted by Bourdin 2003: 352)

(337) I should think at that time the employers thought, Well we'd be well-advised not to be arguing about wages every five minutes. (Bourdin 2003: 352)

A case in which a deontic interpretation is likely is example (338). Here the soldier considers it necessary that s/he and her/his comrades perform the action, most likely because of an order (either by a superior or by her-/himself). In the last example of the type (number (339) below), the President is probably not involved in the physical military intervention, but as commander-in-chief he is certainly active in the planning process.

(338) At the entrance to one military outpost, U.S. soldiers took precautions against an Iraqi military or terrorist attack. SOLDIER: Any time that a vehicle comes on the post we want to ensure that there is no foreign objects placed in that vehicle the owner may not even be aware of, just normal procedures that we take to counteract any type of terrorists. (2009/08/15, *PBS NewsHour*, COCA)

(339) When and if the President makes the decision that yes, we want to use military force, not in response to a provocation but as a matter of policy, I think that needs a vote in Congress. (1990/11/13, "Debating a debate," *ABC Nightline*, COCA)

In sentences with "a third party" serving as the subject a volitional reading is possible and "it will take an adverse environment for it to be dispreferred or even disallowed" (Bourdin 2003: 349). Indeed, no deontic uses of *want to* with a 3rd person subject were found in my data. As far as uses of core modals + *want to*[169] are concerned, animate 3rd person subjects (sg. and pl.) account for 5.2% of all uses. Cases of *may/might* with inanimate subjects[170] – which are per se incapable of experiencing feelings of desire – are even rarer (0.3%). The four occurrences in COCA (spoken, 1990-94, 2005-09) all express different meanings.[171] In example (340) the speaker seems to suggest that the word 'distorting' should be part of the title of the program.

(340) Go ahead, sir, with your question. ROBERT MUHAMMAD: Yes, I'm Minister Robert Muhammad, with the Nation of Islam […]. The name of this program may want to be reporting or distorting or ignoring. Given these factors […], Clinton with a 10- to 15-point lead, […] it's been said by some analysts that if Clinton and Bush split the South, some say that Bush loses- if you were the bureau chief in Atlanta and found out that the honorable Louis Farrakhan was going to be in Atlanta three weeks before the election […] speaking to 72,000 black people, and he was going to make a great announcement and it may affect which way black people deal with this election, let me ask you a question. Would you report it, would you distort it, would you ignore it, and why? (1992/09/16, "Viewpoint politics and the media: Reporting or distorting?" *ABC Special*, 1992)

In example (341) both an epistemic and a deontic reading make sense. It is possible that philosophers (given that the interests of the discipline are identical to the interests of its practitioners) now wish to become closer to other disciplines. It is also conceivable that the speaker considers this necessary or wants his academic peers to act accordingly. Example (341) is a candidate for epistemic meaning. The speaker deduces that a ship must be on the coast when it is captured. Note that in contrast to other cases of *might want to*, what is meant here is not that it is possible that the ship wishes to be on the coast (volition), but that it might actually be on the coast.

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[169] Two queries for noun + core modal + *want to* / *wanna* + infinitive were run to identify all uses of inanimate subjects that had not been identified on account of their possibly deontic meaning in previous searches. 14.4% of all deontic / directive uses that were found had animate 3rd person subjects, 0.3% inanimate subjects.

[170] Note that uses in which an inanimate entity is used metonymically instead of the people actually performing the action (the publishers for the publications in the example below) were not considered as belonging to this category.

(FN 44) Mr-DOUG-MCLENNAN-: In the future, I think that the important voices will establish themselves […] and traditional publications will want to attach themselves to those important voices. (2006/06/11, "Upon further review, 'stolen child' defies tradition," *NPR Sunday*, COCA)

[171] The meanings of three occurrences could be identified. However, the sense of *would want to* in the following example is harder to grasp:

(FN 45) I tried to, in hours and hours of really relentless interviews of coming back to certain things later, trying to get Faye to slip up -- trying, literally, to trip her up and to see if she would tell things the same way. In many cases, in fact, where writer's license would want to take over, she would say, No. It didn't happen that way. (1994/10/19, "The book that stopped the trial of the century; guests discuss how a new book about Nicole Brown Simpson may affect the O.J. Simpson murder trial," *Independent Geraldo*, COCA)

(341) CONAN: Philosophy, you suggested, was going through a long process of defining itself as distinct from everything else, but now may want to integrate itself a little bit more. (2008/02/13, "'Experiments in ethics' on science and philosophy," *NPR Talk of the Nation*, COCA)

(342) Question No. 3. President Lyndon Johnson had a very bad year in 1968, in addition to fighting the Vietnam War. The U.S. ship Pueblo was captured by what country? A, China; B, Russia; C, East Germany; D, North Korea. The Pueblo. Who grabbed it? […] O'REILLY: When you're deducing, you know, if a ship is seized... […] perhaps it might want to be on the coast. But, no, Eastern Europe did have a little access in the Balkans, as you know, Doocy. (2008/04/15, "'Actor follow-up' segment tonight, all over the country, police," *Fox The O'Reilly Factor*, COCA)

May and *might* are hedges that frequently co-occur with deontic *want* (cf. Table 53 below as well as Hilpert (2012: 74), who lists *want* and *need* as distinctive collexemes of *may* in the 2000s in COHA). Bourdin calls the verb *want* itself is a hedge (2003: 342)[172] that can be combined with other hedges (such as *I think* or *may*) to express obligation. As Desagulier observes, the combination of *want to* (or *wanna*) with *may or might* accentuates the epistemic distance of the speaker towards the advice that is given and attenuates its force. He stresses that "paradoxically," this combination of prototypical modals with *want to* intensifies the deontic meaning (2005a: 404). In example (343), for instance, the speaker accuses the crew of the TV show *ABC Nightline* presented by the main anchor Ted Koppel of not having put sufficient effort into fact checking. At the same time, the utterance seems like a demand for the future.

(343) Ms. GRUNWALD: We know that's an element of this story and I would think you'd be rather concerned before you write these allegations about a man who just might be a good president for this country at a time when we need somebody to make some changes. I think you would want to check out the story a little bit more before you devote a half hourto [*sic*] it (1992/01/23, "Tabloid prints new Bill Clinton infidelity allegations," *ABC Nightline*, COCA)

Krug notes that *want to* and *wanna* are preceded by core modals 5.5% and 2.0% of the time (2000: 158). The ratio is slightly lower in COCA (spoken, *want* to: 1.7%, *wanna*: 0.8% in 2005-09, but no occurrences in 1990-94). Interestingly, while the frequency of almost all of these core modals declines, the use of *may want to* (+17% vs. -20% *may* alone) and *might want to* (+62% vs. -1.3% *might*) increases. Table 53 shows that these two constructions also express deontic meanings or

[172] Based on the observation that modals "might without too much simplification be regarded as 'modal particles' which have lost their historical connection with the inflectional paradigm of verbs" and on the realization that utterances with modals can have "a force somewhat similar to that of a performative," Quirk *et al.* claim that modals have a tendency to develop into pragmatic particles (1985: 147). They observe that *want to* behaves like a pragmatic particle in the following examples:

(FN 46) You want to be careful with that saw. (Quirk *et al.* 1985: 148)

(FN 47) I want to tell you how much we enjoyed last night. (Quirk *et al.* 1985: 148)

Whereas the speaker gives the addressee some advice in example 46, *want to* is a performative verb in 47, i.e. the addressee is, by the very action of uttering these words, performing the action it describes. The fact that it is impossible to express the same meaning with a past tense or a (non-negated) progressive form of *want* constitutes, according to Quirk *et al.*, another point of similarity between *want to* in example 46 and pragmatic particles (1985: 148).

can function as directives more often than others do (cf. example (344)), i.e. in about 50% of all cases.

(344) DAVID-MUIR-1-ABC-# (*Voiceover*) Still fearful, Jessika contacted police, and began the process of getting a restraining order against Jeffrey Marsalis. But just as she thought she was going to get him out of her life, an unexpected phone call. JESSIKA-ROVELL-1V# I got a phone call saying you might want to call the Philadelphia Special Victims Unit, I think they need to talk to you. (2009/07/15, "Match.Com imposter; was it date rape?" *ABC Primetime*, COCA)

All Meanings (in w/m)					With Deontic Meaning / Directive Function (in w/m)					
Preceding Modal	1990-1994	2005-2009	Diff. (%)	χ^2 (d.f. =1)	Preceding Modal	% (av.)	1990-1994	2005-2009	Diff. (%)	χ^2 (d.f. =1)
would / 'd	13.43	12.88	-4%	0.0	*would / 'd*	7.1%	0.64	1.23	+94%	**4.1**
might	6.74	10.90	+62%	**20.9**	*might*	49.7%	2.91	6.14	+111%	**24.6**
will / 'll	5.55	4.95	-11%	0.7	*will / 'll*	20.2%	0.64	1.49	+133%	**7.4**
may	4.01	4.71	+17%	1.2	*may*	51.4%	1.64	2.33	+84%	2.5
should	0.55	0.15	-73%	**4.7**						
could	0.09	0.00	-100%	1.8						
total (N = 1,345)	30.36	33.58	+11%	3.4	total (n=354)	26.6%	5.83	11.19	+92%	**36.1**

Table 53 The frequencies of various modals preceding *want to* in COCA (spoken)

Uses with *will* and *would* are rarer. Bourdin shows that the extent of the scope of *will* is crucial for the interpretation of the meaning of the utterances. If the meaning of *you will want to do X tomorrow* is *I advise that you do X tomorrow* and not *you will be advised to do X tomorrow*, *will* is within the scope *want.* Clues for the interpretation of *want* can often be found in the context after the verb itself (cf. Bourdin 2003: 347). In example (345) it is all the more clear that Oprah orders Ms. Milne to take notes when she feels the need to add the question "OK?" to mitigate the force of the directive. However, the existence of clues after *will* / *'ll want* to is rare in COCA. In the majority of the cases, the speakers announce that viewers *will want to listen to / hear / pay attention* etc. to a particular segment of the program (cf. example (346) below).

(345) Ms-CRYSTAL-MILNE*: (From videotape)* Hi, Oprah. My name's Crystal Milne. I'm […] wondering if you have any great snack ideas for me when I'm feeling really ravenous. WINFREY: Great. OK. You 'll want to take notes for this, OK? Here are four of my little bootcamp secrets. (2006/07/24, "Lose weight this summer with Oprah: Boot camp follow-ups" *Independent Oprah*, COCA)

(346) LARRY KING LIVE. Then, at 10:00 p.m. Eastern, Larry will be talking with Dan Rather. Moving on now to another subject, if your kids are out this evening, you will want to stay with us for what I promise will be a revealing look inside the world of our teenagers. (2005/06/02, "Secret world of teens," *CNN Zahn*, COCA)

In a small number of (formulaic) cases (1.6%), the speaker is actually performing the action that s/he professes wanting to perform (cf. (347) below). Using both a core modal and *want to* makes the utterance seem much more tentative and polite. The most common meanings are epistemicity (cf. example (348)) and (hypothetical) volition (cf. example (349), 71%).

(347) And pretty much the police in today's society act for the powerful against the powerless, the powerless people, and we still continue to see that manifested. I would want to add that I think that the dilemma is Mr. Christopher is involved in and the missing element to the solution is that we have to look at Chief Daryl Gates. (1991/07/09, "New report critical of L.A. police," *ABC Nightline*, COCA)

(348) Well, how do you find the lender? FLYNN: Well, the best way, I think, is through referral. Much like any other professional, you want to talk to your friends and family and see who's had good experience. You may want to use a bank. You want -- may want to use a private lender. They're all available to you. (2005/ 02/12, "Interviews with Chris Swecker, Doug Flynn, Danny Lipford," *CNN House*, COCA)

(349) AASHA-DAVIS: I can't speak for Lyle, but I know if it were me I would want to answer as many questions as possible. (2009/03/26, *CBS Early*, COCA)

Meaning in w/m (N= 1,345)	1990-94	2005-09	Difference	Pearson Residuals	
root	5.8	11.2	+92%	**-3.35**	**3.26**
formulaic	0.8	0.2	-68%	1.93	-1.88
epistemic / volitional	23.4	22.9	-2%	1.83	-1.78
ambiguous	0.3	0.6	+87%	-0.73	0.71
total	30.4	33.6	+11%	$\chi^2 = 36.7$, $p<0.001$, $V = 0.09$	

Table 54 Meanings of *may/might/will/would/should/could want to* in COCA (spoken)

Interestingly, as shown by Bourdin, the co-occurrence of a hedge like *may* or *would* with a lexical verb like *wish*, *prefer*, or *like* can also lead to a deontic interpretation of a verb that would otherwise not be associated with an obligation meaning (2003: 342). Example (350) is clearly a request for more comment on a particular detail. Example (351) can be understood as a demand to change the phone message.

(350) But, David, you may wish to comment in a little bit more detail on that one. WILBY: I think that was covered very well yesterday. (1999/03/26, "NATO holds news briefing on Kosovo," *CNN Event*, COCA)

(351) JENNINGS And, finally, to Jeff Greenfield. Are you going to depart from the crowd as you so often do? GREENFIELD: Well, Jerry Brown is the most improved, but every time I call that 800 number, I wind up with paintings of Elvis Presley on velvet, so he may need to work on that phone message a little bit JENNINGS All right, Jeff. (1992/03/10, "The '92 vote: Super Tuesday primaries," *ABC Special*, COCA)

A small investigation into the use of *may|might wish to*, *need to*, *like to*, *start to*, *try to*, and *you may / might have to* in COCA (spoken) shows that 8.6% (16 of 187 occurrences) of all uses in 1990-94 and 4.4% (6 of 137 occurrences) of all uses in 2005-09 express deontic meaning or function as directives ($p<0.01$, d.f.=1). There is thus no tendency towards an increase as in the case of combinations of core modals and *want to*. This finding suggests that the increase in the use of obligation and advice is only tied to the verb *want to* (with and without *may / might etc.*) but not to related verbs like *wish to*, *like to*, *need to*, or *have to.* (Note that the decrease with *need to* and *have to* (-50%) is less pronounced than that with *wish to* and *like to* (-100%).) Yet it needs to be kept in mind that this is only a small-scale analysis that may not be representative.

Finally, it may be of interest to discuss epistemic uses of *want to* and *wanna.* Bolinger stresses that in contrast to *desire* and *wish*, *wanna* can be used epistemically. However, in the two examples he gives (cf. examples (352) and (353) below), *wanna* clearly has a deontic meaning. What the speaker suggests in example (352) is *Be careful*, *you need to be*.

(352) Pick it up with both hands. You wanna be careful it doesn't fall.

(353) There wants to be a little more circumspection in all this. (Bolinger 1980b: 295)

Examples of epistemic meanings expressed in clauses with inanimate subject referents are recorded by Krug (2000: 149-150) for BrE and by Loureiro-Porto for Hong Kong English (2016: 158):

(354) Customer: Do you ????? coolers?

Assistant: Coolers? They wanna be on one of the top shelves somewhere. (Krug 2000: 149-150)

(355) …the figure sixty forty seven forty five want to have been multiplied by point nine five (Loureiro-Porto 2016: 158)

In the data sample from COCA analyzed here, no occurrences of epistemic *want to* or *wanna* were found. It seems that these uses are rare exceptions. Currently, the most important change in the use of *want to* and *wanna* is the rise of deontic meanings. Arguably, this process is still in its early stages, but in light of the particularly polite character orders with *want to* can have it seems very likely that we will be witnessing a further increase of this meaning in the near future.

6.2.6. *(Had'/'d) better* and the Comparative Modals

Previously neglected as a marginal, semi-, or quasi-modal that is usually not included in the list of traditional modals (cf. Jacobsson 1980: 47), *(had'/'d) better* has received considerable attention in the early 2010s (cf. Denison and Cort 2010, van der Auwera and De Wit 2010, van der Auwera *et al.* 2013, Mortelmans and Vanderbiesen 2013, Van linden 2015[173]; another study that is often referenced is Mitchell 2003). Van der Auwera and De Wit (2010: 127) introduced the term 'comparative modals' for the constructions listed in (356). The most frequent member of this family is *(had'/'d) better*. Its diachronic development is extensively discussed in Denison and Cort (2010: 349-364).

(356) *had best*, *'d best*
had better, *'d better*, *better*
would rather, *'d rather*, *had rather*, *should rather*
would sooner, *'d sooner*, *had sooner*, *should sooner*
may (just) as well, *might (just) as well*, *would (just) as soon as*

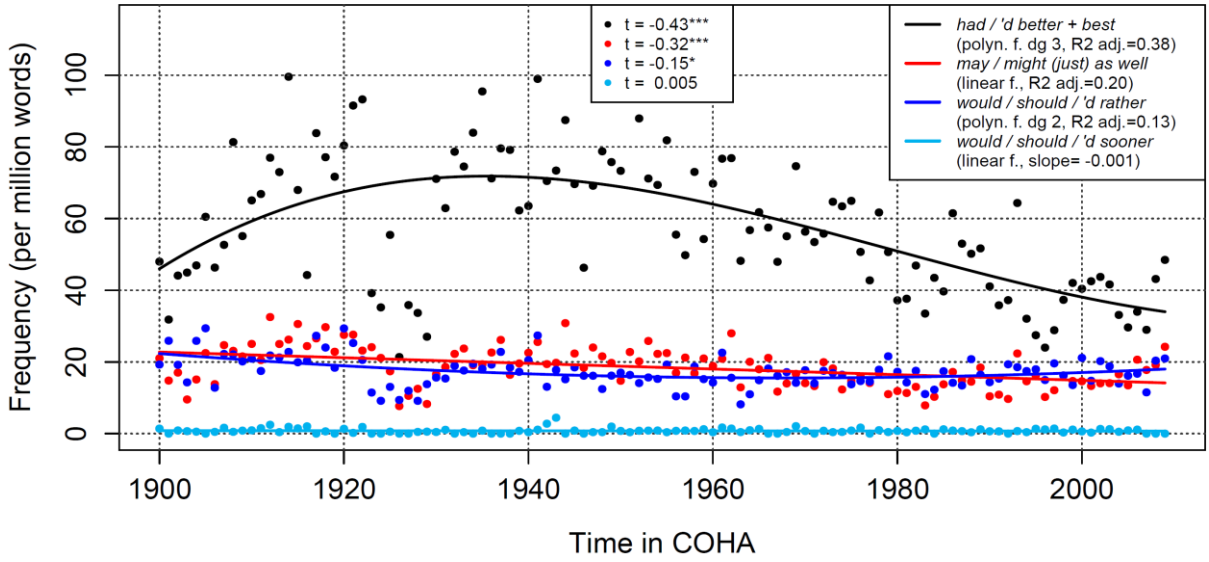

Figure 48 Comparative modals (iwcm) in COHA

Figure 48 illustrates that the use of almost all of these expressions declines in COHA, *(had'/d) better / best* after a peak in usage in the 1930s and 1940s. The only exception is *would (just) as soon as* (not depicted), whereas the frequency of *would / should / had'/'d sooner / rather* stays

[173] The frequencies that Van linden obtains in her analysis of COHA – ranging between 0.7 w/m in 1970-2009 and 1.5 w/m in 1930-1969 in the 20th century (2015: 203) – are remarkably low compared to the numbers gathered here and to van der Auwera *et al.*'s data for written BrE (25.6 w/m for *(had'/'d) better* in the BNC) and written AmE from COCA (25.9 w/m), especially considering that the data from COCA were reused for the compilation of COHA (cf. Davies 2012: 125) and that negated forms are included by both Aarts *et al.* (2013) and Van linden (2015; she also includes *just* + infinitive), whereas I additionally subtracted uses of *(had'/'d) better* + *have* + past participle. A search for *had better* + infinitive in the 2000s alone yields more than the 77 occurrences found by Van linden for 1970-2009. However, the numbers from van der Auwera *et al.*'s analysis of spoken language in COCA are very close (2013: 126). Topics such as the standard of comparison, the subject types, and the history of *Ø better* will not be explored here, but are discussed by van der Auwera *et al*. (2013) and Van linden (2015).

virtually constant. The frequencies of *(had/'d) better* and *(had/'d) best* are combined; the latter only account for up to 16.8% of the total value (on average for 3.8%, mean: 2.2 w/m, sd: 1.7 w/m, τ = -0.16*, cf. also right panel of Figure 49). *Might as well* (mean: 13.7 w/m, sd: 4.0 w/m, τ = -0.05) and *may as well* (mean: 3.1 w/m, sd: 2.9 w/m, τ = -0.45***) are also particularly frequent. With *just*, both constructions are relatively rare (mean: 1.7 w/m, sd: 1.4 w/m, τ = -0.35***). *Rather* and *sooner* are most frequent in combination with the short form *'d*, and least frequent with *should.* In the following, the analysis will focus on *(had/'d) better* and *best.* Constructions with *rather* and *sooner* will not be considered since they are generally not used to express advice or orders but to make explicit comparisons between two options (cf. example (357) below; Van linden speaks of "preference or comparative volition," 2015: 194). Westney observes that they express volition rather than obligation or necessity (1995: 30).[174]

(357) And at one point, for instance, I said, a question he could never have anticipated, because I hadn't either, and I said, "A lot of people say that you feel so strongly about the war on terror that you'd rather lose to a Democrat than to the terrorists." (2006/05/12, "David Frost on interviewing," *CNN International*, COCA)

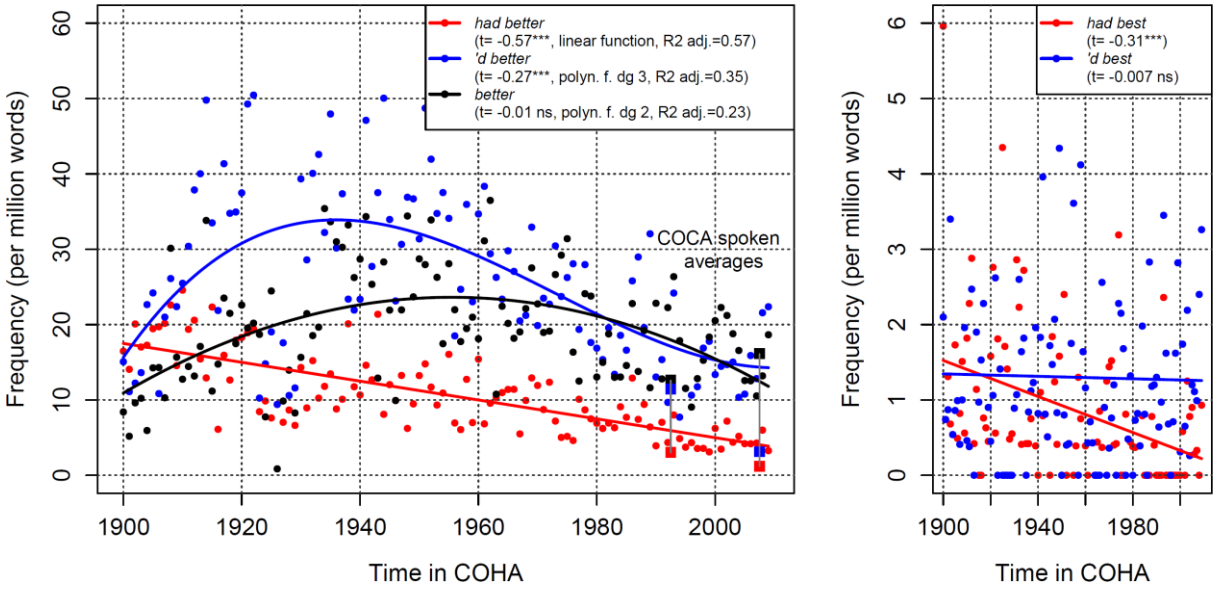

Figure 49 *(had/'d) better* and *('d) best* (iwcm) in COHA[175]

The left panel of Figure 49 reveals some parallels to developments in the Brown family of corpora (BrE/ AmE) and CLMETEV (BrE), but gives a more refined picture of the changes. Both the number of occurrences of *'d better* and *better* is slightly higher in the 2000s than in the 1900s, after a period of increase towards the middle of the century and peaks in the 1930s and 1960s respectively. The most frequent form in the 1960s is *'d better*, but a dramatic decline can be observed towards

[174] Surprisingly, Westney, who classifies *had better* as an item fulfilling the criterion of phonological reduction (a characteristic of modal auxiliaries), considers it not to be met by the *rather* and *sooner* group of modals (1995: 33-36).

[175] An automatic retrieval of all occurrences from the corpus would not have been possible if the infinitive had not been included in the search command. See Appendix A.3 for the queries that were used here.

the end of the 20th century. *Had better* gradually decreases in use in COHA as well as between 1850-1920 (CLMETEV) and in late 20th in BrE (BNC, van der Auwera *et al.* 2013: 132). Since CLMETEV only contains works of fiction and since between 48% and 53% of the sources in that period in COHA are fictional texts, the data are only roughly comparable. More information about AmE comes from Myhill. He notices that the use of ∅ *better* "sharply increased" after the Civil War (1995: 157), a claim which is not directly put to a test here. Leech detects a decrease in the use of *(had) better* between 1961 and 1991/2 in AmE corpora of the Brown family (2003: 229) – a development that is conform with the decline in the use of *(had/'d) better* observed in the second half of the 20th century in COHA.

Figure 49 equally features the frequencies in spoken language (all irrelevant cases were excluded via manual analysis). Surprisingly, the frequencies of all variants except ∅ *better* are lower in the spoken language section of COCA than in written texts. According to van der Auwera *et al.*, *(had/'d) better* mainly occurs in direct speech in written language in the BNC (the numbers are based on the analysis of samples of 200 occurrences per form), so the authors conclude that it is "cognitively entrenched as [a] conversational feature[…]" (2013: 128). In COHA the corpus section in which it is most frequently used is fiction, where it is more than three times as common as in the magazine section in the 2000s. It occasionally also occurs in non-fiction books, even in the headlines of scientific articles (cf. example (358) below).

(358) Miller, Mark J. S. and Matthew B. Grisham (1995) "Nitric oxide as a mediator of inflammation? – You had better believe it." *Mediators of Inflammation* 4.6: 387-396.

Evidence from the Brown family of corpora suggests that *(had/'d) better* is equally frequent in written BrE and AmE (cf. van der Auwera and De Wit 2013: 130, but see Biber *et al.* 1999: 487 for a different finding). Yet van der Auwera *et al.* notice that *('d) better* is a lot more frequent in spoken BrE (BNC) than in spoken AmE (COCA, 2013: 127). A closer analysis shows that the most common form in the BNC, *'d better* (46 w/m), is particularly common in medical and legal consultations (often in situations where the recording modalities are of the topic of the conversation) and in face-to-face spontaneous conversation, thus in very informal contexts. That *'d better* is more frequent in these settings than in the American data might be due to the particular character of the spoken language section of COCA because here the conversations do not take place under the same near-natural conditions as in the BNC (cf. Ch. 4.1 above).

Semantics

The semantics of (*had/'d) better* has sparked many lively discussions in recent years. One issue of debate is the subjectivity of the verb. Perkins is convinced that (*had/'d) better* is solely an expression of deontic modality. He considers it to be "objective in that the deontic source is not (directly) identifiable as the speaker" (1983: 63) – a claim that is later heavily criticized by Mitchell (2003: 141-142), Collins (2009a: 79), and van der Auwera and De Wit (2010: 134-135). All of them stress

that (*had/'d) better* is primarily subjective: Mitchell draws attention to examples such as (359), which he marks as ungrammatical, Collins points to the frequent use of (*had/'d) better* with 2nd person subjects (in 62% of all cases, 2009a: 79), and van der Auwera and De Wit demonstrate in their analysis of the Brown family of corpora that 126 of 137 occurrences of the *better* modals are subjective (2013: 135). The mainly subjective character of (*had/'d) better* is also underlined by Huddleston and Pullum (2002: 196).

(359) *One had usually better take a taxi to be sure of getting to the airport on time. (Mitchell 2003: 141)

Defining the core meaning of (*had/'d) better* has been another aim of many researchers. Jacobsson observes that its meaning is negative and can be paraphrased as "the obligation to avoid ill consequence" (1980: 52). He considers the central meaning to be advisability, while elements of threat, exasperation, and resignation to the inevitable can be inferred from the context (Jacobsson 1980: 52). Altman reports that native speakers rank *better* just after *must* and *have to* (but before *should* and *BE supposed to*) when they are asked to identify the strongest expressions of obligation (1986: 82-83). Mitchell stresses that *had better* implies that the speaker believes the proposed action to be better (or at least not worse) than its alternative. It is often used to give "mitigated commands" to others or to "announc[e] decisions about one's own behavior" (2003: 143). Mortelmans and Vanderbiesen (2013: 301) see the main difference between English and German comparative modals in the directive character of the former and the (generally) purely deontic nature of the latter. Apart from drawing attention to its frequent use with 1st and 2nd person subjects, they underline their claim with a reference to the rare use of *better* with a counterfactual meaning or with a standard of comparison (a sign of grammaticalization). In my sample from COCA, directive utterances account for less than a quarter of the uses, whereas simple subjective meanings account for 36% (cf. Table 55 and the discussion below). These findings confirm that the core meaning of (*had/'d) better* is indeed advisability.

Another topic of controversy is the existence of epistemic uses of *had better*. Perkins (1983: 63) and Westney (1995: 181, 183) claim that *had better* cannot be used epistemically. However, Mitchell is convinced that the speaker "expresses the hope that it is an important matter (and an alternative utterance in this context would be *I hope it's important*)" in examples like (360) and (361). In his opinion, this hope is a type of epistemic volition: "a wish that a proposition whose truth is unknown turns out to be true" (Mitchell 2003: 145).

(360) "Kurt here. I have urgent information. There have been serious developments. Can we meet?..." "I'll meet you in the lobby of the Frankfurter Hof half an hour from now. It had better be important." He slammed down the phone before Meyer could reply… (BNC ARK2617)

(361) I had hoped she would be able to get rid of Dennis quickly, but it was almost 4 o'clock before the red BMW finally appeared and roared away in the direction of the ring road. By that time but I was chilled to the bone exhausted from the relentless battering of the traffic, sullen and depressed. This had better be good, I thought

> grimly as I crossed the road and walked up the cul-de-sac to the Parsonage. This had better be bloody good. (BNC BMR408, both examples quoted by Denison and Cort 2010: 369; short version in Mitchell 2003: 145)

By contrast, Collins argues that *(had/'d) better* should rather be considered deontic, "with the speaker anticipating a required outcome (… *This must/will have to/will need to be good*…)" (2009a: 19). Similar doubts about the correctness of Mitchell's conclusions are expressed by Denison and Cort (2010: 370):

> Epistemic volition is a possible characterization of that part of meaning of BETTER concerned with the truth of the proposition ('I wish it were true/ I wish it to be true'), but it fails to capture that part of the meaning in which the speaker not so much comments on the truth of a proposition as actually tries to influence events (if only counterfactually) by impressing a course of action on a participant imposing an obligation.

Denison and Cort prefer characterizing these meanings as having both an epistemic and a deontic element, referring to Coates (1983) as another specialist who acknowledges the coexistence of two elements of meaning in one utterance. Denison and Cort argue that *better* can be directive and speculative at the same time, when the speaker is both "imposing a retrospective obligation on a speech participant" and "making a judgement about the truth of the proposition" (2010: 370-317). Van der Auwera and De Wit agree with Mitchell insofar as hope is expressed in these two cases and believe that it is difficult to consider them deontic. However, they do not see any reasons for calling them 'epistemic.' "Since hope is a kind of wish, the technical term one would want to associate with these uses should be 'optative (modality)'" (2010: 133). Both van der Auwera *et al.* (2013: 123-125) and Mortelmans and Vanderbiesen (2013: 287-288) use the term 'optative modality.' In my opinion, a deontic meaning and an element of hope are present in these instances. Hoping, i.e. wishing, that something will occur is indeed, as van der Auwera *et al.* stress, "quite different from judging it to be true" (2013: 124). However, the label 'optative modality' seems to place prominence solely on the meaning of hope, while any implications that the speaker will be frustrated or that there will be unpleasant consequences if the situation is not as the speaker would want it to be (as in Mitchell's example above) seem to be ignored. Yet my analysis shows that in most cases the speaker expresses hope (cf. example (362) below), but not necessarily anger. The term 'optative' is thus used here as well. About 4.8% of all occurrences of *(had/'d) better* in COCA (spoken) have this sense.

(362) But that's everybody's nightmare who's working off a prompter, suddenly you look up and it ain't moving BLITZER They <u>better</u> have a good prompter operator and good backup technology down there. I hope they do (2005/09/15, "French quarter on its way to return to normalcy; Bush to address nation tonight," *CNN Situation Room*, COCA)

Despite the increased interest in *(had/'d) better* in recent years, information about the frequency of this use is only given by van der Auwera and De Wit (2010: 136).[176] They analyze the meaning of occurrences with inanimate 3rd person subjects, finding one optative and three deontic uses in Brown and one optative meaning as opposed to eight deontic meanings in Frown. Optative meanings are more frequent in LOB and FLOB, yet the numbers are too low to allow meaningful conclusions. The current analysis thus certainly fills a gap in knowledge.

The examination of 1,010 occurrences (601 Ø *better*, 313 *'d better*, 92 *had better*, 5 of *(d') best*) in the spoken language section of COCA shows that *(had/'d) better* primarily serves as means to utter directives and express subjective deontic meanings. Objective deontic meanings are extremely rare. There are only a few references to collective wishes (cf. example (363) below) and to the opinion of one or several other people (descriptive, cf. example (364)).

(363) A billion to a billion and a half dollars are needed in investments and in recoverable losses before the country can start to be productive again. So amid all the joy here tonight, there's a certain resolution here, a resolve that the country had better get on with its business. Peter? (1990/01/03, "Noriega turns himself in, is flown to U.S.," *ABC Nightline*, COCA)

(364) SAM CHAMPION, WABC-TV, N.Y METEOROLOGIST Well, Larry, last night on this show we told people and all the experts agreed in Broward and Dade Counties they better shut her up and get ready for this storm. (2005/10/24, "Hurricane Wilma's impact," *CNN King*, COCA)

Meaning in w/m (N= 1,014)	1990-94	2005-09	Difference	Pearson Residuals	
deontic / optative	0.91	1.39	+52.3%	-1.58	**3.82**
objective deontic / descriptive	1.09	0.89	-18.4%	-0.17	0.35
subjective deontic / directive function + add. meanings	25.13	18.03	-28.2%	0.43	-0.86
indeterminate	0.18	0.20	+8.8%	-0.34	0.75
total (iwcm)	27.31	20.51	-24.9%	$\chi^2 = 22.8$, $p_{fe}=0.14$, $V = 0.09$	

Table 55 Meanings of *(had/'d) better* and *('d) best* in COCA (spoken)

All instances in which the speaker merely expresses advice or voices a personal opinion are categorized as subjective deontic meanings. In example (365), for instance, Sam Donaldson believes that it would be preferable (and probably in his own interest) for the president to develop a certain toughness. Cases in which the speaker is in a position to exercise authority over the speaker and gives a direct order are considered directive utterances. A pertinent illustration is example (366). Here Michael Jackson tells a child to ask his father for permission to call Michael 'Dad.' There are also a certain number of cases in which it is hard to tell whether the speaker has any authority over the addressee or whether s/he only gives advice (cf. example (367), where the speaker tells his interlocutors what to do when the airline gives them any information). These instances were classified as subjective deontic with a (possibly) directive function.

[176] Even Collins (2009a), usually a dependable source of detailed information about the different meanings of almost all (semi-)modals, merely describes different shades of meaning without specifying their frequency of use.

(365) ROBERT-REICH-1THE# You know, one of the great strengths of this president, I don't think he has a mean bone in his body. […] SAM-DONALDSON-1-A# (Off-camera) He better develop a toughness. (2009/05/10, "The roundtable; economic mending," *ABC This Week*, COCA)

(366) Mr-M-JACKSON: (Audiotape) I know I'm healing him. He says, I need you, Michael. And then he calls me dad. I go, You better ask your dad if it's OK for you to call me that. He goes, Dad, is it OK if I call Michael dad? He says, Yes. He says, No problem. (2009/09/25, "The source," *NBC Dateline*, COCA)

(367) K. DOLAN: Exactly right. And, by the way, be careful when that airline tells you something. You better check them out. (2005/02/26, "A look at eminent domain, Interview with Dan Glickman, head of the Motion Picture Association of America," *CNN Dolans*, COCA)

Meaning in w/m (n= 916)	1990-94	2005-09	Difference	Pearson Residuals	
subjective deontic	10.38	6.79	-34.6%	0.82	-1.62
subjective deontic (p. directive function)	8.19	7.08	-13.6%	-0.80	1.69
subjective deontic (directive function)	5.14	3.12	-39.3%	0.87	-1.70
subjective deontic / adverse consequence	0.55	0.50	-9.3%	-0.28	0.60
directive utterance / adverse consequence	0.68	0.40	-42.0%	0.38	-0.73
+ threat	0.18	0.15	-18.4%	-0.07	0.14

Table 56 Subjective deontic meanings of (*had/'d) better* and *('d) best* in COCA (spoken)

Denison and Cort find "just a handful" of cases in which speakers use *had better* to utter threats or suggest an adverse consequence in the Brown family of corpora and in a sample of 200 uses in the BNC (2010: 372). In my data speakers mention adverse consequences if the situation is not realized as described in about 4.4% of all cases in COCA (spoken). Simple advice (cf. example (368) below) is given in roughly half of these utterances; in others, such as in example (369), where the addressee is told to leave the premise, speakers give orders.

(368) But the minute she announces, she's going to have to have a plan about how to get rid of Iraq. I mean, she's actually suggested maybe we should send in more troops and she better have a Nixon-esque secret plan or I think she's in trouble. (2005/09/25, *MSNBC Meet the Press*, COCA)

(369) SOCKS: That's it. You better get out of here or I'll have the FBI come and get you. (1994/03/24, "Whitewater revelations are frightening," *Independent Limbaugh*, COCA)

0.7% of all utterances are simple threats in which the adverse consequences are not directly mentioned but can easily be deduced. A case in point is example (370). Here the speaker implies that he will hurt Heather's family if she does not comply with his wishes.

(370) HEATHER And that's when Tim called me with the news. He said, "Well, you better sit down, because I have pictures of your family and there's no mistake." (1992/12/18, "The long journey home," *ABC 20/20*, COCA)

These additional meanings (e.g. threats or allusions to adverse consequences), which set (*had/'d) better* apart, are thus actually rare. As the use of (*had/'d) better* declines, their share remains stable (5.1% in both 1990-94 and in 2005-09), which suggests that they stay integral components of the

verb's semantics. The particular character of (*had/'d) better* is also mirrored in the fact that most distinctive collexemes attracted to *must* and *should* (e.g. *say*, *see*, *know*, *hear*, *put* etc.) are repelled by the semi-modal (cf. Table 57 below). A considerable number of mental verbs (such as *believe*, *hope*, *enjoy*, *detect*, *assess* etc., cf. Biber *et al.* 1999: 360-371) collocate with (*had/'d) better. Understand*, which often occurs in mental focus uses (e.g. with *must* or *need to*), is one of them ($p \leq 0.001$). However, there are only three uses of (*had/'d) better* that can be understood as requests to focus on a particular aspect of the situation that is discussed. In example (371), for instance, the physics professor Dr. Park explains why Venus, the Earth, and Mars are very different planets.

(371) Venus is the closest, then the Earth, then Mars. They are very different planets, and we had better understand why, because only one of those planets is livable. Venus is so hot that lead on its surface would be molten. Mars, on the other hand, I mean, a good summer day near the equator, you might get up to freezing, and at night it's going 250 degrees below freezing. (1993/08/24, *CNN Crossfire*, COCA)

$p \leq$	Attracted Lexical Verbs	Repelled Lexical Verbs
0.001	*get*, *believe*, *understand*, *hurry*, *place*, *watch*, *hope*, *start*, *check*, *protect*, *enjoy*, *coordinate*, *wake*, *handle*, *listen*, *inform*, *shape*, *hold*, *learn*, *duck*, *call*, *manage*, *beware*, *heed*, *detect*, *shut*, *stop*, *sit*, *prepare*, *batten*, *behave*, *assess*, *predict*, *figure*, *secure*	*say*, *see*, *know*, *hear*, *put*, *tell*, *thank*, *ask*, *work*, *talk*, *continue*, *happen*, *point*
0.01	*define*, *explain*, *control*, *organize*, *lock*, *find*, *educate*, *fix*	*raise*, *remember*, *show*, *use*, *cut*, *decide*, *play*, *feel*
0.05	*enable*, *appreciate*, *identify*, *settle*, *stick*, *rethink*, *design*, *ride*, *clean*, *communicate*, *serve*, *react*, *reflect*, *slow*, *love*, *treat*, *bet*	*admit*, *add*, *pay*, *speak*, *mention*, *provide*, *spend*, *answer*, *build*, *share*, *wait*, *consider*, *wonder*, *act*, *go*, *live*, *remain*, *end*, *remind*, *sell*, *reach*, *write*, *create*

Table 57 Distinctive collexemes of (*had/'d) better / best* in COCA (spoken, 1990-2012)

The majority of the other attracted collexemes are verbs denoting activities (e.g. *get*, *move*, *hold*, *sit*, *watch*, *check*, *fix*, *clean*, *control* etc., Biber *et al.* 1999: 360-371), which is in keeping with the finding that (*had/'d) better* is mainly used to give advice or orders that a particular action be taken.

6.2.7. *Be supposed to*

In COHA *be supposed to* is one of the few verbs that continually increase in use between 1900 and 2009 (τ = 0.65***, +20 w/m, cf. Figure 50). It is more frequent in the spoken language section of COCA than in the written texts of COHA (49 w/m vs. 24 w/m between 1990 and 2009). However, a trend is harder to detect in COCA, tending towards a decline rather than an increase (τ = -0.13 ns, slope = -0.27 w/m). Collins suspects that *supposed to* may be replacing *ought to* (2009a: 80), but both verbs decrease in spoken AmE[177], *ought to* even much more drastically (-74%, -151 w/m) than *be supposed to* (-11%, -6 w/m).

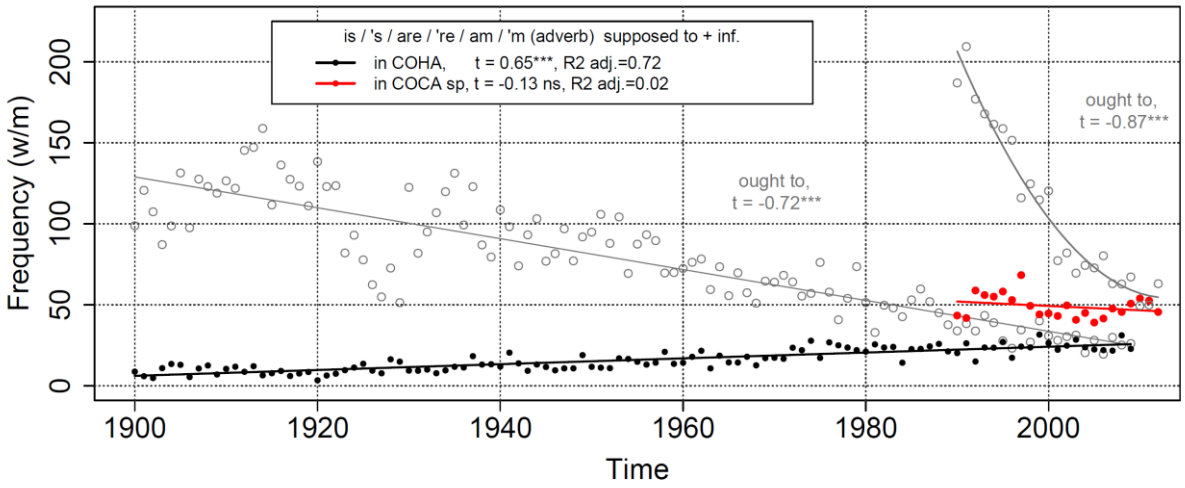

Figure 50 *Be supposed to* (vs. *ought to*) (iwcm) in COHA and COCA (spoken)

Discussions about *be supposed to* mainly focus on its semantic development (cf. Noël and van der Auwera 2009, Moore 2007, Berkenfield 2006, Visconti 2004, Ziegeler 2003, and the comments in Larreya 2001). The central question is whether this development is compatible with grammaticalization theory. Early uses (such as example (372) below) have been considered to express epistemic meanings (cf. also example (373)). Since they appear more frequently prior to deontic meanings, *supposed to* would constitute a counterexample to the unidirectionality principle of grammaticalization theory if they were indeed epistemic (cf. Mair 2004: 137, who attributes this to the epistemic meaning of the lexical verb *suppose*, which is considered the source of *be supposed to*).

(372) This is thy doghter which thow hast supposed To be my wyf. (Chaucer (c.1390) *Canterbury Tales*, *Middle English Dictionary*)

(373) THE obituaries for Philip Larkin included an account of his attendance at an amateur boxing match in Hull It was a bout of poor quality and the writer is supposed to have murmured: "Only connect." (BNC A35 101, both examples quoted by Noël and van der Auwera 2009: 607, 600).

[177] Even when the entire lemma is considered (cf. right panel of Figure B.10 in Appendix B.3), the frequency of *BE (*) supposed to* in COCA (spoken, average: 1990-92: 85 w/m) is much lower than in DICE (BrE 1990/92, 178 w/m) and LCASE (the estimated number estimated by Leech *et al.* (2009: 287, 100) is 364 w/m; Mittmann (2004: 111) lists 303 w/m). The factor corpus composition seems to play an important role here.

Visconti argues that there are three stages: "Shifting from evidential to deontic then epistemic, the construction is a counterargument to the claim that epistemic meanings arise later than deontic ones" (2004: 186). For Berkenfield, who proposes a more complex map of meanings, *supposed to* "is not really a counterexample" to the usual grammaticalization pattern (2006: 40-41). An overview of the different positions is given in Noël and van der Auwera (2009). Since the focus of my study does not lie on the historical development, suffice it to say here that in a footnote that has often been overlooked Traugott suggests that epistemic and deontic meanings have their origins in different senses of "two coexistent paths of development from the two senses 'expect' and 'c that were borrowed with the form *suppose* from Middle French" (1989: 45). The 'expect' sense developed a deontic meaning, following the path from expectation via volition/intention to obligation (cf. Traugott 1989: 51). Noël and van der Auwera support this claim by offering more examples from Middle English as well as typological evidence for the volition > obligation path and by showing a parallelism between *be supposed to* and *be expected to* (2009: 607-612). The semantic development of *be supposed to* can thus be reconciled with grammaticalization theory.

Semantics

The semantic analysis of *be supposed to* in COCA (spoken) is based on data from 1990 and 1991 (169 and 152 occurrences) as well as from 2008 and 2009 (54 and 137 occurrences). Including more occurrences of the verb from 1992-1994 and 2005-2007, as in the case of (*had/'d) better*, was not deemed necessary because roughly 500 uses constituted a database big enough for making reliable claims. As outlined in Ch. 4.7 above, the search is restricted to affirmative present tense forms. There is a marked decline from 38 w/m in 1990-91 to 25 w/m in 2008-09. This decrease primarily affects the full forms (*am*, *are*, *is*, -56%), whereas contracted forms hold their ground (with a frequency of ~15 w/m in both 1990-91 and 2008-09). This difference can be explained by a tendency towards more colloquial and informal language in which contracted forms are preferred (cf. Ch. 3.3 and the references therein).

Meaning in w/m (n= 512)	1990-1991	2008-2009	Difference	Pearson Residuals	
subjective deontic	1.28	0.79	-38%	0.33	-0.63
objective deontic	31.48	20.12	-36%	1.42	**-2.77**
dynamic	0.12	0.26	+126%	-0.57	1.54
epistemic	2.44	2.37	-3%	-0.39	0.83
epistemic / deontic	1.97	1.58	-20%	0.00	0.00
total (iwcm)	37.29	25.11	-33%	$\chi^2 = 13.7$, p_{fe}=0.53, $V = 0.08$	

Table 58 Meanings of *be supposed to* in COCA (spoken)

Table 58 shows that *be supposed to* mainly expresses root modality today. Merely 8.0% of all occurrences express epistemic meaning (such as example (374) below).

(374) Mr. PERIZEAU: Oh, but the Swiss, for instance, are supposed to be very reasonable and democratic people (1990/04/27, *CNN Crossfire*, COCA)

Cases in which both a deontic and an epistemic interpretation are possible are less common (5.8%). One example is (375), where the speaker could mean that the appearance of the stars is planned and expected or that it is assumed that they are already there.

(375) ROBIN-ROBERTS-1-A# *(Off-camera)* … Oscar winning actor Forest Whitaker, and Academy president Sid Ganis are going to announce the names in mere minutes. In mere seconds. Where are they? Step out. Come on. They're supposed to be there. Oh, there they are. (2009/01/22, "81st Academy Award nominations; predictions and nominees," *ABC Good Morning America*, COCA)

There is also one instance of *be supposed to* with a dynamic meaning. In example (376), the purpose of the cells affected by the AIDS virus is determined by nature. In his study of the 25 occurrences of *be supposed to* in C-US, Collins similarly finds only one dynamic use, with a reference to the natural behavior of fish (2009a: 80). By contrast, in Verhulst *et al.*'s analysis of 400 occurrences of *supposed to* in the BNC, the number is much higher – circumstantial utterances account for as much as 64%. However, Verhulst *et al.* consider uses such as example (376) cases of circumstantial necessity, which may explain why the high discrepancy to Collins' (4% in C-US and 3% in ICE-GB, 2009a: 80) and my own analysis (0.2%) in which occurrences such as example (376) – where the obligation seems to be the result of a human arrangement, plan, or order – were treated as deontic and objective.

(376) So epidemics have always been self limiting [*sic*] and this has happened very fast in certain virus diseases such as the epidemic in 1918. The AIDS virus kills the very cells that are supposed to protect us and to protect us also from other inflections. (1990/03/29, *PBS NewsHour*, COCA)

(377) About quarter to eight he shoots through to the other room and finds Dick and Joy Hardy here, they were supposed to be picking Gwen up and bring her round. (BNC GUD 845, quoted by Verhulst *et al.* 2013: 210)

There are also a few cases in which no rule, regulation, situation, or plan exists and in which the speaker is the origin of the obligation. In example (378) the speaker expresses that everybody should be capable of protecting his or her home. An alternative reading (*I think you are expected by society / the administration etc. to be able to protect your home*) is possible, but less likely.

(378) If you can have a gun inside your home for your protection, this is our home, this is our home. You might have' em piled on top of each other, but this is our home. And I think that you're supposed to be able to protect your home. (1991/06/13, "Law and order; disarming proposal; hostage to politics?," *PBS NewsHour*, COCA)

Meaning in w/m (n= 426)	1990	2009	Difference	Pearson Residuals	
schedule, plan	1.0	1.3	26%	-0.64	1.45
intention	6.5	5.0	-23%	0.12	-0.24
rule, regulation, contract	19.5	9.5	-51%	**2.30**	**-4.29**
reported directive	2.0	2.8	40%	-1.12	**2.60**
expectation	2.4	1.6	-35%	0.38	-0.73

Table 59 Objective deontic meanings of *be supposed to* (iwcm) in COCA (spoken)

If we want to take a closer look at objective deontic uses, we can distinguish five meanings. Yet it has to be stressed that the distinction between them is not always clear-cut and different classifications are conceivable in some cases. A schedule, plan, or arrangement is described in example (379). These uses are relatively rare, accounting for only 4% of all occurrences. Example (380) can be paraphrased with *The test is intended / meant to…* or *The purpose of the test is….* When the effect an action is meant to have is described, the meaning is classified as 'intention.' Almost 19% of the occurrences can be considered to belong to this category.

(379) Amb. al-ASHTAL: We certainly wish that there won't be a shooting war. There certainly is a lot of role for the United Nations. I actually welcome now the efforts of the Secretary General, who is supposed to meet with the Iraqi authorities. (1990/08/26, *CNN News Sunday*, COCA)

(380) The tests are supposed to help circumvent kidnappings and baby swapping, but the private investigator says there are ways to get around DNA tests. (2008/01/20, "To catch a baby broker; hidden camera investigation into illegal international adoption," *NBC Dateline*, COCA)

Utterances in which a fixed rule, a law, or a contract is the source of the obligation constitute the majority (57%)[178] of all objective deontic utterances. This meaning undergoes a statistically significant decline (cf. Table 59 above), from 52% in 1990-91 to 38% in 2008-09. Medical instructions (cf. example (381) below) are considered reported directives. In 8% of all uses of *supposed to* in my sample, an order is given to somebody specific.

(381) These are $450 to $500 a month, depending on where you go. None less than $450 anywhere, except for Canada. I'm supposed to take 12 a day. And this keeps my Crohn's under control. (2009/08/15, "California state of emergency," *CNN Miscellaneous*, COCA)

In some cases, such as in example (382), there is no plan or rule, but still an expectation (e.g. by society) that somebody acts in a certain way.[179] These uses account for ~6% of all occurrences.

(382) GREENFIELD *voice-over* Such sentiments may seem almost subversive at a time when we know we are supposed to feel otherwise, when memories of magazine covers and images from today's television screens offer tidings of familial comfort and joy. (1990/12/25, "Christmas day 1990," *ABC Nightline*, COCA)

In conclusion, we can say that *supposed to* is mainly used to express obligations resulting from rules, regulations, and contracts (46.3%). Moreover, it needs to be pointed out that reported directives, which do, however, only account for a small share of all occurrences of *be supposed to* (7.8%), significantly increase in use.

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[178] This ties in with findings that *be supposed to* often co-occurs with mental verbs (17 collexemes) and activity verbs (13 collexemes, cf. Table F.10 in Appendix 6). It is less frequently used with relationship verbs (6 collexemes), causation and occurrences verbs (5 c.), communication verbs (3 c.), and aspectual verbs (1 c.).

[179] These utterances resemble those uses of *be to* that Declerck qualifies as having "some sense of necessity" with "rather indefinable" origins (2010: 280).

(FN 48) "I'm broke! I've lost everything. What am I to do now? (The M-origin [i.e. the origin of the necessity] is as vague as in *What am I supposed to do now*?)" (Declerck 2010: 280)

6.2.8. *Be bound to*

Be bound to is a rather infrequent expression (cf. e.g. Coates 1983: 42-43, Collins 2009a: 87) only occasionally mentioned in discussions of modal verbs. Collins' data suggest that it is particularly rare in AmE as opposed to BrE (2009a: 87). Since it primarily expresses epistemic modality, it is only of minor importance in a study of non-epistemic modality. As the data from COHA show, it decreases considerably in use between 1900 and 2009 (τ = -0.52***). *Be bound to* is most common in the magazine section (average $freq_{1900\text{-}2009}$: 13.0 w/m vs. 9 w/m in other written corpus sections), but rare in COCA (spoken) (average: 7.7 w/m). Here it exclusively occurs in affirmative clauses and declines considerably (τ = -51***, cf. Figure 51).

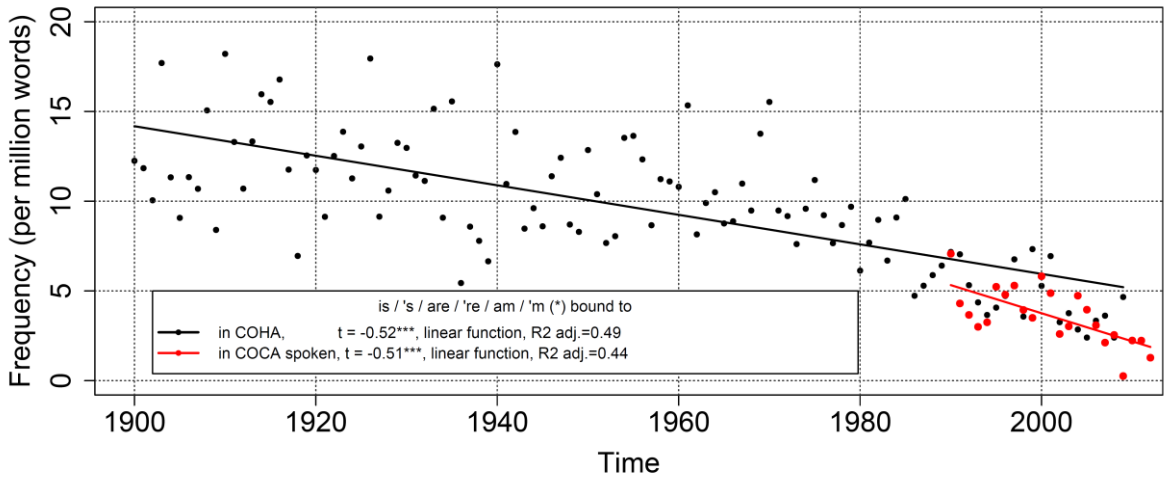


Figure 51 *Be bound to* (iwcm) in COHA and COCA (spoken)

A contracted form of *bound to* exists (cf. Bolinger 1980b: 293), but though it might be frequent in speech, it has not (yet?) found its way into the transcriptions of COCA, let alone into written English. Even a search on the Internet, a place to discover all kinds of linguistic caprices, yielded only two uses of *bounta*, one in a blog where spoken language is imitated (cf. example (384) below) and one in the Twitter archive (cf. example (385) below).

(383) He's bounta ('determined to') have his way. (Bolinger 1980b: 293)

(384) We often hear the tell-tale "squeaky squeaky squeaky" sound of her blood pressure cuff […], followed by her announcing to anyone in ear shot whether she's "bounta have a stroke any minute" or "damn near dead." (Davis, M. (2008/0/16) "Drugs, Hippos and Deep Thoughts," <http://hiddenmahala. blogspot.de/2008_04_01_archive.html> (2015/07/15), Internet Blog)

(385) "Think I'm Bounta take me a nap 😴 "(2012/08/10, <https://twitter.com /potentialndall_/status/233959846792269824> (2015/07/15), Twitter Archive)

Semantics

BE bound to can express obligation (cf. example (386) below) and logical necessity (as in example (387) below, cf. e.g. Palmer 1979: 45, Leech 2004: 105), but it is mainly used epistemically (cf. Perkins 1983: 73, Palmer 1990: 55, Collins 2009a: 87).

(386) You're a trustee and you're bound to follow certain rules with respect to that. (1992/07/20, "Clinton will bring money to cities says NYC comptroller," *CNN News*, COCA)

(387) KATHIE-LEE-GIFFORD: No matter where you turn, you can't help but see countless images of skinny fashion models and celebrity starlets, and those images are bound to affect how we look and feel about our own bodies. (2008/09/24, "A. Burt-Murray, J. Weiner, and M. Callahan discuss body image," *NBC Today*, COCA)

Deontic uses of *be bound to* (such as examples (386) and (388)) are infrequent (cf. Table 60). They account for 8.5% of all occurrences of the analyzed present tense forms in COCA (spoken) and only slightly increase in use, which could easily be the result of chance. *Be supposed to* expresses objective deontic meaning in all of these cases.

(388) JOHN ROBERTS, SUPREME COURT NOMINEE: […] The judge is bound to follow the Supreme Court precedent whether he agrees with it or disagrees with it (2005/07/20, "Nomination of John Roberts," *CNN Insight*, COCA)

Like the majority of the expressions analyzed here, *bound to* decreases in use between 1990-94 and 2005-09. This development is due to the absolute decrease of epistemic meanings – a tendency that has also been observed in the case of *must*, *should*, *shall*, *ought to*, and *have to.*

Meaning in w/m (N= 141)	1990-1994	2005-2009	Difference	Pearson Residuals	
root	0.23	0.35	+52.3%	-1.04	1.44
epistemic	3.91	2.03	-48.1%	0.24	-0.34
ambiguous	0.09	0	-100.0%	0.59	-0.83
total (iwcm)	4.23	2.38	-43.8%	$\chi^2 = 4.4$, p_{fe}=0.14, $V = 0.12$	

Table 60 Meanings of *be bound to* in COCA (spoken)

Palmer observes that *BE bound to* mainly occurs with verbs of action (1990: 55). However, only two of the attracted distinctive collexemes identified in the MDCA described above (cf. Ch. 4.5) are qualified as activity verbs by Biber *et al.* 1999, i.e. *give* and *come*. The majority of the collexems are rather abstract, elaborate, and infrequent. Only 18 of them (underlined in Table 61) are among the top 100 most common verbs in the spoken language section of COCA.

$p\leq$	Attracted Lexical Verbs	Repelled Lexical Verbs
0.001	*happen*, *fall*, *fail*, *collapse*, *backfire*, *lead*, *cause*, *come*, *occur*, *legislate*, *fascinate*, *ripple*	*know*
0.01	*ripple*, *follow*, *annoy*, *disintegrate*, *excoriate*, *intersect*, *resurface*, *spot*, *worsen*, *blast*, *bowl*, *complicate*, *ensue*, *explode*, *respect*, *trigger*, *disappoint*, *offend*, *energize*, *jeopardize*, *produce*, *raise*, *hit*, *revive*	
0.05	*change*, *isolate*, *screw*, *want*, *result*, *rub*, *spell*, *claim*, *reduce*, *lose*, *oppose*, *affect*, *get*, *weigh*, *seem*, *spread*, *attract*	*talk*, *ask*, *work*, *look*, *pay*

Table 61 Distinctive collexemes of affirmative *be bound to* in COCA (spoken, 1990-2012)

The discussion of the low-frequency verb *bound to*, which contributes very little to the expression of root modality, concludes this section outlining the findings of a detailed semantic analysis of (semi-)modal verbs. The next step will be to subject lexical verbs with related meanings to the same analysis.

6.3. Lexical Verbs with Related Meanings

As has been the standard practice for modals, semi-modals, and adjectives, the analysis of lexical verbs is restricted to present tense affirmative uses. Like in the case of *be supposed to* and *be bound to*, the forms *am*, *are*, *is*, and their short forms are considered in combination with the passive forms *obliged to*, *required to*, *compelled to*, and *urged to.* The morphosyntax and the root meanings of these passive forms closely resemble those of *be supposed to* and *be bound to* (epistemic meanings are, of course, not expressed by passive forms of lexical verbs). Yet active verb forms behave differently. The main contrast between modal verbs and passive forms of lexical verbs on the one hand and active forms of lexical verbs on the other hand lies in the different topicalization (cf. Talmy 1988: 80-84). Whereas the use of modal verbs implies that the agonist is foregrounded, the antagonist is always topicalized when verbs such as *require*, *demand*, *permit etc.* – which Talmy also considers to be the lexical compeers of the modals – are used in the active voice. Compare the following examples given by Talmy (1988: 82, 84). In (389) the focus lies on the addressee, while more emphasis is also placed on the speaker in example (390).

(389) You may go to the playground. You have to stay in the house.

(390) I permit you to go to the playground. I require you to stay in the house.

The same applies to other expressions of obligation and necessity and to requests. An utterance with *urge*, such as example (391), can easily be rephrased with a modal verb. The focus then shifts from the addressee to the former object. Mindful of this difference, I analyzed 499 occurrences of lexical verbs with 1st person singular subjects in 1990-94 and 2005-09 in the spoken language section of COCA.

(391) SEN-WARNER: Our President has wisely stayed in step with our allies, and I urge him to continue. (1994, *PBS NewsHour*, COCA) → *... he should / needs to continue.*

The situation is markedly different in clauses with 2nd and 3rd person subjects. Telling illustrations of these differences are examples (392) and (393), where the acts of forcing the army to retreat and of forcing the employer to give benefits are described. Paraphrases with modals are theoretically possible ("*he [the American employer] must give all these benefits*," "*until the army must withdraw*"), yet the component of the meaning that indicates that there was an active tour de force by a (human) agent is lost. In (392) and in almost all other cases, the integration of a modal and additional elements into the sentence disturbs its flow and makes it awkward and clumsy.

(392) BUCHANAN But don't you simply price the American employer out of his market if you force him to give all these benefits and then you say,' if you cross the border, you don't have to give any of them'? (1991/07/26, *CNN Crossfire*, COCA)
→ *But don't you simply price the American employer out of his market if he must give all these benefits and then you say 'if you cross the border…*

(393) That means flying lots of patrols, it's not easy, day and night, to intercept trucks bringing food to the Iraqi army in Kuwait and then the odd van and then the camels, and you starve out that army, you force it to withdraw. In the meantime, of course, you have bombed all these military factories, you have bombed all the offending

chemical and missile and biological and everything else you want to bomb and at the end of the day you still have an Iraq in place. (1991/01/17, "U.S. air attacks continue; Iraqi missiles hit Israel," *ABC Nightline*, COCA)
→… *and you starve out the army until it needs to withdraw*

The majority of sentences with 3rd person subjects cannot be rephrased (cf. examples (394) and (395) below). Example (396), where *must* can be inserted, is a rare exception.

(394) Mr. WILL: Well, you know, there is something to be said for the compulsory rotation in office simply because it forces people to go back and reacquaint themselves with the way other people live. (1991/10/06, *ABC Brinkley*, COCA)

(395) SCHAAP *voice-over* Hall Thompson's statements were not subtle, but ironically, they could be the catalyst that forces golf to start moving toward the 21st century. (1990/07/26, "Private clubs: The racial barrier in golf," *ABC Nightline*, COCA)

(396) But in order to buy the drug, Sandoz Pharmaceuticals forces patients to use an expensive monitoring system, driving Clozapine's cost up to nearly $9,000 a year, so many of those who need the drug can't get it. (1990/12/07, "Every woman for herself; whose side are they on?; True detectives," *ABC 20/20*, COCA)
→ *But in order to buy the drug, patients must use an expensive monitoring system that drives Clozapine's cost up …*

For these reasons, active sentences with 2nd and 3rd person subjects were not considered in this study. The following analysis only focuses on passive forms on the one hand and on clauses with 1st person subjects on the other hand.

6.3.1. Present Tense Passive Forms

As we have seen above, present tense affirmative passive forms of *compel*, *force*, *oblige*, *require*, and *urge* heavily decline in use in COHA (τ = -0.78***) as well as in the short time span surveyed in the spoken language section of COCA (τ = -0.41***). This, of course, is in line with the general trend of the *be*-passive to decrease in frequency (cf. e.g. Seoane 2006, Leech *et al.* 2009: 148, Smith and Leech 2013: 93, Biber and Gray 2012: 319, 2013: 112).

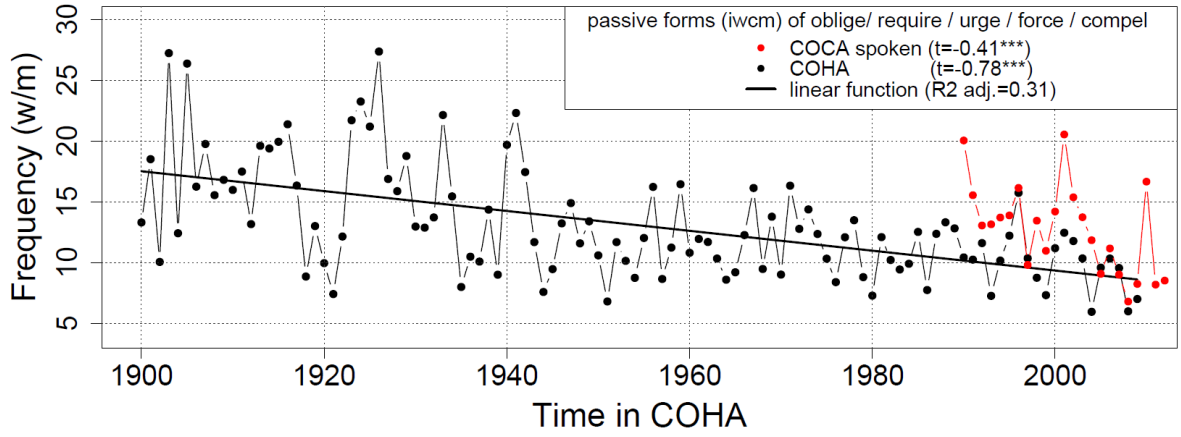


Figure 52 Passive forms of selected lexical verbs of obligation in COHA and COCA (spoken)

Yet in light of findings that the passive is rare in conversation (cf. Biber *et al.* 1999: 476, Biber and Conrad 2009: 117), it is interesting to see that the passive constructions analyzed here are slightly more frequent in spoken English (COCA, average frequency between 1990 and 2009: 13 w/m) than in written English (COHA, 10 w/m, cf. Figure 52). Table 62 shows the frequencies of the analyzed expressions in the spoken language section of COCA (per million words; the numbers in brackets are the raw frequencies). There is a pronounced decrease in their use (d.f.= 1, $p<0.001$), which is mainly due to the decline of *be forced to* and *be required to* (and, to a lesser extent, *be obliged to*).

Verb in w/m (N= 521)	1990-1994	2005-2009	Difference	$\chi 2$-value (d.f. = 1)
forced	7.4 (163)	4.5 (90)	-40%	**35.0** ($p<0.001$)
required	6.4 (141)	3.8 (76)	-41%	**30.4** ($p<0.001$)
obliged	0.9 (20)	0.4 (8)	-56%	**5.0** ($p<0.05$)
urged	0.4 (9)	0.3 (6)	-27%	2.0 ($p>0.05$)
compelled	0.3 (7)	0.1 (1)	-84%	3.7($p>0.05$)
total (iwcm)	15.4 (340)	9.0 (181)	-42%	**73.5** ($p<0.001$)

Table 62 Passive forms of *force*, *require*, *oblige*, *urge*, *compel* in COCA (spoken)

While all other verbs are exclusively found with *to*-infinitives, there are five present tense occurrences of *require* in extraposition constructions with *that* (such as example (397) below). The latter are also included in the analysis. Passive forms of *compel*, *urge*, and *oblige* are particularly rare in the COCA (spoken). Therefore, only a few comments will be made about their use.

(397) Of course, under Jewish law, it's required that all bodies be buried with as many of the remain as can be recovered. (2005/10/26, *CNN Your World*, COCA)

Semantics

As Table 63 reveals, the majority of the meanings expressed by the passive forms of the analyzed five lexical verbs are deontic and objective (cf. example (398) below). The speaker is reporting that a rule or regulation exists. Included in this category in Table 63 are also descriptive meanings such as in example (399). Here the speaker describes that an influence is exerted on a particular group of people to perform a certain action.

(398) Ms. FIELDS: …We have different rules in the military. Men are forced to live together. Men are forced to be in the open showers together … (1993/01/26, "Gridlock over gays in the military?," *CNN Company*, COCA)

(399) Happening now its 7:00 p.m. in Florida where the Gulf Coast gets the first hurricane warning of the season and many residents get a mandatory evacuation order. Others are urged to make emergency preparations right now. (2006/06/12, "Gulf coast gets first hurricane warning of the season; Bush holds war council at Camp David," *CNN Situation*, COCA)

Meaning in w/m (N= 521)	1990-1994	2005-2009	Difference	Pearson Residuals	
subjective deontic (possibly directive function)	1.27	0.84	-33.9%	-0.24	0.33
objective deontic (incl. descriptive uses)	11.11	6.74	-39.3%	-0.22	0.30
dynamic	3.00	1.39	-53.8%	0.61	-0.84
total (iwcm)	15.39	8.97	-41.7%	$\chi^2 = 1.4$, $p>0.05$, $V = 0.04$	

Table 63 Meanings of *force*, *require*, *oblige*, *urge*, *compel* (passive) in COCA (spoken)

The predilection speakers have for using the analyzed passive forms with verbs that denote activities is evidenced in the results of the performed MDCA. The distinctive collexemes of *required*, *forced*, and *obliged* are primarily activity verbs (such as *give*, *pay*, and *exercise* in the case of *required* (p<0.01), *get*, *make*, *leave*, *work* in the case of *forced* (p<0.05), and *try* and *follow* in the case of *obliged* (p<0.05, cf. Table 64 below)). *Forced* also collocates with mental verbs such as *choose* and *face*, whereas other mental verbs that place the focus on a realization of the speaker (such as *know*, *see*, and *understand*) are repelled (p<0.05). The same tendency can be observed when it comes to the distinctive collexemes of *required* (*choose* is attracted, but *know* and *see* are repelled). *Required* in particular collocates with verbs that are rare in the spoken language section of COCA. Almost 60% of its 57 collocates do not even rank among the top 1,000 most frequent verbs (e.g. *compensate*, *notify*, *sustain*, *aid*).

p≤	*be required to*	*be forced to*	*be obliged to*
0.001	*compensate*, *report*, *attend*, *notify*, *give*, *provide*, *enforce*, *execute*, *pay*, *sustain*, *prosecute* (repelled: *say*, *know*, *see*)	*confront*, *leave*, *sleep*, *live*, *resign*, *compete*, *sink*, *work*, *lie*, *drop*, *face*, *evacuate*, *pay* (repelled: *say*, *know*)	*carry out*, *incarcerate*, *lodge*
0.01	*aid*, *insulate*, *prepay*, *wear*, *capitulate*, *devour*, *keep*, *constitute*, *enrich*, *service*, *follow*, *reduce*, *register*, *clock*, *contribute*, *filter*, *moderate*, *exercise*, *disconnect*, *display* (repelled: *talk*)	*pay*, *trivialize*, *trudge*, *close*, *intermingle*, *scan*, *cough*, *ditch*, *exert*, *pile*, *operate*, *commute*, *retool*, *disrupt*, *temper* (repelled: *get*)	*dismiss*, *beg*, *follow*, *transfer*, *fund*
0.05	*heat*, *credit*, *renounce*, *verify*, *advise*, *process*, *illustrate*, *incorporate*, *list*, *graduate*, *hold*, *donate*, *legislate*, *smile*, *volunteer*, *balance*, *salute*, *record*, *turn*, *cover*, *import*, *carry*, *issue*, *choose*, *maintain* (repelled: *go*, *ask*, *start*)	*break*, *wear*, *gamble*, *eat*, *cut*, *sell*, *flee*, *become*, *repay*, *rescue*, *presume*, *share*, *testify*, *entertain*, *retreat*, *make*, *form*, *import*, *issue*, *choose*, *abandon*, *announce*, *approach* (repelled: *tell*, *see*, *understand*, *talk*, *ask*, *start*)	*insist*, *perform*, *impose*, *contribute*, *submit*, *proceed*, *remove*, *participate*, *drive*, *try*, *maintain*, *report*

Table 64 Attracted (and repelled) distinctive collexemes of affirmative *be required* / *forced* / *obliged to* in COCA spoken (1990-2012)

Subjective deontic uses are also occasionally found (8% of all occurrences). In example (400), for instance, the speaker, Mr. Moose, Assistant Secretary of State for African Affairs in the Clinton Administration, expresses his opinion that the USA should make an effort to fight against the genocide in Burundi. He implies that they have a moral responsibility (cf. the use of the paraphrase

"to be morally or legally bound" before the specification that it can, "more generally," mean "to be under a necessity, to be behoved" in the OED, "*oblige*, v.," 4).

(400) MS-FARNSWORTH: Sec. Moose, what about Burundi, do you think that the same sort of thing that happened in Rwanda can be avoided in Burundi? SEC-MOOSE: Well, I hope that it can, and I think we are obliged to try to make that effort, the effort that Mr. Lucas just referred to. One of the most important things we can do is the constant reminder to the political parties and leaders in Burundi that the international community is, indeed, watching and attentive to what they're doing. (1994/09/01, "Safe to return?; Earthshaking news," *PBS NewsHour*, COCA)

Only two utterances can be interpreted as directives. They are grouped with cases of subjective deontic meaning in Table 63. In example (401) the speaker invites the jury to ask themselves if they do not even have one ounce of doubt that the defendant is guilty. In example (402) the (felt) obligation originates in the speaker's own understanding of what he believes his behavior should be like, i.e. in his own moral code. In fact, his statement is an announcement of his own will rather than a report of an existing obligation.

(401) Mr-ROBINSON: *(In-court)* And the question that you're required to ask yourselves is, what has the state shown me to make me believe that he is guilty without having one reason to doubt it? (2007/09/15, "Perfectly executed; Sebastian Burns and Atif Rafay accused of murdering Rafay's family in Bellevue, Washington," *CBS 48 Hours*, COCA)

(402) LIMBAUGH: Now what is important? What is impor -- well, all of this is important. And -- and -- and I don't mean to diminish Paula Jones and what may have happened to her. But I'll tell you something, folks, I am -- I am forced here to be consistent. (1994/08/24, "Sexual harassment lawsuit against President Clinton," *Independent Limbaugh*, COCA)

Cases in which real internal needs are expressed are rare. In example (403) a disorder can be considered the cause of the obsessive behavior. By contrast, in example (404) external circumstances, i.e. the unavailability of tap water and fuel, force the local population to drink water from rivers without boiling it. These dynamic readings account for 18% of the occurrences, a number close to that for *have to* (simple aspect, 21%). It is also very elevated compared to *be supposed to*, where dynamic uses only account for only 0.7% of all root meanings.

(403) CONAN: There are obsessives, though, who are compelled to correct the angle of every picture they see or rearrange the books in *(unintelligible)*. Dr-GOODMAN: Oh, yeah, to the point that it's absurd. (2007/09/06, "Living with obsessive-compulsive disorder," *NPR Talk of the Nation*, COCA)

(404) RIVER The UN report says deprived of tap water, people are drinking from rivers polluted with raw sewage. PEDESTRIANS Deprived of fuel, they are forced to ignore warnings to boil water before drinking it. (1991/03/22, *ABC Jennings*, COCA)

Yet the strong focus on objective deontic meanings is something that the passive uses of the analyzed lexical verbs (72.7%) and *be supposed to* (95.5%) have in common.

6.3.2. Performatives

Interestingly, performatives slightly increase in use (τ = 0.14*). As Figure 53 illustrates, they are more frequent in the spoken language component of COCA than in COHA (average between 1990 and 2009: 2.2 w/m vs. 1.0 w/m).

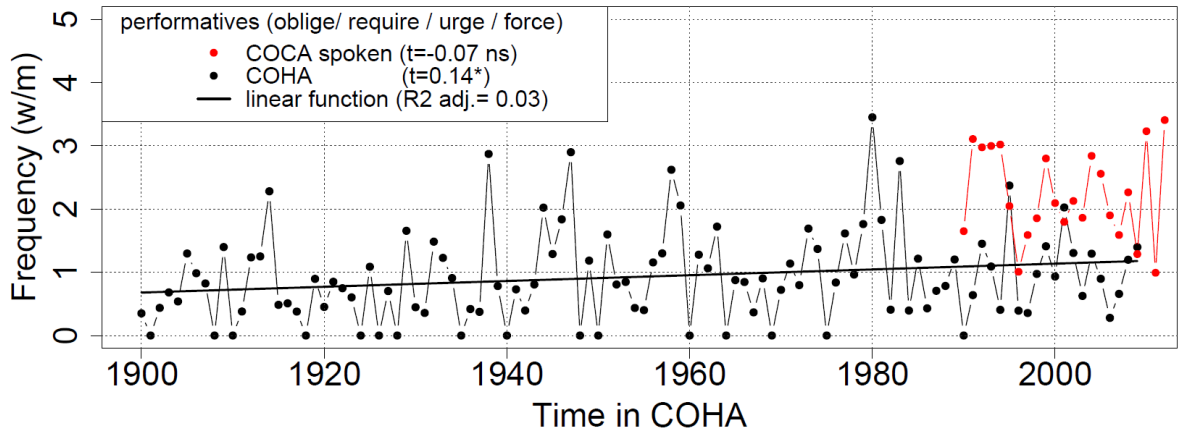


Figure 53 Performative forms (1st person) of selected lexical verbs of obligation in COHA and COCA (spoken)

Table 65 shows the number of present tense affirmative first person singular forms of the verbs *urge*, *demand*, *force*, and *require*. Note that in contrast to the analysis of the passive forms described above, there are no examples of *compel* with a performative meaning. Again, we see a pronounced decrease in the use of the examined expressions in spoken English between 1990-94 and 2005-09, caused primarily by the decline in the use of *urge*.

Verb (N=129)	1990-1994	2005-2009	Difference	χ^2-value (d.f. = 1)
urge	**3.28 (72)**	**2.18 (44)**	-34%	**15.4** (p<0.001)
demand	0.18 (4)	0.20 (4)	+9%	
force	0.14 (3)		-100%	
require	0.05 (1)	0.05 (1)	+9%	
total (iwcm)	**3.64 (80)**	**2.43 (49)**	-33%	**17.2** (p<0.001)

Table 65 Frequency of present tense *I / we urge / demand / force / require*

Semantics

In the majority of the cases, the speaker expresses the wish that a certain action be performed on the spot. Pertinent illustrations are example (405), where the speaker demands that an utterance be deleted from the record, and example (406), where the speaker invites the audience of the Democratic National Convention to ask themselves a question.

(405) When a Democratic congresswoman mentioned the word Senate, a violation of arcane House rules, tempers exploded. [..] CONGRESSMAN: Point of order, Mr. Speaker. I demand the gentlewoman's words be taken down. Rep. THOMAS FOLEY, Speaker of the House: The gentlewoman will suspend. (1991/10/08, "Senate delays Thomas confirmation vote," *ABC Nightline*, COCA)

(406) I urge you to ask yourselves this question: Do you still believe that there was no difference between the candidates? *(APPLAUSE)* (2004/07/26, "Al Gore, Jimmy Carter address Democratic National Convention," *CNN Even*, COCA)

Yet as we see in examples such as (407), the addressee is not always present at the moment of utterance. Here the speaker wants the owners of the buses to switch to other models (*I urge them to replace them…*). Such cases are, however, rare.

(407) SYLVIA CHASE: *voice-over* NHTSA never recalled the Kentucky-type bus, and they remain on the road […]. 'How can we justify the sale of these dangerous buses? This is essentially selling a time bomb.' *interviewing* I can tell you that there are children being put on the exact same bus in which your daughter burned to death this same day. LARRY FAIR: That would absolutely shock me. I urge them to be replaced as expeditiously as possible. (1994/10/20, "'Rosario Ames' - On the eve of sentencing," *ABC Primetime*, COCA)

In six sentences the speaker merely reports the action of urging. In example (408), for instance, John McCain describes the consequences of his request to consider ground troops.

(408) Sen-McCAIN: I'm fully aware that when I urge the president to consider the option of ground troops, that I will then assume some responsibility for the commensurate loss of young American lives. I don't take that responsibility lightly. (1999/04/18, "Citizen McCain; Arizona Senator John McCain discusses his views on the Yugoslav War," *CBS Sunday Morning*, COCA)

Summary of the Results of the Analysis of the Lexical Verbs of Obligation

The analysis of lexical verbs of obligation has thus shown that they – like the core modal verbs, *have to*, *had better*, *be bound to*, and many of the modal adjectives – also decline in use. The decrease in the use of passive forms can be linked to the general decline of the passive, which may have its roots in a growing avoidance tendency. Wanner explains that the passive voice has the reputation of being "undynamic" and "pseudo-objective" and that it is heavily criticized in American style manuals (2009: 200). In his survey of the comments about the condemnation of the passive in 20th century style manuals, journals, and language blogs – fittingly titled "Fear and Loathing of the English Passive" – Pullum calls the commentaries on the passive "unremittingly negative" (2014: 60). Exposing what he calls "critical incompetence," he demonstrates that many of the allegations are directed at sentences that do not actually contain any passive forms, but conceal or obscure agency in some way or another (with predicative complements, intransitive actives with and without infinitival complements, or even simple active transitives like *experienced a quick revival*, 2004: 67, 70). Yet use of the passive is entirely justified when the focus of the reader or hearer is meant to be placed on the patient of the action, i.e., for instance, on the person to whom something is done (cf. Pinker 2014: 55-56). Passive forms of the verbs of obligation analyzed here – just like modal verbs – direct the hearer's attention to the people that are required to realize a certain state of affairs. With the exception of *urged*, which merely describes pleas (and is incidentally the verb with the least pronounced decrease), their meanings are strong – *forced*, *required*,

obliged, and *compelled* all create binding obligations. It thus seems hardly surprising that these expressions suffer the same fate as strong modals like *must.*

The agent is typically not indicated in the passive clauses in my sample. Only in less than 6% of all cases (cf. example (409) below) do we obtain the information that the action is required by law, the government, an institution, or a policy. However, with performatives the source of the obligation is made explicit, it is even emphasized. This is best illustrated when we look at an utterance. In example (410), a case of synthetic personalization (cf. Fairclough 1989: 62, 2001: 52), the moderator, like a close friend, advises the supposedly delicate viewer not to watch the terrible scenes, appealing to her/his own wishes (*you don't want to…*).

(409) In our state, we're required by law of the state to have deputy registrars in each precinct in every county. (1992/07/06, "Drive to vote," *PBS NewsHour*, COCA)

(410) What you're going to see, as I said earlier, is a computer-generated depiction of what the state alleges happened. […] The programmers have created the prosecution's version of the horrific events in excruciating detail. I warn you again, if you are at all squeamish, you don't want to watch this part of our show. Again, I urge you to change the channel. (1994/11/16, "O.J. caught red-handed, the blood evidence against Simpson," *Independent Geraldo*, COCA)

By using a performative verb, the speaker describes the action s/he is performing instead of merely issuing a directive. Consequently, the force of the imperative seems attenuated, leaving the addressee more room for non-compliance with the speaker's request. As in the case of polite past tense uses of *wonder* or *want* in demands, a polite distance is created (cf. also Halliday 2014: 705). Because of the trend towards the use of more indirect, polite expressions, we might also expect an increase in the use of these performatives, yet this is only the case in COHA ($\tau = 0.14$*), but not in the spoken language section of COCA ($\tau = -0.07$ ns). One explanation might be seen in the fact there is an increased willingness to shine the light on the needs and desires of the addressee, as can neatly be done with *need to* and root *want to*, and not so much on the speaker him-/herself.

6.4. Modal Adjectives

Many adjectives mentioned in studies by Van linden (2012: *indispensable*, *needful*, *vital*), Övergaard (1995: *advisable*, *desirous*, *fitting*, *fundamental*), and Perkins (1983: 81, *mandatory*, *obligatory*, and *compulsory*) were in fact too infrequent in the spoken language section of COCA to be included in the discussion here, so the focus solely lies on the (strong) adjectives *necessary*, *essential*, *critical*, *crucial*, and *imperative.* As we have seen above (cf. Figure 14 in Ch. 5), there is a considerable decline in their use in COHA from the 1940s on, caused primarily by a retreat of *necessary* (τ = -0.59***, cf. Figure 54[180]). By contrast, the other adjectives experience a rise in use (τ = 0.22***). Patterns are harder to detect in the spoken language section of COCA (cf. small plot in the top right corner of Figure 54 with a focus on the years 1990-2009). A significant decrease between 1990-94 and 2005-09 can only be observed in the case of *necessary* and *essential* (d.f. = 1, p< 0.05). The other analyzed adjectives are already comparatively rare. *Crucial*, *critical*, and *imperative* also pattern differently than *necessary* and *essential* as far as register distribution is concerned. I will discuss this in more detail when each of these adjectives are considered separately.

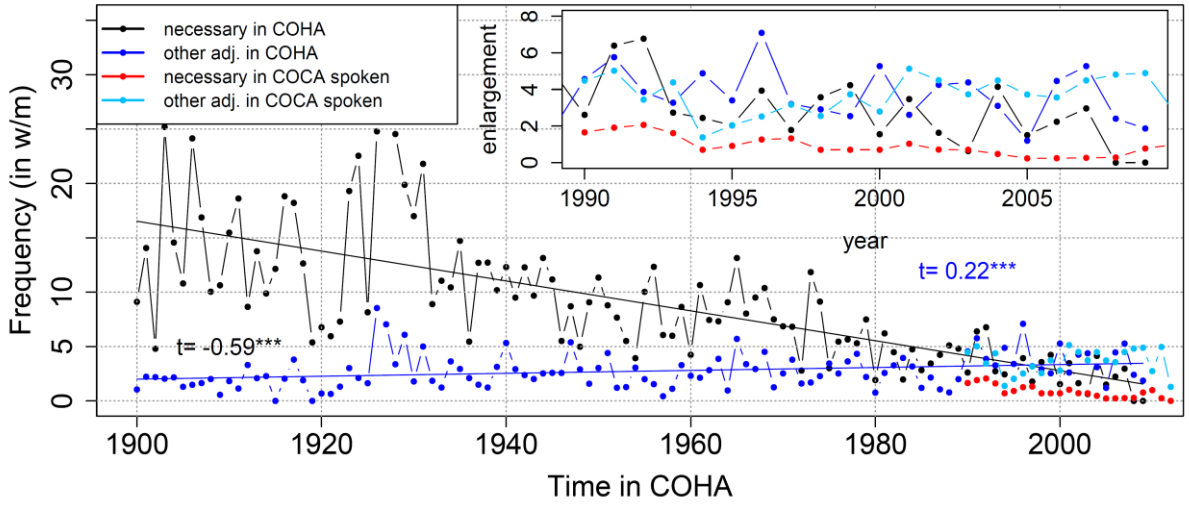


Figure 54 *Necessary* vs. *critical*, *crucial*, *essential*, *imperative* (iwcm) in COHA and COCA (spoken)

[180] *Essential* also decreases in use, but there is no statistically significant correlation between frequency and time (τ = -0.11 ns, p= 0.10). Since *essential* is also a lot less frequent than *necessary*, it is here plotted with the other low-frequency items *critical*, *crucial*, and *imperative.*

6.4.1. Complementation

First, however, let us look at the complements that *necessary*, *essential*, *imperative*, *critical*, and *crucial* take. In Brown and Frown, they occur 19 times in present tense extraposition constructions with *that* and drastically decline in use (from 14 to 5 occurrences).[181] *To*-infinitives are more common in Brown (24 occurrences), but less frequent in Frown (3 occurrences). In the data from COHA (1900-2009), *necessary* is primarily used with a *to*-infinitive, whereas *essential* and *imperative* predominantly take *that*-complements (cf. Table 66 below).[182] *Critical* and *crucial* are only used in extraposition constructions since the 1960s. They mainly occur with *to*-complements in written data in the 2000s, but *that*-complements are the preferred alternative with *critical* in the 1990s. The data from COCA seem to indicate that the trend might go towards a use of both adjectives with *that*, yet admittedly, the numbers for both adjectives are rather small and the constructions relatively new. We thus have to treat these findings with caution.[183]

		1900	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000	COCA
necessary	*to*	236	271	280	285	201	176	191	136	88	88	57	165
	that	56	34	61	28	31	27	21	19	14	8	7	16
	~~*that*~~	3	1	1		2			1				
essential	*to*	3	2	3	2	3	1	1	0	6	5	4	4
	that	20	20	35	31	30	22	32	24	12	21	21	47
	~~*that*~~					1					0	1	
imperative	*to*	3	2	3	2	3	1	1	0	6	5	4	2
	that	5	10	9	12	24	13	12	16	9	17	16	26
	~~*that*~~				1	1	1		1	4			
critical	*to*								1	1	1	37	12
	that							2		1	8	20	35
	~~*that*~~										1		
crucial	*to*										23	26	6
	that							1	2	4	15	7	14
corpus size in million words		12.0	11.9	12.5	11.9	11.9	12.0	11.6	11.6	12.2	13.3	14.6	384

Table 66 *That- /to-* complements of the analyzed adjectives in COHA (per decade) and in COCA (spoken, 1990-94 and 2005-09, raw)

Van linden observes that the variation between *that-* and *to*-clauses largely depends on the adjective itself, but that the information structure of the discourse also factors in occasionally. *To*-infinitives are chosen when the speaker does not want to specify the agent or when it can be inferred from the context (an exception might be the *for… to* construction). *That*-clauses, however, enable her/him

[181] My thanks go to the English Linguistics Department of the University of Mainz for granting me access to Brown and Frown.

[182] Please note that the preference of *essential* for *that*-complementation is less pronounced in Van linden and Davidse's database (BrE) for PDE. The share of *that*-complements (53% in CB, n=293, 2009: 191) differs substantially from the share of 81% in the 1990s in COHA. Van linden and Davidse summarize their findings by stating that *to*-complements are not predominant in the case of *essential* (2009: 195). Yet it should also be kept in mind that Van linden and Davidse (2009) analyze a much larger number of uses of *essential.*

[183] A look at previous studies does not help clear up the picture: In Van linden and Davidse's data from the Collins COBUILD Corpus (1990-95), 52% of all extraposition constructions with *crucial* have *to*-complements (2009a: 192).

to place emphasis on informationally salient subjects and to select a modal that s/he considers particularly well suited (cf. Van linden 2012: 193). Stylistic considerations such the "widespread (and presumably universal) tendency to avoid the repetition of identical and adjacent grammatical elements or structures" (called *horror aequi*, Rohdenburg 2003: 205, cf. example (411)) may also play a role (cf. Van linden 2013: 193). Hundt informs us that sentences in which *that* is omitted account for more than 8% of all cases in FLOB (2009: 168). Hoffmann (1997: 71) finds a share of 19% in the spoken subcorpus of the BNC. However, there is only one use in 1990-94 and 2005-09 in COCA (spoken), namely example (412).[184]

(411) Tell your mistress that it is imperative she give me the honor of her attendance. (Wolfe, Th. (1939) *Web and the Rock*, COHA)

(412) VERJEE: Human Rights Watch says it's crucial the trial of Saddam Hussein be fair to ensure justice for the victims. (1991/03/22, *ABC Jennings*, COCA)

That-omissions make up 2.5% (i.e. 19) of all 750 occurrences in COHA (cf. Appendix A.3 for the used query). Since *that*-omission is characteristic of informal language (cf. Hundt 2009: 168), it is not surprising that 70% of all uses in COHA occur in fiction, 20% in magazines, and 10% in newspapers, mainly in (quoted) spoken language. *Horror aequi* is only relevant in two of the 19 cases.

Another topic worth discussing are the moods that are used in these complements clauses. In the 19 clauses with *that*-omission, the modal adjective *should*, the subjunctive, and non-distinct verb forms follow the adjectival trigger. We find *should* seven times (cf. example (413) below) and the subjunctive in four cases (cf. example (411) above). The subjunctive can easily be identified when the clause has a 3rd person singular subject or when the verb is *be* (because of its formally distinct forms), or when a backshift of tenses is required (which is not the case in my present tense data). Yet in clauses with 1st and 2nd person and 3rd pl. subjects (exception: *be*), the subjunctive and the indicative cannot be distinguished (cf. example (414) below). Eight of these occurrences are found in clauses with *that*-omission. The last option is the use of the so-called "mandative indicative" (Algeo 1992: 611, cf. example (415) below).

(413) I am sure. I haven't much money left, and it is necessary I should do something. (Hawthorne, N. (1901) *Twice Told Tales*, COHA)

(414) All I can tell you is it's critical you have a man with you. (Perry, A. (1993) *Farriers' Lane*, COHA)

(415) A little study will be necessary before laying out the court. […] You must first learn what the dimensions are supposed to be and get as near to them as is humanly possible. Whereas there might be a slight margin for error in some measurements, it is absolutely essential that both sides are the same length, otherwise you might end up by lobbing back to yourself if you got very excited. (Benchley, R. (1922) *Love Conquers All*, COHA)

[184] Additionally, there are five occurrences in the rest of the spoken section (one with *necessary* in 1991, three with *essential* in 1997 and 1998, and one with *critical* in 2004).

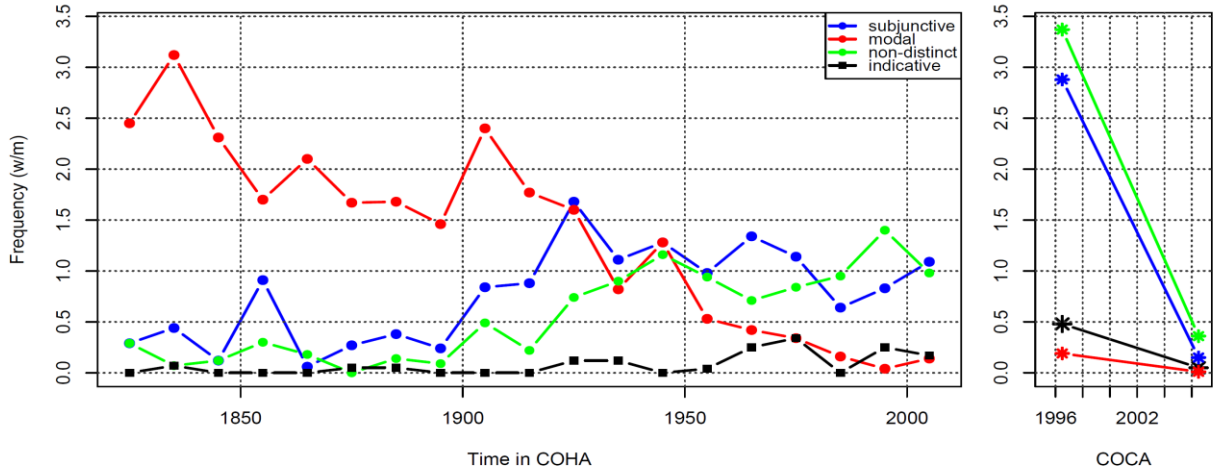


Figure 55 Normalized frequency (decade averages) of different forms of finite verbs in *that*-clauses after selected adjectives of obligation in COHA and COCA (spoken)

Figure 55 and Figure 56 display the absolute and the relative frequency of the subjunctive, the modals, the indicative, and non-distinct, ambiguous forms after these five adjectives and *that* in present tense extraposition constructions in COHA (decade averages, n= 289). Indicatives are extremely rare in both COHA (4.6% between 1900 and 2009) and the spoken language section of COCA (7.6%). Leech *et al.* similarly find no indicatives after suasive expressions in Brown and Frown and only one in LCASE (2009: 56-57).[185] However, the mandative indicative accounts for the majority of uses in comparable spoken data from BrE (43% of all present tense uses of strong adjectives, N=274, cf. Van linden 2012: 160). This difference between the two varieties confirms the well-documented finding that we are dealing with a case of regional variation (cf. e.g. Erdmann 1981: 126, Johansson and Norheim 1988: 30, Algeo 1992: 616, Övergaard 1995: 89, Hundt 1998: 171, Hundt 2009: 30-31, Crawford 2009: 272-273, Leech *et al.* 2009: 55, 69).

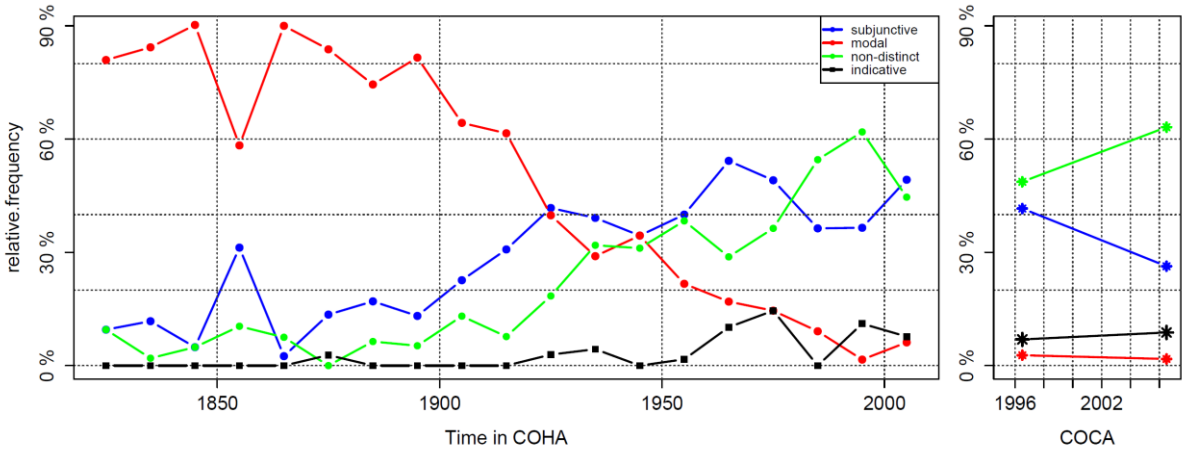


Figure 56 Relative frequency (decade averages) of different forms of finite verbs in *that*-clauses after selected adjectives of obligation in COHA and COCA (spoken)

[185] Cf. also Quirk *et al.*'s observation that putative *should*, the subjunctive, or "marginally, also, an indicative verb" can occur in clauses with anticipatory *it* as subject (1985: 1224).

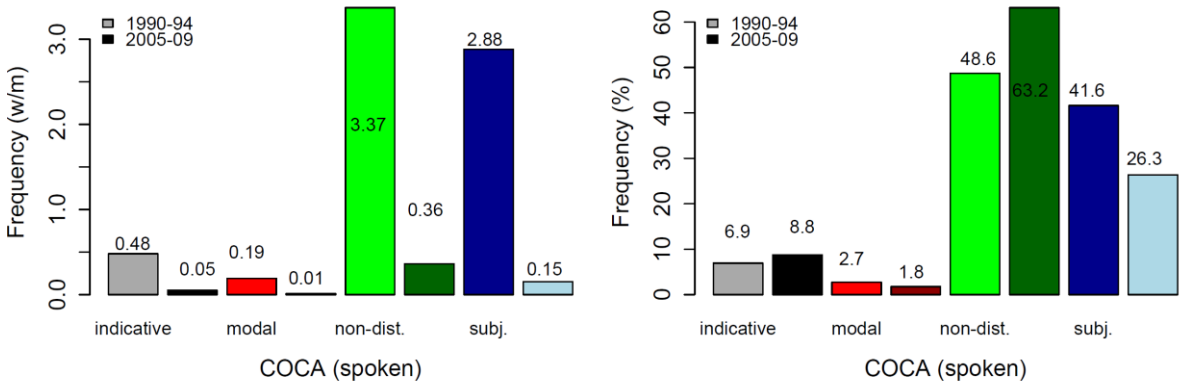


Figure 57 Subjunctives, modals, non-distinct uses, and indicatives in *that*-clauses after selected adjectives of obligation in COCA (spoken)

The number of non-distinct cases is very high in both American corpora analyzed here. It ranges between 12% in the 1900s and 55% in the 1980s in COHA and between 49% and 62% in COCA (spoken). Övergaard (1995) has been criticized for counting these uses as subjunctives (e.g. by Hundt 1998: 161) and for thereby distorting the picture. Yet she does indeed indicate these numbers, even if in a separate chapter, so that comparable data can still be obtained. The share of non-distinct forms is, with figures ranging between 2% (1940) and 11% (1990), much lower in her corpora (N=488) than in my sample (cf. Figure 58 below).

In many studies the frequency of non-distinct forms is not indicated, which makes the comparison between the subjective and the periphrastic construction (i.e. modal) more "pronounced" (Leech *et al.* 2009: 54). The issue is discussed at length in Hundt (1998: 160-161), who herself opts for contrasting only subjunctives and periphrastic constructions. For the sake of transparency, I chose to indicate the number of non-distinct cases since they also give us information about the number of potential subjunctives and the general frequency of the construction.

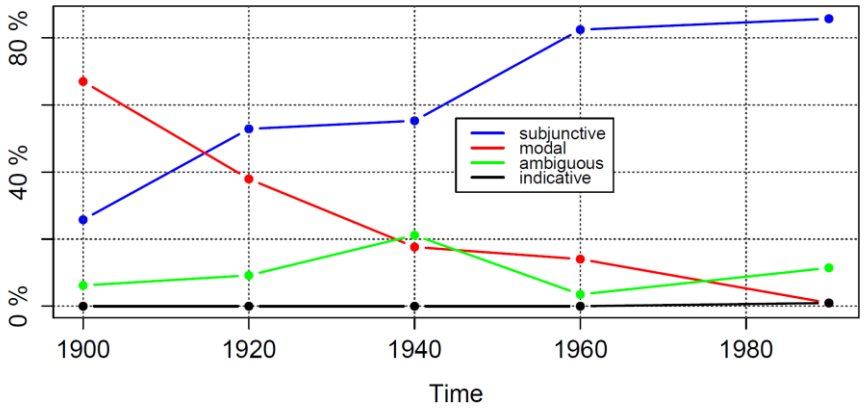


Figure 58 Subjunctives, modals, non-distinct uses, indicatives in Övergaard's data (1995)[186]

[186] These numbers are based on information given on page 69 (non-distinct forms are listed as "non-inflected subjunctives") as well as on pages 40-41 (subjunctives, periphrastic alternants, indicatives).

The subjunctive becomes the preferred option in COHA from the 1930s on, after the decline of the modals (cf. Figure 56; the average decade frequency of the subjunctive is already higher than that of the modals in the 1920s). As Figure 59 suggests, there is a peak in usage in 1927 (8.4 w/m) caused by 21 occurrences after *necessary* and *essential* + *that* in *Electric Power Equipment* (non-fiction books).[187] When we remove this outlier, we can distinguish three periods in the use of the subjunctive: 1900-1925, with an average frequency of 0.77 w/m, 1926-1968, the period with the highest average frequency (1.45 w/m), and 1969-2009, where the frequency drops just below 1 w/m.

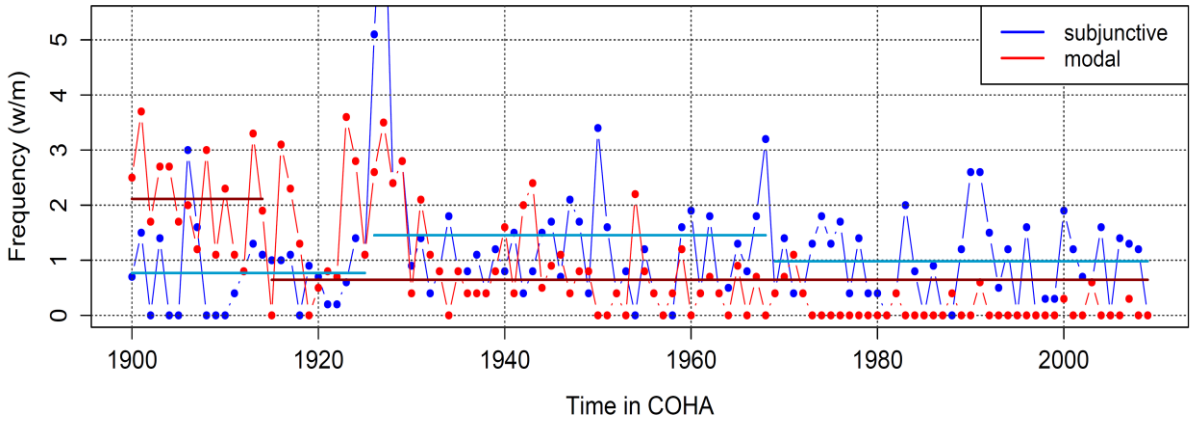


Figure 59 Subjunctive forms and modals in *that*-clauses after selected adjectives of obligation (with VNC) in COHA

This decline in the use of the subjunctive seems to confirm tendencies observed in other studies that point to a decrease in the use of the subjunctive between 1961 (Brown) and 1991/92 (Frown) (cf. Hundt 1998: 161, Serpollet 2001: 541).[188] Hundt observes that "the spread of the subjunctive in AmE has probably been slowing down after the rapid increase in the first half of this century" (1998: 161). The VNC-analysis in COHA also reveals a slight decrease towards the end of the 20th century. The examination of the frequency of the subjunctive after the analyzed adjectives and the nouns *constraint*, *demand*, *necessity*, *need*, *requirement*, and *request* in all contexts (and not just in those in which they can substitute a modal), presented in Figure E.7 in Appendix E.2, confirms that this reverse U-shaped development of the frequency of the subjunctive is indeed a robust trend.

[187] The high frequency of 5.1 w/m in the previous year, 1926, is due to the existence of four occurrences of the subjunctive in *Animal Husbandry* – in a year with only 1,169,833 words (the smallest word count between 1900 and 2007). Since an accumulation of four uses in one year is not unusual, the data point is not treated as an outlier.

[188] The analysis of present tense extraposition constructions with *necessary*, *essential*, *imperative*, *critical*, and *crucial* in the Brown corpus also shows that the subjunctive is the preferred option (10 of 14 occurrences). In Frown, however, these adjectives are too infrequent (5 occurrences) for the detection of a tendency (2 uses of the subjunctive; data obtained in my own analysis of Brown and Frown with *AntConc* 3.4.4w).

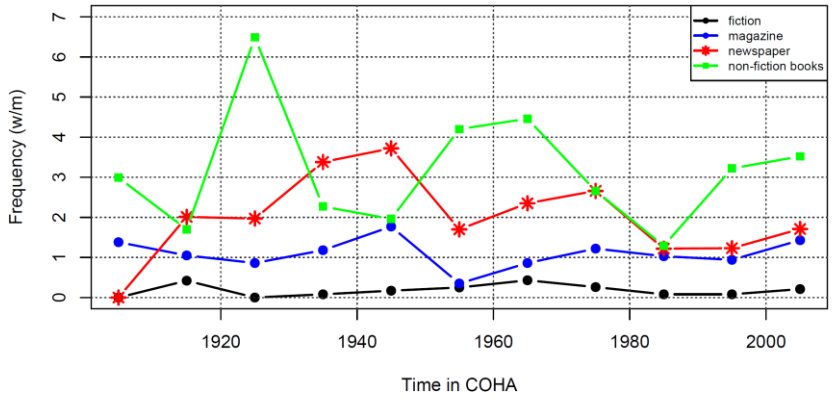


Figure 60 The subjunctive after selected adjectives of obligation in different text types (COHA)

Figure 60 sheds light on the use of the subjunctive after the analyzed adjectives in different text types. The subjunctive mood is particularly frequent in non-fiction books and, with the exception of the 1900s, in newspapers. These results thus correspond to studies highlighting that the subjunctive is very common in journalistic prose (e.g. after nominal, verbal, and adjectival triggers in Brown, cf. Serpollet 2001: 540 as well as my data for nouns in Appendix E.1). They are also concordant with previous reports on the formal character of the subjunctive (cf. Quirk *et al.* 1985: 157, Johansson and Norheim 1988: 30 for BrE).[189] Hundt notices signs that "the subjunctive in BrE is indeed losing its formal connotations" (1998: 167): an increase in *that*-omissions (+15%) and relative decrease in the use of passive subjunctives (55%, *mc*) from LOB to FLOB. While there is no clear tendency in the use of *that*-omissions in COHA, a relative decrease of passive subjunctives can indeed be observed in my data from COHA (τ = -0.67**, 61%, in the 1900s vs. 38% in the 2000s, N= 147[190]). Hundt's hypothesis that subjunctives will prefer the passive voice in the long run (a conclusion derived from data from Brown and the New Zealand corpus WCNZE) can thus not be confirmed. Her claim that the verb *be* is a stronghold of the subjunctive has to be treated with caution. The share of uses of active and passive forms of *be* decreases from 94.4% in the 1900s to 59.4% in the 2000s (τ = -0.62**). After nouns of obligation (*demand*, *request*, *requirement*), the passive also significantly declines considerably (τ = -0.60**, from 54% in the 1900s to 47% in the 2000s, cf. also Appendix E.1). My data thus point towards an increasing reserve on the part of writers to make use of the passive subjunctive in AmE. Admittedly, though, mandative verbs, the strongest triggers of the subjunctive (cf. Crawford 2009: 272), might evoke different patterns of use of the subjunctive.

[189] However, Serpollet finds the lowest number of occurrences of the subjunctive in Brown in the 'Learned Prose' section (2001: 540).

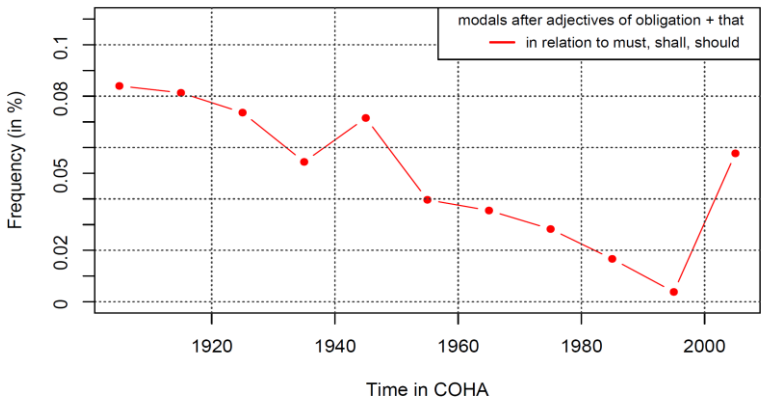
[190] In cases with obvious errors in transcription, as in the following example, the corrected version was taken into account.

(FN 49) … in the case of power transformers for the higher transmission voltages, it is essential that the oil he [*be*] kept free from moisture ... (1927, *Electric Power Equipment*, COHA)

In spoken BrE as well as in postcolonial English, the mandative subjunctive has been found to occur mainly in public and institutional dialogues and monologues rather than in spontaneous informal conversation (cf. Peters 2009: 134 and Hundt 2009: 169). This also explains why it is fairly common in the broadcast transcripts in COCA. It is particularly frequent in 1990-94 (2.9 w/m), but rare in 2005-09 (0.2 w/m; the difference is statistically significant at $p<0.05$). This scarcity is partially caused by the overall decrease in the use of *that*-complements in these contexts. However, the subjunctive slightly declines in relative importance between 1990-94 and 2005-09 (cf. Figure 57 above). The values for each year point towards a progressive decrease (τ = -0.36 ns), yet given the small size of the database predictions about future developments can only be tentative.

Moreover, the use of modals drastically declines after the analyzed mandative adjectives. A close look at COHA reveals that the earliest occurrences of mandative *should* can be found in 1814 (cf. example (416) below). After a period of heavy use that lasted until 1914 (i.e. the end of period 1 as identified via VNC-analysis), the average frequency per year drops from 1.82 w/m to 0.64 w/m (cf. Figure 59 above). The decrease of the modals after these mandative adjectives is more pronounced than the general decline of these modal verbs in all contexts in the 20th century. As we can see in Figure 61, *should*, *must*, and *shall*, account for about 0.08% of all uses of *should*, *must*, and *shall* (iwcm) in the 1900s, but only for 0.006 % in the 1990s.

Curme argued that the modals allow the speaker or writer to express "finer shades of meaning (1936: 227) than the subjunctive. Similarly, Övergaard stresses that the modals have the ability to signal "varying degrees of semantic strength, such as requirement, exhortation or tentative suggestion" (1995: 55). Yet after the last occurrences of *shall* in 1959 (cf. example (417) below) and *must* in 1971 (cf. example (418) below), both in non-fiction books, *should* is the only modal used in these contexts in COHA from 1972 on, so that there is in fact little variation in forms. The frequency of *should* drops from 1.14 w/m in 1900-1959 to 0.15 w/m in 1960-2009. Today, it has become standard practice to consider the subjunctive and the modals (cf. Övergaard 1995) or, more specifically, *should* and *must* (cf. Crawford 2009) or *should* alone (cf. Haegeman 1986, Johansson and Norheim 1988, Leech *et al.* 2009, Kastronic and Poplack 2014).



w/m	1900-1959	1960-2009
should	1.14	0.19
shall	0.22	0.00
must	0.03	0.03
other modals	0.04	0.01

Figure 61 Modals after adjectives of obligation + *that* in COHA in relation to the overall frequency of *must*, *should*, and *shall* (iwcm), decade averages

(416) Baron Wildenhain Hear me, Amelia; it is scarcely necessary that I should talk with the minister, and he afterwards talk with you. But still as he is here, leave us together. (Kotzebue, A. v. (1814) *Lovers Vows*, COHA)

(417) The venture is a difficult one, for it is essential that none but the right lover shall take her. (Streatfeild, D. (1959) *Persephone*: *A Study of Two Worlds*, COHA)

(418) Even though its purpose may quite overtly be to attract sales, it is essential that it must be truthful and accurate. (Nixon, F. (1971) *Managing to Achieve Quality and Reliability*, COHA)

We can thus once again see that there is drastic decline in the use of the modals, but this study, like others, confirms that the subjunctive is still quite frequently used in AmE, albeit with a slight tendency towards a decrease.

6.4.2. Necessary

Necessary is the most frequent adjective analyzed here. It undergoes a drastic decline (τ = -0.51***, -296%) in COHA. In the spoken language section of COCA, where it is less common, it also decreases in use (τ = -0.57****). Extraposition constructions with *necessary* seem to have a formal connotation since both *to*- and *that*-complements are most frequent in non-fiction books (cf. Appendix C.6). The fewest occurrences are found in fiction, the text type closest to spoken language.

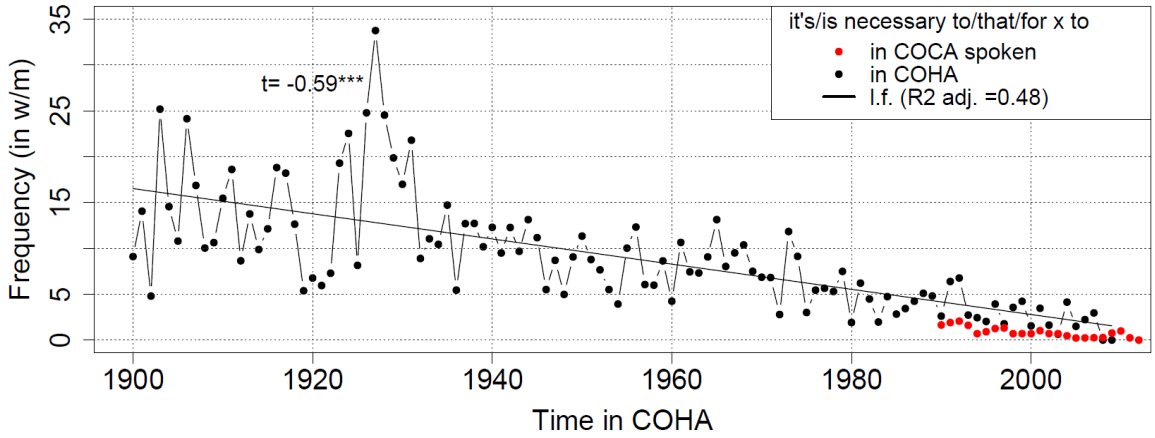


Figure 62 *Necessary* in extraposition constructions (iwcm) in COHA and COCA (spoken)

Like all other analyzed adjectives, *necessary* mainly expresses subjective deontic meanings (cf. example (419) below). In many cases, the assessment is merely reported (cf. example (420) below).

(419) Dep. Mayor STANKEVICH: […] It looks like President Gorbachev decided at last to leave his party post. I think it is a very prudent decision. […] At the same time, I think that it is necessary to suspend Communist Party's activity and to investigate its real role in abortive coup. (1991/09/25, *CNN News Saturday*, COCA)

(420) There is this national politician who says it is necessary to get very tough on welfare. (1994/12/10, "Clinton waffling will kill him, say experts," *NPR Weekend*, COCA)

Almost none of these uses can be interpreted as orders or request. The only case that comes close to expressing an imperative is a translation by an interpreter. All other instantiations of this subjective deontic meaning are mental focus uses (discussed in Ch. 2.2.2.2 on deontic modality) that are also not uttered by native speakers of English. The relative frequency of these constructions is slightly higher (3.3%) than in Van linden's sample of BrE (1.5%, 3 of 200 occurrences). Both numbers suggest that the construction is infrequent, but they are too low for us to draw any other conclusions (e.g. about differences between BrE and AmE).

Meaning in w/m (N= 92)	1990-1994	2005-2009	Difference
subjective deontic	2.51 (56)	0.40 (8)	-85%
subjective deontic (possibly directive function)	0.18 (4)		-100%
descriptive: subjective deontic	0.27 (6)	0.20 (4)	-27%
objective deontic	0.18 (4)	0.05 (1)	-78%
dynamic	0.23 (5)	0.15 (3)	-35%
evaluative		0.05 (1)	100%
total (iwcm) (p>0.001, d.f.= 1)[191]	3.46 (75)	0.84 (17)	-76%

Table 67 Meanings of *necessary* in extraposition constructions in COCA (spoken)

Necessary is also the only adjective in my sample that refers to objective deontic obligations resulting from laws, contracts, or agreements such as in example (421). In example (422) the situation is better attributed to economic circumstances. (Admittedly, the monetary decisions are made by groups of people, in this case the administrators of the hospitals, but the geographical location of the hospital, the number of people coming in, and the amount of money they get from medical insurances etc. also tie their hands.) Finally, in example (423) the non-functioning computers create speaker-external circumstances in which a technician is needed.

(421) CULHANE: (*Voiceover*) It works like this: all someone needs to buy a gun in Virginia is a driver's license and another piece of identification. In neither case is it necessary to give proof of residence. (1993/02/21 "Efforts in Virginia for gun control," *CBS Sunday Morning*, COCA)

(422) Some small hospitals, especially in rural areas, cannot afford to pay much, and the contract groups have their profit margin to worry about. Dr-LOUBE: It's often necessary to find a doctor who will work for $ 25 or $ 30 an hour. (1993/11/28, "In good hands? Many of nation's emergency rooms are staffed by contracting out to profit-making companies…" *CBS Sixty*, COCA)

(423) UNIDENTIFIED FEMALE: We had a problem of maintaining our computers, especially our CPUs. […] VAN MARSH *(on camera):* Now, while it is still necessary to call the technicians every once in a while, the owners say that the main component, the PIC, is virtually problem free. (2005/09/17, "Technology and ecology around the world," *CNN Global*, COCA)

[191] Since the criteria for the Fisher exact test are not met, the statistical significance of the changes in meaning cannot be determined. Hence, only the total frequencies in 1990-94 and 2005-09 were submitted to a chi-square test (d.f. = 1, p>0.01, $\chi 2$=23.3 / LL 17.37).

There are also non-modal evaluative and specialized uses (where a particular historical context, for instance, serves as a baseline for the speaker's evaluation) with other adjectives in the COCA data. With four occurrences, the number of evaluative uses of *necessary*, *critical*, and *essential* is very low. Van linden and Davidse specify that evaluative meanings are "typically expressed by *that*-clauses," but can "exceptionally" also occur in *to*-complements (2009: 173). In my data *that*-complements with evaluative meanings are much more common than *to*-complements. Only one expression of evaluative meaning with a *to*-complement was found: In example (424) Mike Menoi, who calls into a TV show where the alleged massacre of Iraqi civilians by U.S. Marines in Haditha (Iraq) is discussed, argues that the death of civilians can sometimes not be avoided and is necessary. This statement is an evaluation of an existing situation and not an opinion on what should be done in the future.

(424) I'm from Scottsboro (ph), Alabama and my question is, I'm in the United States Army and sometimes it's unavoidable or necessary to kill civilians that are a threat to forces. Why is this story any different than the others? (2006/06/03, "Correspondents discuss stories behind the stories," *CNN On the Story*, COCA)

The past tense is particularly suitable for retrospective evaluations. A case in point is example (425), in which the speaker comments on the desirability or necessity of the participation of the Syrian delegation at the Middle East Conference in Madrid in 1991. (Please note that this example is not included in the count in Table 72 since the tense in the extraposed clause is the present perfect.)[192]

(425) And finally, the Syrian delegation arrived during the day. *voice-over* They have said very little so far, have kept a very low profile, but of course it has been very critical that the Syrians take part. (1991/10/29, *ABC Nightline*, COCA)

A case that could be interpreted as evaluative, but in which the use of the mandative subjunctive makes this reading unlikely, is example (426). Here the meteorologist Bryan Norcross explains why his presence at the TV station is essential.

(426) KING How important in all of this - the fact that you are a meteorologist? Mr. NORCROSS: Well, I think it's critical that somebody at a television station be able to understand the reasoning behind various kinds of advisories. (1993/08/24, "The breaking Michael Jackson story," *CNN King*, COCA)

In view of the scarcity of mental focus uses, it is hardly surprising that cognition predicates (e.g. *note*, *understand*, *recognize*, *remember*) – which mental focus constructions usually co-occur with (cf. Van linden 2012: 283-287) – are not identified as attracted collexemes in the performed MDCA. *Necessary* collocates with many verbs that are not particularly common (only 5 of the 75 attracted

[192] In another utterance of this type the German native speaker Cardinal Ratzinger comments on the importance of divine creations in English:

(FN 50) JOSEPH-CARDINAL-RA: … But I think it's always essential that the nature of human beings, it's given. And we understand that men and women are created one to the other. This is a creational relationship and reflecting also, all what is the nature given for the continuation of the human generation, it is essential that God created men and women to be one, as stated in the first chapters of the Bible. (2005/04/20, "Interview with Raymond Arroyo," *Fox HC*, COCA)

collexemes are among the top 100 most frequently used verbs in COCA (spoken), 20 among the top 500-1,000). The majority of them are abstract and many refer to achievements. They are thus well suited to describe individual aims. 7 of the attracted collocates are activity verbs (such as *make*, *fix*, *get*, and *produce*) and 5 are causation verbs (such as *prevent*, *help*, *ensure*, *force*, *affect*). Infinitives that frequently used with core modals like *must* (such as *say*, *know*, *take*, *work*, *tell* etc.) are repelled by extraposed *necessary.*

$p \leq$	Attracted Lexical Verbs	Repelled Lexical Verbs
0.001	*protect*, *prevent*, *succeed*, *keep*, *help*, *achieve*, *create*, *ensure*, *sustain*, *maintain*	*say*, *know*, *take*
0.01	*make*, *preserve*, *support*, *satisfy*, *implement*, *avoid*, *complement*, *defuse*, *denude*, *negate*, *oust*, *outnumber*, *permeate*, *reheat*, *reproduce*, *subdue*, *traffic*, *gain*, *jumpstart*, *spy*, *fix*, *curb*, *cover*, *breath*, *unify*, *perform*, *bring*, *solve*, *sever*, *force*, *get*, *restore*, *train*, *hasten*, *validate*	*work*, *tell*, *come*, *see*
0.05	*construct*, *detain*, *reconstruct*, *overcome*, *accomplish*, *crawl*, *save*, *confront*, *produce*, *modify*, *tweak*, *master*, *relieve*, *free*, *level*, *heal*, *compensate*, *benefit*, *re-establish*, *seal*, *amend*, *stabilize*, *portray*, *evacuate*, *minimize*, *regain*, *import*, *affect*, *defeat*, *address*	*talk*, *ask*, *pay*, *remember*, *put*

Table 68 Distinctive collexemes of *BE necessary* in COCA (spoken) (1990-2012)

6.4.3. Essential

Like *necessary*, *essential* is most frequently used in non-fiction books (cf. also Appendix C.6). It also seems to suffer the same fate, namely declining usage, even if this trend is not statistically significant (τ = -0.11 ns). In COCA there is equally no clear tendency (*essential:* τ = -0.22 ns).

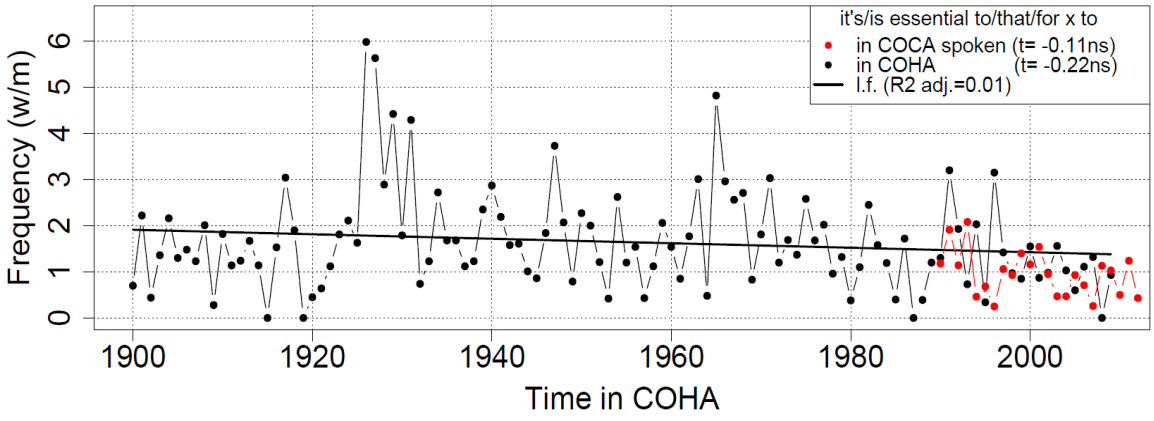


Figure 63 *Essential* in extraposition constructions (iwcm) in COHA and COCA (spoken)

According to Van linden, deontic meanings with *essential* first appear in English in 1842. By contrast, dynamic meanings are said to exist since 1618 (2012: 90). In my data only one dynamic use is found. *Essential* mainly expresses subjective deontic meanings (cf. Table 69). In example (427), for instance, the speaker expresses what he believes should be done in the face of a severe famine.

(427) KOPPEL Now, Mr. Hammock, I gather that a couple of days is just about the margin you think that many people have in Ethiopia. JOHN HAMMOCK, Oxfam America:

Well, it's absolutely essential that the ports be opened as quickly as possible and that food begin to flow again in Ethiopia as quickly as possible. (1991/05/28, "Desperate times in Ethiopia," *ABC Nightline*, COCA)

In two cases, one of which is example (428), the speaker merely reports somebody else's wishes. The French ambassador in example (429) repeats the position of the French government on the best course of action of the US in Bosnia and Herzegovina.

(428) … we will talk with both the prosecutor and the defense attorney in the Henry Hernandez case. Both of them insist it is essential that Brian Karem reveal his sources. (1990/07/06, "Texas reporter jailed for protecting," *ABC Nightline*, COCA)

(429) MR-MacNeil: How does France think U.N. forces should deal now with Bosnian or Serb fighters who keep shooting, especially at the efforts to get the supplies out of the airport and into airport? AMB-MERIMEE: Well, it's very essential that first Sarajevo airport be kept opened (1992/06/30, "Mercy mission; taxing issue," *PBS NewsHour*, COCA)

In example (430) the doctor is speaking about a medical necessity. Even though some medical decisions are open to debate or even controversial, it seems safe to conclude that we are dealing with a simple case here in which the functioning of the human body and the natural interest of the unborn child dictate the course of action.

(430) Dr-BRIGHTMAN: [...] yes, a woman should get a vaccine regardless of where they are during the course of their pregnancy. If a woman has the virus, you know, during the course of their pregnancy, it can have differing significance depending on when they get sick; for example, during the first trimester it's essential that a woman treat her fever [...] -- when a woman's exposed to a high fever during pregnancy it can potentially have adverse effects on the fetus. (2009/ 10/ 20, "Dr. Dan Carlin and Dr. Rebecca Brightman discuss the swine flu," *NBC Today*, COCA)

Meaning in w/m (N= 48)	1990-1994	2005-2009	Difference
subjective deontic (including 2 descriptive uses)	1.46 (32)	0.64 (13)	-56%
dynamic		0.05 (1)	+100%
evaluative		0.10 (2)	+100%
total (iwcm) (p>0.025, d.f.= 1)	1.46 (32)	0.79 (16)	-47%

Table 69 Meanings of *essential* in extraposition constructions in COCA (spoken)

In one of the 48 occurrences of *essential*, a desired mental focus is specified (2.1%). Van linden, who identifies a share of 1.5% mental focus uses in her sample of 200 uses in BrE (2012: 184), observes that all of them "have a combined pattern of complementation, with a primary *to*-complement in turn complemented by a (secondary) *that*-clause" (2010a: 734, 2012: 280), yet in example (431) we find both a primary and a secondary *that*-clause. Such near-adjacencies of identical grammatical items tend to be avoided (cf. Rohdenburg 2003: 205). Here the use of the personal pronoun makes the request more concrete.

(431) Again, under our American way of life it's absolutely essential that we understand that the police are here to help us, the FBI is here to help us, and to help people cope with what is actually a very difficult time, where a man, as President Bush has said,

intends to carry terrorism around the world (1991/01/25, "U.S. safety," *ABC Nightline*, COCA)

Since there is only one mental focus use of *essential* with *understand* in my data, it is hardly surprising that no cognition verb can be found among the attracted collexemes of *essential.* As in the case of *necessary*, many of the collexemes are abstract verbs. Neither *necessary* nor *essential* are used in formulaic utterances (with verbalization predicates). Both are repelled from the verb *say.*

	Attracted Lexical Verbs	Repelled Lexical Verbs
$p \leq 0.001$	*protect*, *preserve*, *challenge*, *keep*, *emerge*	
$p \leq 0.01$	*repudiate*, *dismantle*, *create*, *assert*, *adhere*, *meet*	
$p \leq 0.05$	*conclude*, *declare*, *reveal*, *force*, *succeed*, *continue*, *demonstrate*	*say*

Table 70 Distinctive collexemes of *essential* in COCA (spoken) (1990-2012)

6.4.4. Imperative

In contrast to *necessary* and *essential*, *imperative* is more common in magazines than in non-fiction books (in eight of eleven decades, the highest frequency is found in magazines). There seems to be a tendency towards an increase in both COHA and COCA, but correlation tests do not show any statistically significant results ($\tau = 0.11$ ns, $p = 0.10$, COCA (spoken): $\tau = 0.26$ ns).

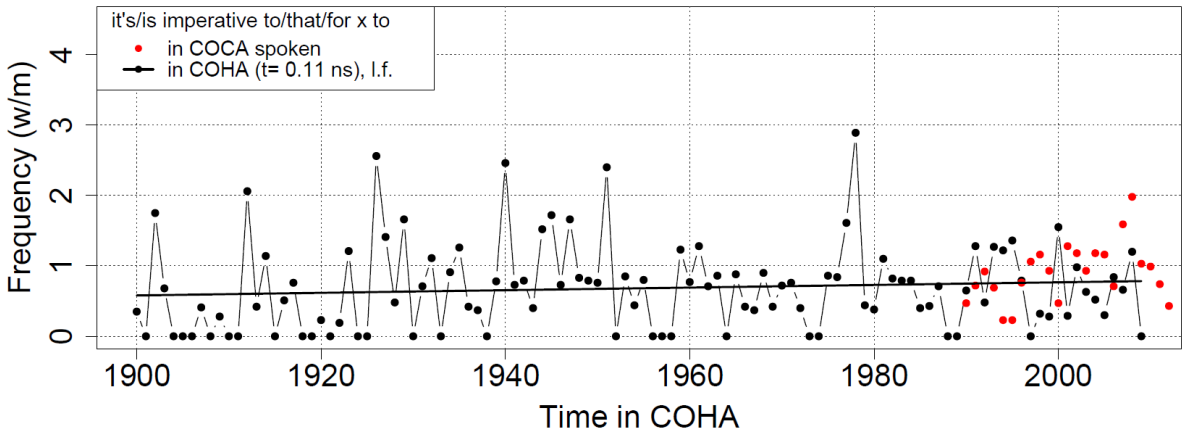


Figure 64 *Imperative* in extraposition constructions (iwcm) in COHA and COCA (spoken)

The use of the adjective *imperative* seems to imply that the situation is very urgent and that the proposed action is indispensable. In the OED *imperative* is characterized as expressing a command (first attestation in 1598) and "demanding obedience, execution, action, etc." (first attestation in 1823, "*imperative*, adj." 3, 4, OED). Two of the attracted distinctive collexemes of *imperative* are activity verbs: *get* and *open* (cf. Table 71 below). It is thus not surprising that *imperative* is also used in directives, even if such occurrences are rare (7%). Example (432) is a case in point: The soldier clearly gives an order to his subordinates.

(432) SOLDIER: When you hit the beach, no matter where you hit, drive right straight forward into any objective in front of you. Destroy all the installations there are in

front of you, and it's imperative that all these defenses be reduced be reduced as quickly as possible. (1994/06/05, "Events of June 5th, 1944," *NPR ATC*, COCA)

Cases in which subjective deontic meanings are expressed account for the majority of the uses of extraposed *imperative* (93%). In example (433) the journalist Ted Koppel stresses the necessity not to allow genocide again. The majority of the attracted collexemes (none are repelled) mirror this strong focus on personal opinions. Again, there are no cognition verbs among the collexemes.

(433) KOPPEL You put it in harsh terms and obviously, particularly when one thinks of what happened to the Gypsies during the Second World War, it is imperative that anything similar not be allowed to happen again. (1992/10/07, "Germany's ethnic turmoil," *ABC Nightline*, COCA)

Meaning in w/m (N= 27)	1990-1994	2005-2009	Diff.	Attracted Collexemes (Lexical Verbs)	
subjective deontic	0.46 (10)	0.74 (15)	+63%	$p \leq 0.01$	*permit*, *view*
subjective deontic (directive function)	0.05 (1)	0.05 (1)	+ 9%	$p \leq 0.05$	*unite*, *get*, *quit*, *welcome*, *open*, *choose*, *rely*
total (iwcm) (p>0.5, d.f.= 1)	0.50 (11)	0.79 (16)	+58%		

Table 71 Meanings and distinctive collexemes of extraposed *imperative* in COCA (spoken)

6.4.5. *Critical* and *Crucial*

Critical and *crucial* have been used as English adjectives since the 16th and 18th centuries respectively (cf. Van linden 2012: 105, 111; cf. also Van linden 2010b for the semantic development of *critical*, *crucial*, and *essential*), but, as we have seen above, they only start appearing in extraposition constructions in AmE in the 1960s and markedly increase in use from that time on (τ = 0.55*** | τ = 0.53***, COHA). *Critical* is more frequent in COCA (spoken, 1.20 w/m, 1990-2009) than in the same time frame in COHA (0.90 w/m), whereas the situation is reverse for *crucial* (0.62 w/m vs. 0.89 w/m). For both verbs, there is a no clear tendency towards a decrease or an increase in COCA (*critical*: τ = 0.02, p=0.92, *crucial*: τ = 0.12, p=0.43)

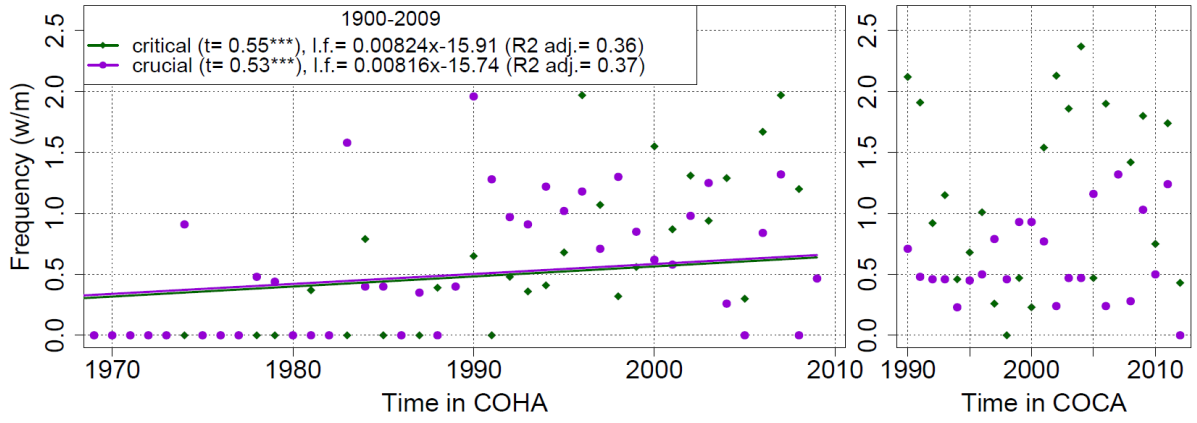


Figure 65 *Critical* and *crucial* in extraposition constructions (iwcm) in COHA and COCA (spoken)

Both adjectives mainly express subjective deontic meanings (cf. example (434) and Table 72 below). One subjective deontic use of *critical* and four uses of *crucial* are merely reported (cf. ex-

ample (435) below). In some rare cases, the utterances function as requests: In example (436) the speaker instructs the audience to listen. The only evaluative meaning found with *critical* is discussed above in Ch. 6.4.2.

(434) JAMES BAKER, Secretary of State: Now, more than ever before, it is crucial that the Soviet leadership seize the present opportunity to break with old ways that have proved unworkable before (1991/06/09, *ABC Brinkley*, COCA)

(435) He says it's critical that Congress act now. (1992/06/30, "Mercy mission; taxing issue," *PBS NewsHour*, COCA)

(436) Can we play that again, by the way, Chet? I want -- I want -- I want to -- I want you people -- this is just critical -- this is crucial that you hear this. Can we have it again? Let -- let me know when it's ready to go, because it -- is it ready? Listen again very carefully […] (1992/11/17, *Independent Limbaugh*, COCA)

Both adjectives collocate with the cognition verb *understand*, *critical* also with *recognize* (cf. example (437) below) and *acknowledge.* These uses direct the listeners' attention to a statement that the speaker considers particularly important (cf. example (438) below). The mere fact of mentioning the issues is often meant to function as an eye-opener for the audience or the addressee.

Meaning in w/m	*critical* (N= 48)			*crucial* (N= 22)		
	1990-1994	2005-2009	Diff.	1990-1994	2005-2009	Diff.
subjective deontic	0.91 (20)	1.24 (25)	+30%	0.46 (10)	0.30 (6)	-35%
subjective deontic with (possibly) directive function	0.05 (1)	0	-100%	0.09 (2)	0	-100%
descriptive: subjective deontic	0.05 (1)		-100%	0.05 (1)	0.15 (3)	+226%
evaluative	0.05 (1)	0	-100%			
total (p>0.5, d.f.= 1)	1.05 (23)	1.24 (25)	+18%	0.59 (13)	0.45 (9)	-25%

Table 72 Meanings of *critical* and *crucial* in extraposition constructions in COCA (spoken)

(437) DR-BRODER: I think if you add up all those factors, issues of access to care, access to early diagnosis, knowledge about prevention, and other cultural habits that I think are quite important, it's critical to recognize that there are a number of lifestyle issues that can affect cancer, not in every case. (1990/09/10, *PBS NewsHour*, COCA)

(438) First of all, I think no one would deny that the presence of insurance has contributed to the rise in costs. But I think more importantly, it's really crucial to remember that what's really driven the rising cost is a proliferation of technology [...] (1992/07/28, "Health care crisis," *CNN Sonya*, COCA)

$p\leq$	Lexical Verbs Attracted to *Critical*	Lexical Verbs Attracted to *Crucial*
0.001	*understand*, *preserve*	*enthuse*, *have*, *understand*
0.01	*retake*, *recognize*	*get*, *let*
0.05	*evaluate*, *shift*, *continue*, *back*, *train*, *acknowledge*, *find*	*seize*, *control*, *allow*, *choose*

Table 73 Distinctive collexemes of *critical / crucial* in COCA (spoken) (1990-2012)

My analysis has thus brought various insights about the use of *necessary*, *essential*, *imperative*, *critical*, and *crucial* to the fore: Whereas extraposed *necessary* drastically declines in use in COHA (τ = -0.51***), the tendency towards a decrease is less pronounced in the case of *essential* (τ = -0.11 ns). *Imperative* increases slightly in use (τ = 0.11 ns), yet this change is not statistically significant, while extraposition constructions with *critical* and *crucial*, which only emerge in the 1960s, experience a rise towards the end of the analyzed time span (τ = 0.55*** | τ = 0.54***). These mixed tendencies mirror on the one hand the reservations speakers might have towards using such formal expressions and testify on the other hand to the appeal for speakers to use phrases that seem explicitly objective (cf. Halliday 2014: 679) and thus more face-friendly than the modal auxiliaries. In light of these findings it seems only natural that subjective opinions are predominantly expressed in the analyzed utterances (80.7%). Evaluative meanings are found with *necessary*, *essential*, and *crucial*, but they are rare (3.6%). Uses that direct the focus of the listener to a particular statement are also infrequent (4.3%). *Imperative* is not used in this sense in my sample. Contrary to previous reports that such cases do not exist (Van linden 2010a), one occurrence with both a primary and a secondary *that*-complement was identified (example (431) above). Unfortunately, my database is very small (N= 232). More studies are needed to confirm the tendencies detected here. One promising avenue of further research is the extension of the semantic analysis to other text types such as academic writing and magazines, in which these adjectives are more frequently used[193], and to weaker adjectives such as *important* (τ_{coha} = 0.55***) or *desirable* (τ_{coha} = -0.48***).

[193] Cf. the frequency of *it's/is necessary|essential|imperative|critical|crucial that|to* + inf. in COCA: academic writing (40.71 w/m), magazines (11.53 w/m), newspapers (8.42 w/m), spoken (8.13 w/m), fiction (1.87 w/m).

6.5. Modal Nouns

The ensuing discussion focuses on the use of nouns in those contexts in which they could be replaced by a modal auxiliary. (Detailed information about the use of these nouns in all contexts can be found in Appendix E.1. There the focus lies on the relative increase of the subjunctive and its frequency in various text types. As Figure E.5 shows, it is primarily found in newspapers).

10,865 uses of *constraint*, *demand*, *need*, *necessity*, *obligation*, *request*, and *requirement* in COHA were examined. After relative clauses and other irrelevant cases had been eliminated, 8,287 occurrences with *to*-infinitives and 1,385 occurrences with *that*-complements were analyzed. The contexts in which modals could have been used instead of the nouns were then determined via manual analysis. Only 6.2% of the total number of occurrences (N= 535) contain *that*-complements, whereas the majority of them has *to*-infinitives. Changes over time reveal countervailing tendencies in the use of complementation patterns: The striking increase of the *to*-infinitive ($\tau = 0.71$***) stands in vivid contrast to the notable decrease of *that*-complements ($\tau = -0.22$***).

It was discovered that only *obligation*, *need*, and *necessity* can frequently be substituted by a modal verb: *obligation* 252 times, *need* 89 times, and *necessity* 20 times. Moreover, one occurrence of *requirement* was identified. The infinitives after which these nouns were found are *be*, *confirm*, *have*, *emphasize*, *explain*, *express*, *feel*, *imply*, *mean*, *understand*, *stress*, *see*, *realize*, *recognize*, *question*, and *rediscover*. Two exemplary paraphrases demonstrate that the use of modals is a viable alternative (cf. examples (439)-(440) below). When a (semi-)modal verb is used, the focus lies on the subject that is asked to realize the SoA, but with nouns, the group of addressees as well as the origin of the obligation seem more diffuse, which, in turn, makes the utterances more face-friendly and indirect.

(439) The transformation of attitudes on Capitol Hill from indifference or deep-seated hostility to their current positive status confirms the necessity that a foreign country have a strong domestic base of support (Rubinoff, A. G. (2001) "Changing perceptions of India in the U.S. Congress." *Asian Affairs* 28.1: 37-61, COHA) → *that a foreign country needs to have a strong…*

(440) there's a requirement to report it into cyberspace, not to punish, not to find fault. (2005/04/16, *CNN Dolans*, COCA) → *We/You/They must report it into cyberspace…*

In other cases it is theoretically possible but cumbersome to rephrase the sentence using a modal verb. The paraphrase in example (441) is a somewhat lengthier alternative; in example (442) an active sentence has to be turned into a passive one.

(441) Pres-BUSH: We talked about his need to go up to Capitol Hill (2007/03/15, *CBS Early*, COCA) → *We talked about the fact that he must / should / has to / needs to etc. go up to Capitol Hill.*

(442) CHRIS-CUOMO-1ABC-# (*Voiceover*) The President is expected to talk about the need to increase the size of Afghan security forces. (2007/02/15, "News headlines," *ABC GMA*, COCA) → *The President is expected to talk about the fact that we need to increase …. | that the size of Afghan security forces must / should / has to / needs to etc. to be increased.*

These cases were not counted as instances in which a substitution is possible. Similarly, whenever the noun is modified by an adjective like *moral*, *solemn*, *special*, etc., such as in example (443), a component of meaning would be lost if a modal was used. Therefore, these uses, which account for 0.6% of the data in COHA and 3.4% in COCA (spoken), were also removed from the database.

(443) If I owned property like that, I'd feel it a moral obligation to make it comfortable and adequate. (1964/09/22, "This old house… " *Time Magazine*, COHA)

The frequency of the remaining occurrences (light purple line, labeled 'nouns iwcm,' i.e. interchangeable with core modals, illustrated in Figure 66) increases over the course of the 20th century (τ = 0.50***). With the help of VNC-analysis (cf. Fig. C.15 in Appendix C.7), two periods of use can be distinguished: one from the beginning of the 20th century until 1946, with an average frequency of 0.94 w/m, and one from 1947 until 2009, with a higher average frequency of 1.67 w/m. The final curve of the 3rd degree polynomial function (R^2 adj. = 0.54) signals that there may be a decline in the 21st century, yet more data would be needed to confirm this very tentative assumption.

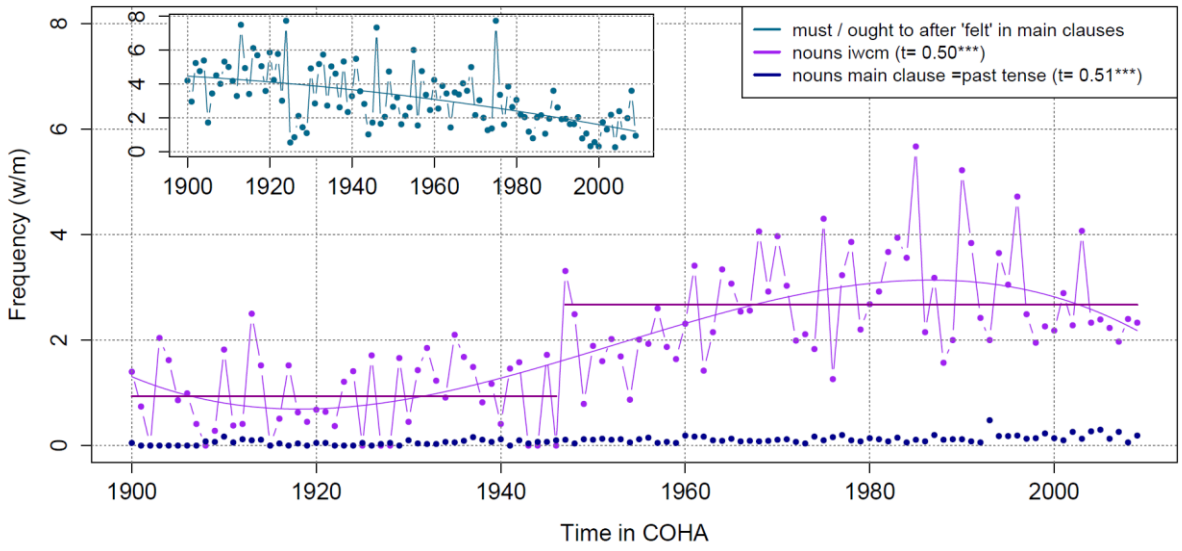


Figure 66 Nouns (iwcm) in COHA

Figure 66 also shows an increase (τ = 0.51***) in the use of these nouns after past tense forms of verbs like *feel*, *see*, and *stress* (such as in example (444) below), whereas the frequency of *must*, *should*, and *ought to* in these contexts (cf. example (445) below) declines (τ = -0.40***). This decrease is in line with Jacobsson's observation that past tense *must* is "another doomed usage that refuses to die although its death is still repeatedly announced" (1994: 171).

(444) Mr-LaLIBERTE: And he felt -- he felt that we had an obligation to disclose that fact. (2009/03/22, "Inside the financial fiasco: Mortgage madness; how the recession was started by bad mortgages," *NBC Dateline*, COCA)

(445) But when the Soviets secretly shipped nuclear missiles to Cuba in 1962, Kennedy felt he must respond and in October declared a quarantine' of the island. (Barone, M. (1993/11/15) "The lost world of John Kennedy." *U.S. News & World Report* 115.19: 38-44, COHA)

Yet with an average frequency of 1.6 w/m in the 2000s after *felt* alone, the use of modals is still a lot more frequent than that of the analyzed nouns after *felt*, *saw*, *stressed* etc. (cf. Figure 66).[194] The increase in the use of nouns after past tense main clauses (+ 0.87 w/m) can only be considered a partial compensation for the decline in the use of the modals (here after *felt* alone: -3.26 w/m).

Semantics

Contrary to what might be expected, the analyzed nouns primarily express subjective deontic meanings directly uttered by the speaker (cf. example (446), 57 % of the occurrences) and not objective deontic meanings. Reported subjective deontic uses (6%) are comparatively rare. In 30% of all occurrences, the source of the obligation is a law or a collective agreement (as in example (447)). There are also a few dynamic uses of these nouns (7%, cf. example (448) below).

(446) MR-FITCHER: Yes. I feel the United States has an obligation to protect even third world countries. (1990/12/20, *PBS NewsHour*, COCA)

(447) Iran must explain to the world why they had a program. Iran has an obligation to explain to the IAEA [International Atomic Energy Agency] why they hid this program from them. (2007/12/11, "Political headlines," *Fox Hume*, COCA)

(448) KAREN-FREDETTE: Even if you choose to live as a solitary you still have the need to communicate. (2009/11/28, *PBS NewsHour*, COCA)

Meaning in w/m (n= 354)	1990-1994	2005-2009	Difference	Pearson Residuals	
subjective deontic	6.19	3.57	-42%	0.44	-0.57
descriptive: subjective deontic	0.46	0.54	+20%	-0.89	1.16
objective deontic	2.91	2.13	-27%	-0.41	0.54
dynamic	0.82	0.40	-52%	0.40	-0.52
total (iwcm)	10.38	6.64	-36%	$\chi^2 = 3.5$, $p > 0.05$, $V = 0.06$	

Table 74 Meanings of *need*, *obligation*, and *necessity* in COCA (spoken)

With the exception of reported subjective deontic uses, all meanings decline between 1990-1994 and 2005-2009, but according to a chi-square test, the changes in distribution are not statistically significant (d.f. = 3). Overall, the use of these nouns declines by 36%. This pronounced decrease in spoken language is another argument in favor of the hypothesis (derived from the data in COHA) that the use of these nouns will decline in the future.

In sum, the analyzed nouns thus only make a small contribution to the expression of obligation in spoken AmE. Even if I did not to restrict my focus to only those contexts in which the core modals could have easily been used instead of these nouns, the frequency of these nouns would only amount to 20.2 w/m in 1990-94 and 12.8 w/m in 2005-09 (N=1,313). Nonetheless, the examination of these modals nouns reveals interesting new facts about their usage: the surprisingly skewed distribution towards subjective deontic meanings, the pronounced increase in 20th century written English, and their decline in spoken AmE.

[194] Only main clauses with *felt* were considered here (cf. Appendix A.3 for the search commands). If we solely look at *should*, there is no significant trend (τ = -0.02 ns vs. *must:* τ = -0.47***, *ought to:* τ = -0.24***).

6.6. Other Expressions of Obligation and Necessity

There certainly is a multitude of other expressions of obligation and necessity that could not all be inspected in this study. In some cases, the necessary manual analysis would be too time-consuming; in others, data extraction would be very difficult. In the following, only a few other possibilities to express obligation, necessity, and desirability will receive brief mention: infinitive clauses, (indirect) questions, declarative sentences functioning as demands, imperatives, and phrasal verbs.

Infinitive Clauses

Leech (2013: 110) draws attention to the fact that it is possible to replace modals with infinitive constructions in dependent clauses (cf. example (449) below) which can also function as directives. This type of use is also discussed under the heading of 'covert modality' (cf. Bhatt 2006).

(449) MR. MEDINA Don't try to tell me what to do. → *what I should do* (Cruz, M. (1994) *Latins in La La Land*, COHA

	COHA				COCA (spoken)			
	τ =	1900s	2000s	Difference	τ =	1990-94	2005-09	Difference
what to	0.62***	28.2 w/m	60.3 w/m	+114%	0.52***	41.1 w/m	47.8 w/m	+16%
when to	0.40***	3.1 w/m	6.9 w/m	+118%	0.62**	5.6 w/m	6.9 w/m	+24%

Table 75 Dependent clauses with *what* | *when to* + infinitive in COHA and COCA (spoken)

Exemplary searches for dependent clauses with *what to* and *when to* + infinitive show increases in use in both analyzed corpora (cf. Table 75, d.f. =1, $p < 0.01$), but it would be necessary to verify that an obligation sense is always intended in the case of *when to* (cf. example (450) below). Likewise, constructions with *who to* and *where to*, in which *can* and *should / must* / *have to* could be used as substitutes (cf. examples (451)-(453) below), would equally have to be manually analyzed. *How-to*-clauses seem to replace *can* or *could*, not *must* or *should* (cf. also Bhatt 2008: 123).[195]

(450) Watching him with my son reminds me of something else I learned: Know when to let go. (2007, *Men's Health* 22.2: 82-85, COHA) → *where I can / should let go*

(451) Working with the same crew for months on the sub, she learned who to trust and who to avoid (Kasai, K. I. (2009) *Ice Song.* New York: Del Rey / Ballantine Books, COHA) → *who she could trust and who she should avoid*

(452) "… And the farmers are beginning to ask where to buy theme machines." [*sic*] (1947/04/01, *Saturday Evening Post* 219.27: 20-47l, COHA) → *where they could buy the machines*

(453) He paid them and gave them instructions where to take the cargo. (Tiedemann, M. W. (1998) *Fantasy & Science Fiction* 95.6: 55-71, COHA)

Thus, while there certainly is an increase in the use of embedded infinitival clauses headed by *what* and *when*, their contribution to a compensation for the decline of the modal verbs of obligation and

[195] Note that Bhatt also observes that a paraphrase with *can / could* is also fitting in the case of *where* (2006: 123). However, he points out that the variation between *could* and *should* does not only depend on the nature of the *wh*-phrase, but also on the contextually salient goals and the semantics of the embedding predicate (2006: 7).

necessity is small. However, it might be informative to investigate the use of dependent clauses headed by nouns (cf. example (454), Aijmer's example (listed as (455) below) of noun modification, and Leech 2013: 110). Again, a time-consuming manual analysis would have to be carried out. Since Leech reports that the potential for core modals to be replaced by these *to*-infinitives is very low (merely 3% in his 200-word sample, 2013: 110), I refrained from making this effort.

(454) "The defendant and his lawyer are present, the assistant district attorney is present. Shall we bring in the jurors, Your Honor?" "You both ready to go forward? Any housekeeping to attend to?" (Fairstein, L. A. (2007) *Bad Blood.* New York: Scribner, COHA) → *Any housekeeping that you need to / must / have to attend to?*

(455) Three points to consider → *Three points which need to or must be considered* (Aijmer 2015: 274)

(Indirect) Questions with Core Modals

Carter and McCarthy believe that questions with other core modals than those discussed above, i.e. with *will*, *would*, *can*, and *could*, can also function as directives, but allow the speaker "to make the directive softer and more polite" than imperatives (2006: 685). A good illustration is example (456), given by Coates (1983: 172). This use of a *yes-/no*-question with *will* or *can* as a "polite way of getting someone to do something" is conventionalized in English, but not in other languages (Comrie 1984: 282).

(456) Will you listen to me and stop interrupting! (Lan15-515, quoted by Coates 1983: 172)

These speech acts have come to be known as "whimperatives" – a term introduced by Sadock in 1970 (a blend of *whimper* and *imperatives*). While much has been said about the function of whimperatives, very few statements have been made about their actual frequency in English. A rare exception is Coates' study (1983). She observes that uses with *will* (and *would*) are quite common in spoken language, whereas the use of whimperatives with *can* and *could* is unusual (1983: 98, 121). In her sample, 19% of the utterances with *will* (n= 200, SEU) are questions that actually function as directives (1983: 171-172). According to Coates, *would you* is a "toned[-]down" alternative to *will you* and directives with *would* are less common than those with *will* in her sample (1983: 212).

In light of the large number of uses of *will* (2,238 w/m), *would* (2,791 w/m), *can* (2,500 w/m), and *could* (1,441 w/m) in the spoken language section of COCA, an exhaustive analysis of all occurrences would go beyond the scope of this study. An exploratory search suggests that whimperatives are rare in COCA (spoken).[196] Only three occurrences of *will you* + infinitive collocating with an exclamation mark are found (cf. example (457), plus an additional two with both a question mark and an exclamation mark), whereas *can*, *could*, and *would* do not occur in this type of usage.

(457) RIVERA: Will you shut up! (1992/08/21, "Women involved with mob members," *Independent Geraldo*, COCA)

[196] The following query was used: *will you* + ! in the following 9 words. A manual analysis of the KWICs ensued.

Questions with *please* (such as example (458) below) are much more common (average: 4.6 w/m, sd: 1.7 w/m) and occur with all four verbs.[197] *Would* and *can* account for the majority of uses (147 and 145 uses respectively), *will* only for about 50 occurrences. These types of occurrences are illustrated in examples (458) to (460) below. There is a slight tendency towards a decline of these uses in the spoken language section of COCA, but the trend is not statistically significant (τ = -0.67 ns).

(458) THANIA BROCK: Can you repeat the question, please? (1996/08/13, "The Republican National Convention," *ABC Nightline*, COCA)

(459) Judge: *(In court)* Would you hand it to the sheriff, please. (2007/08/25, "Two wigs, a gun and a murder," *CBS 48 Hours*, COCA)

(460) LEMON: Hang on. Will you let me finish, please? (2010/08/15, *CNN News*, COCA)

Of course, whimperatives can also be encountered in embedded contexts, for example after *see if*..., *I WANT to ask*... , or *I WONDER if*... (cf. examples (461) and (462) below). The embedding here leads to an increase in distance between speaker and addressee and thus attenuates the force of the request (cf. Halliday 2014: 705 and Ch. 2.2 above)

(461) I spotted on my own bookshelf, a book actually called, "The most brilliant thoughts of all time." […] I couldn't really figure out what they were talking about. Here are some of them. See if you could figure out what's up with these brilliant thoughts?! (2001/11/14, *CBS Sixty Minutes*, COCA)

(462) BLOCK: You have a dance tune that you learned from Joe Thompson on the new CD. It's called "Cindy Gal." And I wonder if you would play us a version here in the studio? (2010/02/15, "Old-time music with a twist," *NPR ATC*, COCA)

See if and *I want|wanted to ask* are rare in COCA (spoken), with only four uses each. *Wonder| was wondering if* is more frequent (about 150 uses in COCA, 1990-2012). However, like so many other expressions that can function as directives, it declines in use (τ = -0.41**).

Declaratives

Lyons stresses that declaratives such as example (463) can also function as demands and may thus be analyzed as epistemic or deontic (1977: 847). Collins observes that deontic uses of *will* account for 1.3% of all occurrences in C-US. The number is higher in his spoken data (1.9%, 9 of 486 occurrences) than in his written data (0.3%, 1 of 290 occurrences), but the numbers are very low and thus not particularly reliable (cf. Collins 2009a: 179).

(463) The successful candidate will be a woman in her mid-thirties of demonstrated ability. (Lyons 1977: 847)

(464) You'll clear the bikes (ICE-GB 2SA-054 35, quoted by Collins 2009a: 134)

Charnock explains that although *may* usually has a permissive sense in legal documents, it functions like *must* under particular circumstances (2003: 177). In a comment on a statute specifying that a schoolboard "may" provide free transportation for the pupils, Curran (1939: 151) observes:

[197] A search was made for the use of *please* up to two words before and eight words after *could|can|will|would you|we|he|she* [v?i*]. The results were manually analyzed.

> Whether the word "may" in a statute is to be construed as mandatory and imposing a duty, or merely as permissive and conferring discretion, is to be determined in each case from the apparent intention of the statue as gathered from the context.

Collins reports that these directive utterances with *may* are more frequent than subjective uses of *may* in which the speaker permits something or asks for permission. They are primarily found in "the statement of rules and regulations in bureaucratic and administrative writing" (2009a: 95, cf. example (465) below).

(465) Your local Training Officer can assist you in understanding and meeting your obligations. Any problems that arise may be referred to the Vocational Training Board. (ICE-AUS W2D-002 258, quoted by Collins 2009a: 95)

Determining the frequency of these occurrences without reading every keyword in context is impossible. Even an exemplary search of a 200- or 300-word sample, for instance, could only lead to uncovering some cases, but not to any meaningful conclusions about the frequency of use. Typical of legal documents, these uses are not prone to appearing in spoken language.

Moreover, indirect requests can be expressed by *need* or *want* statements (cf. Erwin-Tripp 1976: 29-30). The demands in which the speaker announces needing the addressee's help (cf. example (466) below) are the most direct ones. They are often uttered by presidential candidates in my data. A direct question, the word *please*, or a *thank you* are only added in 7 of the analyzed 140 cases. A good example of such "conventional request embroidery" (Erwin-Tripp 1976: 29) is (467), where the attorney asks for privacy – most likely a demand that other people leave the room.

(466) CHERYLE GARTLEY, President, The Simon Foundation for Continence: […] But sad is a whole lot different than ashamed, embarrassed, stigmatized and unwilling to say to your partner, who should be your doctor in this case when you've got a medical problem, '"Doctor, I need your help. I'm kind of upset about this and it's hard for me to speak about." (199101/11, "Nobody wants to talk about it," *ABC 20/20*, COCA)

(467) *(Footage-from-court)* Unidentified Attorney: I need some privacy with my clients. Thank you. (1992/12/17, "Children becoming orphans in hurricane Andrew's wake," *CBS Street*, COCA)

A search for *I need* + place holder + noun in COHA (τ = 0.64%, +594%, from 2 w/m in the 1900s to 14 w/m in the 2000s) and in COCA (spoken) suggests that these constructions increase in use (+50%, from 2.6 w/m in 1990-94 to 3.9 w/m in 2005-09, cf. also Johansson 2015).

Concealed Passives

Need, *require*, and *want* (as well as *deserve*) can also occur in what Huddleston and Pullum call "concealed passives" (2002: 1199), i.e. passive clauses with gerund-participles as heads (cf. also Pullum 2014: 63), as evidenced in examples (468) and (469).

(468) "Dad," I say. # "What?" His hair needs combing. # (2000, "Hush in this Heat." *Southern Review* (Autumn) 36.4: 772-785, COHA). → *needs to be combed*

(469) There's no magic formula for presenting national will. It's doggone difficult. It requires a larger commitment of national resources toward conventional arms. It requires persuading West Europeans. It requires hardening the dollar. It requires balancing the budget, stopping inflation.... (Willis, D. K. (1980) "Carter's man in moscow sees contest of national wills." *Christian Science Monitor* 1980/12/16: 5, COHA) → *the government must / has to / needs to persuade West Europeans etc.*

Exemplary searches in COHA suggest that the frequency of *need* in concealed passives remains relatively stable between 1900 and 2009 ($\tau = 0.03$ ns, average: 2.6 w/m, sd: 1.1 w/m), while *require* becomes more common ($\tau = 0.40$***, average in the 1900s: 0.4 w/m, in the 2000s: 2.4 w/m). *Want*, which is a lot less frequent than *need* and *require* in this type of usage, slightly decreases in use, but there is no statistically significant correlation between time and frequency ($\tau = -0.07$ ns, mean and sd: 0.3 w/m). The same ranking in frequency is found in COCA (spoken): *need* (mean: 1.3 w/m), *require* (mean: 1.0 w/m), and *want* (mean: 0.6 w/m). However, trends are even harder to identify here (when four periods, i.e. 1990-94, 1995-09, 2000-04, 2005-09, 2010-2012, are distinguished: *need:* $\tau = -0.2$ ns, *require:* $\tau = -0.6$ ns, *want:* $\tau = 0.2$ ns).

Dialectal uses of *need* or *needs* with a past participle (cf. Murray *et al.* 1996), here illustrated in examples (470) and (471), are even rarer. They only occur with a frequency of 0.16 w/m in COCA (spoken). In COHA there are just 15 uses from the 1940s on.

(470) He's trying to change a system that badly needs changed. (2001/01/26, "Mexico's new start under President Vicente Fox," *CNN Insight*, COCA)

(471) That is the major opportunity and thing that needs done now. (1990/03/14, *PBS NewsHour*, COCA)

Imperatives

Automatically singling out imperative forms is extremely difficult in COCA and COHA because the results of searches for finite verb forms made with the query [v?0] include uninflected present tense verb forms. To get an idea of possible changes, punctuation marks and uses of such verb forms followed by *me*, *her*, *him*, *us*, *them* were identified in COHA (cf. example (472) below). There is a slight increase in the use of these constructions (from 156 w/m in the 1900s to 163 w/m in the 2000s, $\tau = 0.07$ns, $\tau_{dec} = 0.03$ns). Yet it would be too much of a stretch to conclude that there is a general rise in the use of imperatives. The question has to be answered in future studies.

(472) It's your duty to Timothy, to me, to the family. Bring him home, let him lie beside your father in the churchyard, where he belongs. (Todd, Ch. (2009) *A Matter of Justice.* New York: William Morrow, COHA)

A search for hortative *let us / let's* + infinitive also revealed that these uses also heavily decline ($\tau = -0.74$***), from an average of 65 w/m in the 1900s to 17 w/m in the 2000s. They thus reinforce the overall trend towards a decrease of modal meanings of obligation.

Phrasal Verbs

Discourse analysis and the study of lexical patterns have led to the identification of other "interesting" alternatives to modal verbs of obligation, such as *have time until/ to …*, *is expected to…*, *it's up to [you] to* (Hunston 2003: 38), *it will be up to X to* (cf. Vincent 2013: 249), *it is the task of X to*, or *it is X's turn to…*(cf. examples (473) and (474) below). In these extraposition constructions, the person or entity under obligation as well as the action that is to be performed constitute new information and are placed in the center of attention (cf. Hunston 2011: 86).

(473) It is the task of government to create an environment in which these qualities are rewarded (2002/12/09, "Analysis: President Bush's economic agenda, and replacing Paul O'Neill and Lawrence Lindsey," *NPR Talk of the Nation*, COCA)

(474) And it's the doctor's turn to learn from his patient. (1999/12/27, "The healer; physician Jerome Groopman treats patients emotionally as well as physically," *NBC Dateline*, COCA)

These chunks are also low-frequency items in the spoken language section of COCA. *It is X's turn to* only occurs 19 times, *it's up to [you] to* more than 300 times. The latter phrase decreases in COCA (τ = -0.14 ns). *It is the task of X to* is solely used twice in COCA (spoken).

Additionally, there are a number of other ways to express directives indirectly (cf. also Carter and McCarthy 2006: 683-698). Only a selection can be examined in exploratory searches. The most difficult group to identify automatically in corpora are hints like *It is cold in here*, meant to make somebody shut a window or door. Other types that are not treated in more detail are questions without any modal verb functioning as directives (such as "Gotta match?", Erwin-Tripp 1976: 29) or statements stressing the merits of performing a certain action (e.g. with *worth* as in example (475) below).

(475) It is also worth pointing out that every time they did come back, they dropped enough money to buy a G-5 at Billy's tables… (Lupica, M. (2000) *Bump and Run*, COHA)

This brief analysis shows very few changes in the use of the examined expressions (questions with *can*, *could*, *would*, *will* + *please*, concealed passives, imperatives, and phrasal verbs). Just infinitive clauses with *what* and *when* (+114 / 118 % in COHA, + 16 / 24% between 1990-94 and 2005-09 in COCA) and *need* statements increase in use (+ 594% in COHA (1900s/ 2000s), +50% between 1990-94 and 2005-09 in COCA), whereas whimperatives, for instance, – like so many other expressions of obligation – undergo a significant decrease (τ = -0.41** in COHA).

7. Synopsis and Discussion

After the in-depth analyses of the frequency and the meanings of all examined expressions in Ch. 6, the observed developments will now be considered in their entirety. In contrast to Ch. 5, where the changes in frequency of various types of expressions in COHA and the spoken language section of COCA are retraced, the focus now lies on considering the extent of these changes relative to the changes observed in the group of expressions as a whole (Ch. 7.1). Abstracting away from the shades of meanings of each expression, I will then present the overall changes in meaning (Ch. 7.2), showing which verbs, adjectives, and nouns in particular play substantial roles in the decline or increase of a certain meaning. Finally, emphasis will be placed on outlining the key meanings of certain groups of expressions and it will be suggested that there is a functional division of labor (Ch. 7.3).

7.1. Changes in Frequency

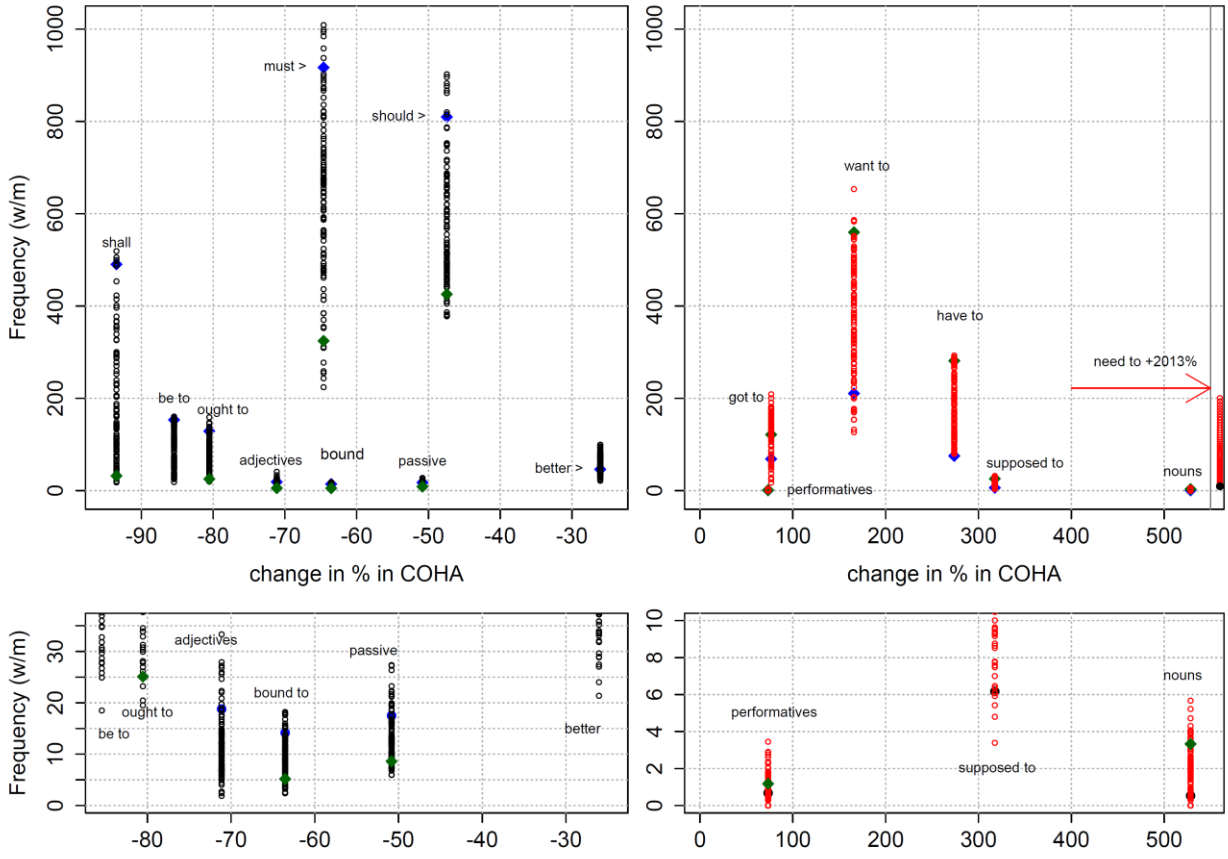


Figure 67 Relative and absolute changes in frequency of all analyzed expressions (iwcm) in COHA

The changes in the frequency of all analyzed expressions between 1900 and 2009 are shown diagrammatically in Figure 67. Normalized frequencies (per million words) are indicated on the y-axis, the corresponding relative changes on the x-axis. To minimize the effect of outliers in 1990

and 2009 and to take the neighboring values into account, the relative changes are calculated on the basis of the functions fitted to these expressions and not with the frequencies for 1900 and 2009 (cf. Ch. 4.3 and the respective chapters for the degrees of these polynomial functions. A graph solely based on the values of these functions is Figure G.1 in Appendix G. The alternative use of average frequencies is also illustrated there.) Blue and green diamonds indicate the starting and end points of these functions. A few additional comments have to be made about the extraordinary increase of *need to* by more than 2000%. As all other changes dwarf in comparison, *need to* is indicated on the far right side of the right panel of Figure 67, but would actually have to be situated at x = 2013. The frequencies of the five analyzed adjectives (*necessary*, *essential*, *imperative*, *critical*, *crucial)*, the nouns *obligation*, *need*, and *necessity*, and the passive and performative forms of *force*, *require*, *oblige*, *urge*, and *compel* are grouped together. In the two small panels in the second row, parts of the graphs are enlarged to shed more light on low-frequency items.

There is no correlation between the absolute frequency (in w/m) in 1900 and the relative change in frequency. As in Millar's study of the TIME corpus (2009: 200-202) and Leech's analysis of Brown and Frown (2003: 228), the sharpest decrease is observed in the case of *shall* (-93%). The ranking in COHA is otherwise almost identical to that in Brown and Frown, which suggests that the results obtained from the two corpora are very robust trends: In order of decreasing relative reductions in frequency we find *shall*, *be to*, *ought to*, *must*, *should*, and *(had/'d) better/best* in both studies. (To my knowledge, *bound to* and passive uses of lexical verbs are not included in any comparable analyses.) Leech (2011: 555-556) classifies *must* and *should* as rather infrequent modals, which experience a decrease in use, as opposed to the high-frequency verbs *would*, *can*, *will*, and *could*, which remain stable. In my data the absolute drop in frequency of *must*, *shall*, and *should* is much bigger than that of all other expressions, yet the picture presented by the relative changes is mixed: The decline in the use of *must* (-65%) and *should* (-49%) is a lot less pronounced than that of the less frequent verbs *be to* (-84%) and *ought to* (-80%) and the mid-frequency verb *shall* (-93%). However, other low-frequency items like *bound to* (-64%) and passive forms of lexical verbs of obligation (-50%) experience a more pronounced decrease than *should* (-49%). Note that all these expressions decline by more than 45%, the smallest reduction being detectable in the case of *(had/'d) better/best* (-26%).

In the right panel of Figure 67, where the expressions that rise in frequency are depicted, the observed changes are even more pronounced, starting at an increase of 73%. Again, there is no correlation between the absolute frequency in 1900 and the relative increase. Some low-frequency items such as *need to* (+2013%), nouns of obligation (528%), and *supposed to* (+317%) rapidly rise in frequency, whereas performatives (+73%) and adjectives (+10%) increase much more slowly. The mid- to high-frequency verbs *got to*, *have to*, and *want to* do not increase by more than 300%. We find at least some link between the starting frequency and the absolute increase in frequency: The higher the starting frequency, the higher is the rise in use, or in the left panel, the

higher the decrease in use. Performative uses of lexical verbs, *bound to*, and adjectives as well as the two verbs at the far ends of the scale, *need to* and *shall*, constitute exceptions: The massive decline of *shall* is linked to its particular association with formal language (cf. Ch. 6.1.3 above). The rapid increase of *need to* only starts in the second half of the 20th century. Thus at the somewhat arbitrary starting point of my investigation, it was relatively rare and a change of this amplitude unforeseeable.

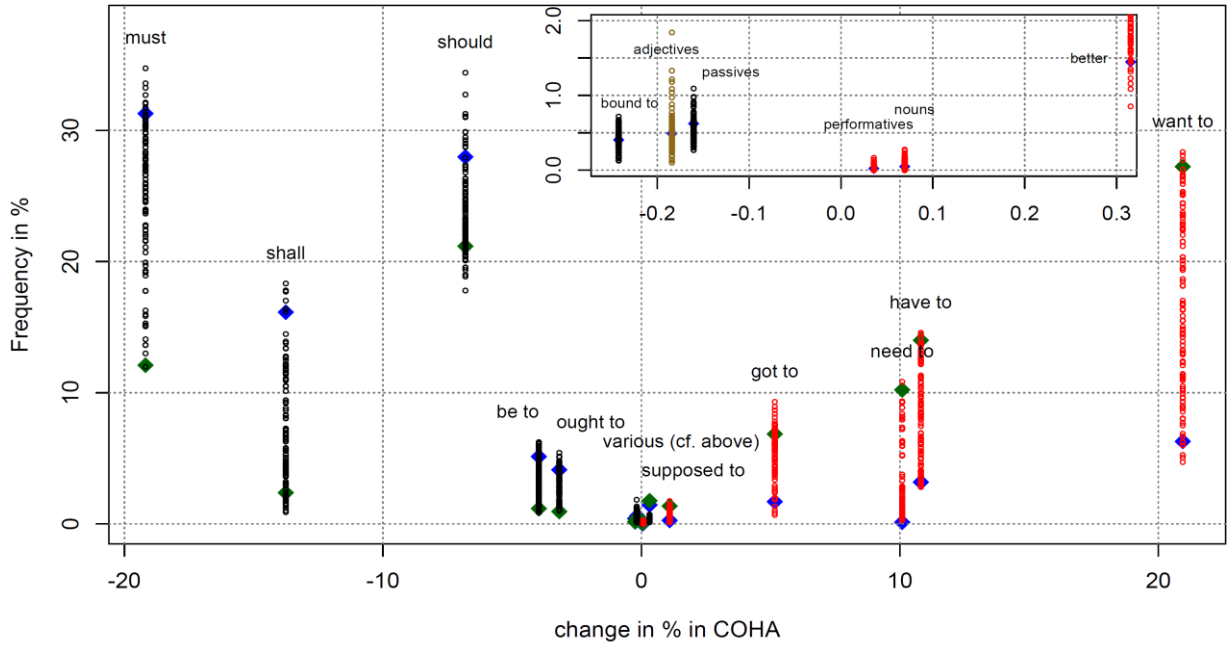


Figure 68 (Changes in) the frequency of all analyzed expressions (iwcm) in relation to the combined frequency of all expressions (iwcm, COHA)

Figure 68 above shows the frequency of the expressions relative to the total frequency of all analyzed verbs, nouns, and adjectives in COHA (τ = -0.70***). The relative frequencies are indicated by black (if x<0%) or red bullets (if x>0%), depending on the position of the expression on the x-axis. The information can be read as follows: Between 1900 and 2009, *shall*, for example, accounts for at least 0.9% and at most 18.4% of all analyzed expressions. Some of these values are extremes, some outliers. Hence, more moderate values, the starting and the end points of the fitted polynomial and linear functions (listed in Appendix G.1), again highlighted by blue and green diamonds, are used as the basis of the calculated overall change displayed on the x-axis (% in 2009 - % in 1900).

Shall experiences a drop in relative frequency (14%), from approx. 16% in 1900 (cf. blue diamond) to 2% in 2009 (cf. green diamond). In the early 20th century, *must* is the expression that accounts for the majority of uses (~31% on average between 1900 and 1910), yet within 100 years, it is overtaken by *should* (21% in the 2000s vs. 12% *must*), *want to* (27% in the 2000s), and *have to* (13.5% in the 2000s). As my objective is to gain as much information as possible about the semantic field of obligation, a point might be made for the exclusion of *want to*, which primarily expresses volition, and *shall*, which is frequently used in formulaic sequences and in reference to

the future. Figure G.3 in Appendix G.1 fulfills these conditions. There the average frequencies in the 1900s and 2000s serve as reference points for the changes presented on the x-axis. Yet very few differences can be observed. Naturally, the remaining expressions occupy higher shares. There are also some minimal changes on x-axis: The relative decrease of *be to* (-1.12%), the adjectives (-0.15%), *bound to* (-0.03%), and *(had/'d) better* (-0.004%) is more pronounced. The highest deviation from the results presented in Figure 68 is that of *have to* (+3.7%).

Figure 68 gives us a good overview of the "big players" of obligation and necessity and the changes in frequency that they undergo in the 20th and early 21st centuries. The clear "winners" are *want to* (27.5%), *have to* (14.1%), and *need to* (10.3%), closely followed by *(have) got to* (6.9%). Particularly the last two modals, tellingly categorized as "emerging" by Krug (2000), were underdogs at the beginning of the 20th century, with frequencies nearing the 1%-mark (0.13% and 1.7%). Yet they have become more important than *be to* and *ought to* (1.1% and 0.9%), two verbs which now find themselves, along with *shall*, reduced to a relative frequency of barely 1%, each. *(Had/'d) better*, *bound to*, the analyzed adjectives, passive forms, and performative uses of lexical verbs as well as nouns of obligation and necessity also only play a minor role in the 2000s (cf. small box at the top of Figure 68).

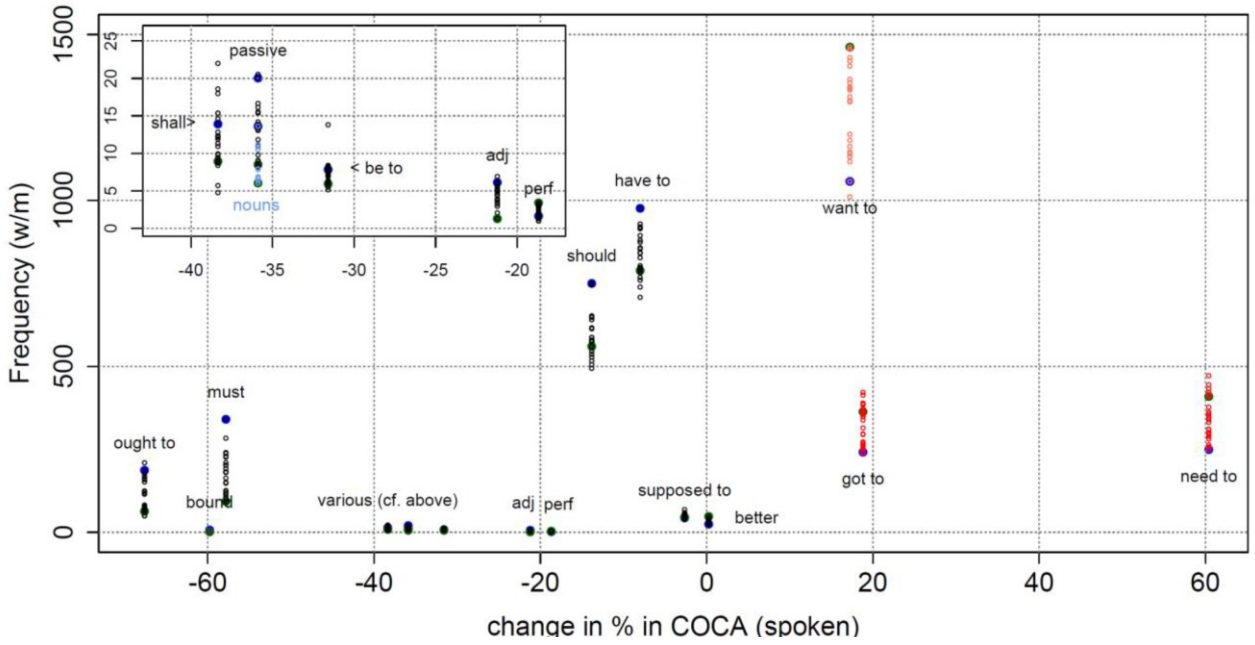


Figure 69 Relative and absolute changes in frequency of all analyzed expressions (iwcm) in the spoken language section of COCA (based on the averages for 1990-94 and 2005-09)

To obtain corresponding data for the spoken language section of COCA, the average values for 1990-94 and 2005-09 were used because the amount of variance captured by fitted functions would be extremely low. The results, displayed in Figure 69 above, show that even fewer expressions increase in use in COCA: only *need to* (+60%), *(have) got to* (+19%), and *want to* (+17%). The decrease is particularly steep in the case of *ought to* (-68%), *bound to* (-60%), and *must* (-58%).

As the small panel at the top left corner of Figure 69 highlights, not only is the percentage of decline of many of the analyzed expressions very similar, but they are also very close to each other in terms of absolute frequency.

Figure 70 below illustrates the distances between the absolute frequencies of all meanings of all analyzed expressions in the spoken language section of COCA (average meanings, 28 categories distinguished) using multidimensional scaling (MDS, cf. Kruskal and Wish 1978), "a method for visualizing dissimilarity data" (Johnson 2008: 208). Baayen (2008: 136) specifies that

> the idea is to create a representation in, for instance, a plane, such that the distances between the points in that plane mirror as best as possible the distances between the points in the original multidimensional space.

The number of dimensions is usually reduced to 2 or 3 (cf. Baayen 2008: 136). For the present analysis, two dimensions were considered most appropriate. (The stress plot that justifies this decision is shown as Figure G.4 in Appendix G.2. As proposed by Johnson (2008: 2012-214), the functions `as.dist` and `isoMDS` from the `MASS` library were used.)

Figure 70 highlights the close similarity in frequency between a large number of expressions analyzed here. Since they are lumped into an indiscriminate mass in the first panel, they are displayed separately in two close-ups in the 2nd and the 3rd panel. As can be seen in the last panel, *be bound to* (total frequency 3.0 w/m) and performative forms of the examined lexical verbs (total frequency 3.3 w/m) are very similar in terms of frequency, while *be to* (6.7 w/m), *be having to* (4.7 w/m), *shall* (7.4 w/m), and *be needing to* (0.11 w/m) are situated further apart. The most frequent expressions *have*, *should*, *need to*, *must*, *got to*, and *ought to* are more isolated because the differences in frequency are more drastic. (The exact coordinates of this plot are indicated in Table G.4.)

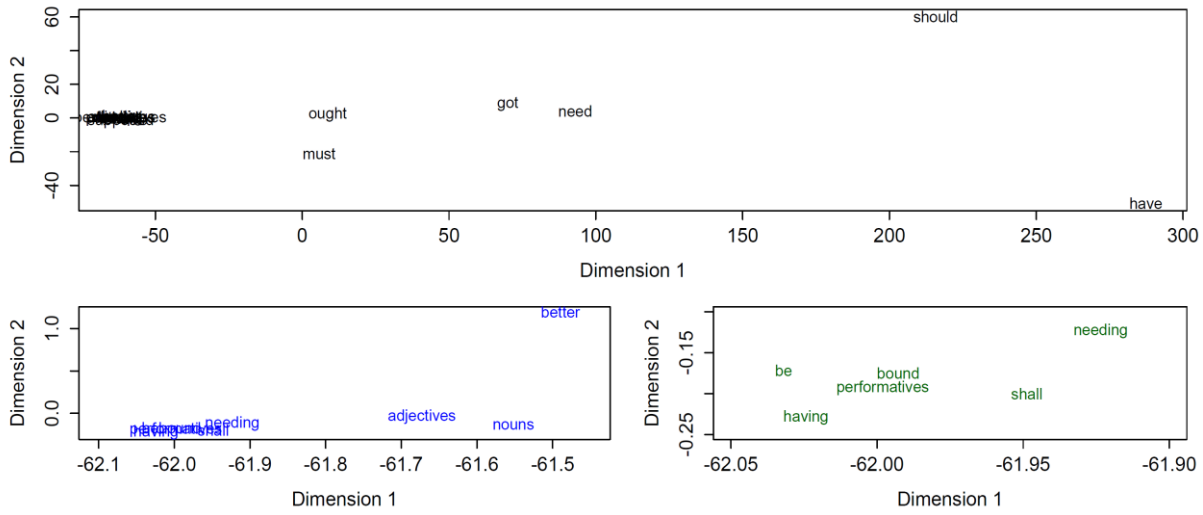


Figure 70 Multidimensional scaling (2 dimensions) of the meanings of all analyzed expressions[198]

[198] The analysis is based on the absolute frequencies of all types of expressions in the years 1990-(1994) and (2005-)2009 in the spoken language section of COCA.

7.2. Changes in Meaning

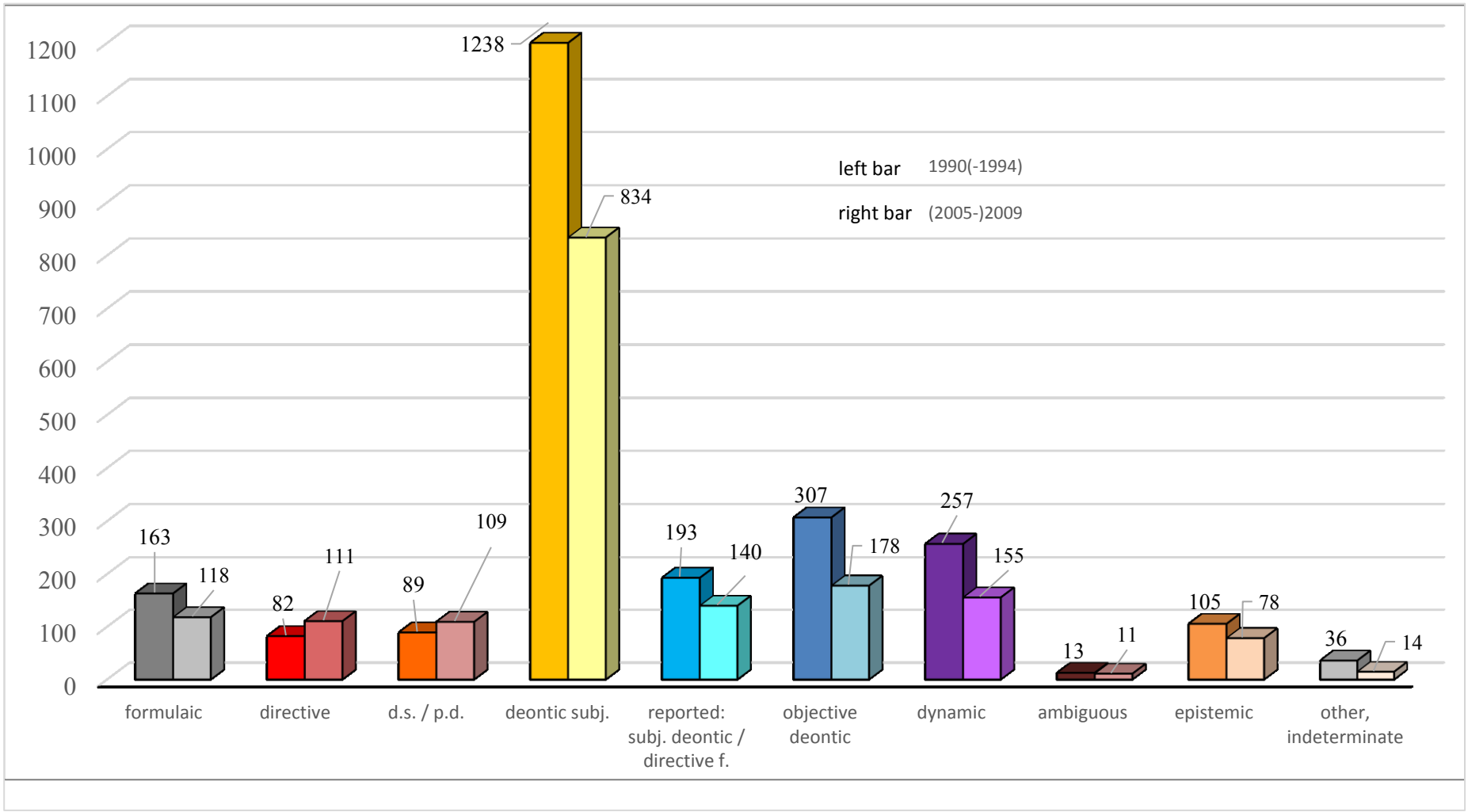
It is interesting to see if there are particular (shades of) meanings which increase or decrease in use. Figure 71 (on the next page) is a synopsis of all semantic analyses that were carried out. It shows the meanings of all analyzed expressions, per million words, in the two different time periods that were considered in the spoken language section of COCA: 1990(-94), on the left side of each pair of bars, and (2005-)09, on the right side. More information on the absolute and relative loss in frequency as well as on the relative frequencies in the two time spans is given below the graph.

As Figure 71 illustrates, the analyzed verbs, nouns, and adjectives mainly express subjective deontic modality (49%). Reported subjective deontic and directive utterances account for another 8%. A large share of meanings is also occupied by objective deontic (11%) and dynamic occurrences (10%), whereas epistemic uses only make up 4% of all meanings. Likewise, directives utterances, which are often considered to embody the prototypical modal meanings, and possibly directive subjective deontic utterances are, with 5% each, not particularly common. Volition (such as in *He wants to get a drink*, 130 w/m in 1990, 395 w/m in 2009) and performative volitional occurrences (such as in *I want to say*, 59 w/m in 1990, 53 w/m in 2009), which exclusively occur with *want to*, are not depicted here. Note also that uses of *may / might / will / would / should / could want to / need to* are not included in this count, since no other combinations of core modals with semi-modals were analyzed.[199]

Almost all meanings decrease in use, particularly subjective deontic modality (-405 w/m) and objective deontic modality (-129 w/m). When we look at these changes in percentages, the loss in objective deontic meaning (-42%) is even more drastic than the loss of subjective meanings (-33%). Dynamic meanings also heavily decline in use (-101 w/m, -49%). Even epistemicity (-27 w/m, -26%), which we would expect to increase as the semi-modals become more grammaticalized, and formulaic meanings, which you could assume might become more entrenched (-45 w/m, -28%), become less common in the short time span of almost 20 years. Only directive (28 w/m, +35%) and subjective deontic utterances that might be intended as directives (20 w/m, +23%) experience a rise in use. Initially, this might seem surprising in light of comments that there is less need for the expression of strong obligation (cf. Leech and Smith 2013: 77 and Ch. 3.3.2). The ensuing analysis of the expressions that are responsible for this increase will shed more light on this issue.

Table 76 - Table 79 present the expressions that experience the highest losses and increases in frequency of a particular meaning. They show how often a particular meaning of a modal expression is in 1990-(1994) and (2005-)2009 and highlight the highest absolute changes (in w/m) and the corresponding relative changes (in %). Statistically significant changes (based on the calculations in Ch. 6) are indicated in bold print.

[199] Likewise, future meanings (as well as the 'destiny' sense of *be to* and the 'intention' sense of *shall*) are not included. Volition, expressed by *want to* and *wanna*, increases by 365 w/m (+280%).



Diff. (w/m)	-45	28	20	-405	-53	-129	-101	-2	-27	-21
Diff. (%)	-27.7%	34.5%	22.6%	-32.7%	-27.5%	-42.0%	-39.5%	-13.1%	-25.8%	-59.5%
Relative frequency in P 1, i.e. 1990(-1994), and P 2, i.e. (2005-)2009										
P1 | P2	6.6% | 6.8%	3.3% | 6.4%	3.6% | 6.2%	50% | 48%	7.8% | 8.0%	12.4% | 10.2%	10.3% | 8.8%	0.5% | 0.6%	4.3% | 4.5%	1.5%|0.8%
Diff. (%)	0.2%	+3.0%	+2.6%	-2.2%	0.2%	-2.2%	-1.5%	0.1%	0.2%	0.03%

Figure 71 Changes in meaning in COCA (spoken, in w/m): all expressions (iwcm)

Table 76 documents that, with regard to formulaic meanings, change is primarily caused by a decline in the use of formulaic *must* (-38 w/m). Formulaic *should* (-7 w/m) and *want to* (-6 w/m) also decrease in use, whereas formulaic *have to* gains some ground (+ 5 w/m). A noticeable reorganization also occurs in the field of epistemic modality. With a decline of 23 w/m (i.e. more than 50 %), *must* loses its status as the prime expression of epistemicity (46 w/m in 1990, 22 w/m in 2009) to *should* (29 w/m in 1990, 30 w/m in 2009). *Have to* (-4 w/m), *be bound to* (-2 w/m), and *ought to* (-1 w/m) only slightly decrease in use. Just *should* (+2 w/m) and *have got to* (+2 w/m) are more often used in an epistemic sense in 2009 than in 1990.

Verb (in w/m)	Formulaic Meanings (-45 w/m)				Verb (in w/m)	Epistemic Meanings (-28 w/m)			
	1990 (-1994)	(2005-) 2009	Diff. in %	Diff. in w/m		1990 (-1994)	(2005-) 2009	Diff. in %	Diff. in w/m
must	44.77	7.31	-83.7%	**-37.47**	*must*	45.70	22.42	-50.9%	**-23.28**
should	22.14	15.08	-31.9%	-7.06	*have to*	13.87	9.42	-32.1%	-4.45
want to	58.92	52.78	-10.4%	**-6.14**	*be bound to*	3.91	2.03	-48.1%	-1.88
…				…	…				…
shall	0.59	1.29	+117.6%	**0.70**	*should*	28.80	30.45	5.7%	1.64
have to	30.43	35.81	17.7%	5.38	*have got to*	9.11	11.04	21.2%	1.93

Statistically significant changes (based on the calculations in Ch. 6) are indicated in bold print.

Table 76 Formulaic and epistemic meaning: expressions with the greatest losses / increases (iwcm) in COCA (spoken)

The absolute losses are highest in the case of subjective and objective deontic meanings (-405 w/m and -128 w/m). There are thus fewer expressions of advice and personal belief in 2005-09 than in 1990-94 and fewer references to necessities arising from laws and other collective agreements. We equally witness substantial changes in the expressions that are preferred for these meanings: Subjective deontic uses of *have to* (-255 w/m), *must* (-77 w/m), *ought to* (-66 w/m), and *should* (-64 w/m) heavily decrease in use, while the "newcomer" *need to* (+75 w/m) profits massively. Objective deontic meanings lose ground, especially in the cases of *have to* (-50 w/m), *must* (-36 w/m), *(have) got to* (-20 w/m), and *should* (-14 w/m). The use of passive forms of the analyzed lexical verbs also declines (-4 w/m), whereas *need to* increasingly refers to laws, rules, and other collective agreements (+5 w/m).

Verb (in w/m)	Subjective Deontic (-405 w/m)				Verb (in w/m)	Objective Deontic (-128 w/m)			
	1990 (-1994)	(2005-) 2009	Diff. in %	Diff. in w/m		1990 (-1994)	(2005-) 2009	Diff. in %	Diff. in w/m
have to	455.59	200.67	-56.0%	-254.91	*have to*	115.91	65.97	-43.1%	-49.94
must	97.85	24.13	-76.0%	**-76.67**	*must*	51.47	15.87	-69.2%	-35.60
ought to	104.63	38.64	-63.1%	-65.99	*have got to*	34.30	14.96	-59.3%	**-20.34**
should	305.32	241.42	-20.9%	-63.90	*should*	34.49	20.81	-39.7%	-13.68
have got to	124.55	115.18	-7.5%	-9.37	passive forms	9.97	5.94	-40.4%	-4.03
…				…	…				…
need to	120.94	196.47	+62.5%	**75.53**	*need to*	18.15	22.66	+24.8%	**4.51**

Statistically significant changes (based on the calculations in Ch. 6) are indicated in bold print.

Table 77 Subjective and objective deontic meaning: expressions with the greatest losses / increases (iwcm) in COCA (spoken)

Dynamic meanings also experience a considerable decrease in use (- 101 w/m) and we see a shift from dynamic *have to* (-93 w/m) and *must* (-18 w/m) to (*have*) *got to* (+2 w/m) and *need to* (+10 w/m). Reported subjective deontic and directive meanings decline in absolute frequency (-53 w/m). Again, the use of the "old" modals *should* and *ought to* declines, while *need to* profits immensely.

Verb (in w/m)	Dynamic (-101 w/m)				Verb (in w/m)	Reported Meanings (-53 w/m)			
	1990 (-1994)	(2005-) 2009	Diff. in %	Diff. in w/m		1990 (-1994)	(2005-) 2009	Diff. in %	Diff. in w/m
have to	199.15	105.77	-46.9%	-93.38	*should (dir.)*	77.12	37.77	+19.8%	-39.35
must	25.16	7.56	-70.0%	-17.60	*ought to (p.d.)*	23.11	11.82	-48.8%	-11.29
passive	3.29	1.39	-56.5%	-1.80	*should (s.d.)*	17.08	7.54	+19.8%	-9.54
…				…	…				
have got to	8.76	10.49	+19.9%	1.74	*need to (dir.)*	0.71	7.98	+1,029%	**7.28**
need to	16.27	26.01	+59.9%	9.74	*need to (s.d.)*	10.61	25.23	+138%	**14.63**

Statistically significant changes (based on the calculations in Ch. 6) are indicated in bold print.
dir.= directive function, s.d.= subjective deontic, p.d. = subjective deontic / possibly directive fimction

Table 78 Dynamic and reported subjective deontic meaning (with directive function): expressions with the greatest losses / increases (iwcm) in COCA (spoken)

Directives are (almost) the only expressions that increase in use in the analyzed time span (+28 w/m). This increase is mainly due to the rise of addressee-friendly expressions like *need to* (+20 w/m) and *should* (+10 w/m) as well as *wanna* (1.6 w/m, cf. also *may/might/will/would want to*, +1.3 w/m, the frequency of which is not included in the overall count). The emphatic *have got to* also increases in use (+2.2 w/m). However, the more authoritative *must* (-2.5 w/m) and the rather colloquial *better* (-2.0 w/m) are less used. This can be seen as a confirmation of a trend towards "packaging" obligation in a more face-friendly way. Possibly directive subjective deontic utterances constitute the other category of meaning that becomes more common (+ 20 w/m). The same type of shift towards weaker alternatives can be observed here.

Verb (in w/m)	Directive utterances (+28 w/m)				Verb (in w/m)	Possibly directive utterances (+20 w/m)			
	1990 (-1994)	(2005-) 2009	Diff. in %	Diff. in w/m		1990 (-1994)	(2005-)2 009	Diff. in %	Diff. in w/m
must	6.00	3.53	-41.2%	-2.47	*must*	10.39	5.79	-44.2%	**-4.59**
had better	8.69	10.91	-39.3%	-2.02	*ought to*	6.92	3.90	-43.7%	**-3.02**
...				…	*have to*	45.65	43.45	-5.0%	-2.29
may/might/ ... want to	0.14	1.44	+952%	**1.30**	*had better*	8.19	7.08	-13.6%	-1.11
					...				…
wanna	0.05	1.68	+3,600%	1.64	*have got to*	2.31	3.27	41.9%	0.97
have got to	8.69	10.91	+25.6%	2.23	*may/might/ ... want to*	1.64	7.97	+387%	**6.34**
should	15.06	24.58	+19.8%	**9.51**					
need to	3.30	23.17	+602%	**19.87**	*need to*	14.14	44.55	+215%	**30.40**

Statistically significant changes (based on the calculations in Ch. 6) are indicated in bold print.

Table 79 (Possibly) directive utterances: expressions with the greatest losses / increases (iwcm) in COCA (spoken)

Finally, very few relative changes deserve mention (cf. Figure 71). Only (possibly) directive utterances (+2.7% |+3.0%) and reported obligations and advice (+0.2%) increase in use. The share of objective (-2.2%) and subjective (-2.2%) deontic meanings as well as dynamic meanings (-1.4%)

slightly declines. As drastic as the drop in absolute frequency may be (-735 w/m) and as considerable as the changes in the favored expressions are, the shares of meanings remain quite similar (standard deviation: 1.2%).

7.3. Semantic Profiles

Let us now take a closer look at the semantic profiles of various groups of expressions and examine which meanings they overwhelmingly express. It will become apparent that there are not only considerable differences in frequency, but that the evidence also points to a functional division of labor between the analyzed core modals, semi-modals, adjectives, lexical verbs, and nouns.

The core modals and the three emerging modals *have to*, *have got to*, and *need to* mainly express subjective deontic modality (cf. Figure 72). Major differences can be found in the expression of epistemic meanings: They are more than twice as frequent with the former than with the latter group of verbs (53 w/m vs. 22 w/m) in 2009. This, of course, is no surprise considering the more advanced stage of grammaticalization of the core modals. A more astonishing finding is the fading use of formulaic *must*, *should*, and *shall* (from 68 w/m to 24 w/m[200]), while formulaic meanings of the emerging modals hardly decline at all (from 96 w/m and 94 w/m). However, *have to*, *got to*, and *need to* seem to be taking over as the main expressions of utterances with a directive function and uses that can be interpreted as such (directive: 51 w/m to 76 w/m, possible directives: 63 to 92 w/m). They thus conquer a domain that is often considered the core meaning of the modals (directives: 21 to 28 w/m, possible directives: 18 to 10 w/m). In 2009 these verbs are more frequently used than *must*, *should*, *shall*, and *ought to* to express advice and personal opinions (530 w/m vs. 304 w/m). *Have (got) to* and *need to* are now also much more common with objective deontic meanings than the core modals (110 w/m vs. 43 w/m in 2009). Yet with a share of barely 9% they are far from the prime expressions of objective deontic meanings, i.e. the lexical verbs, (60%) and the runner-up group (*be to*, *(had/'d) better/best*, *(bound to)*, and *be supposed to* (31%)).

Be to, *(had/'d) better/best*, *(bound to)*, and *be supposed to* form a very heterogeneous group (cf. Figure 73, left panel). Not only do they express deontic, dynamic, and epistemic meanings and can have a directive function, but speakers additionally use them to suggest adverse consequences or to utter threats (*had/'d better*)[201], to refer to hypothetical situations (*be to*), to arrangements, plans, or expectations (*be to*, *be supposed to*), or to future events.[202] On average, more than 40% of all occurrences of *be to* and 25 % of all uses of *be supposed to* express one of these other meanings; in the case of *(had/'d) better* the number goes down to 5%. *Be bound to*, however, always has epistemic or deontic meaning.

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[200] *Ought to* is not used in this sense.

[201] Note that utterances that function as directives and subjective deontic uses in which threats or adverse consequences are mentioned or implied are included in the count and not treated as other uses in the left panel of Figure 73.

[202] In contrast to Figure 74, the following graphs include future meanings (as well as plans, intentions and 'destinies'), classified as "other meanings."

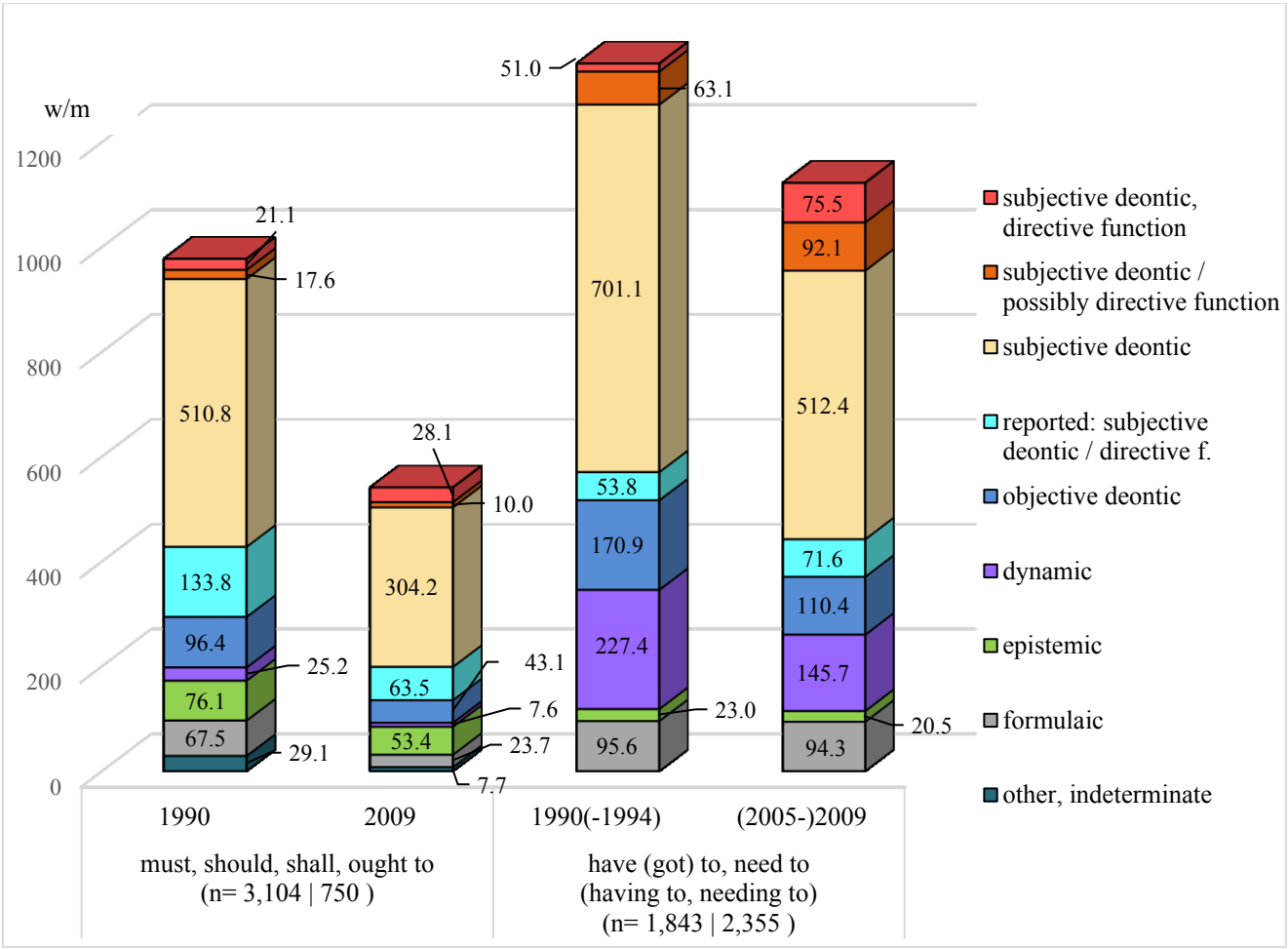


Figure 72 Changes in meaning in COCA (spoken): group 1: *must*, *should*, *shall*, *have (got) to*, *need to*, *ought to*

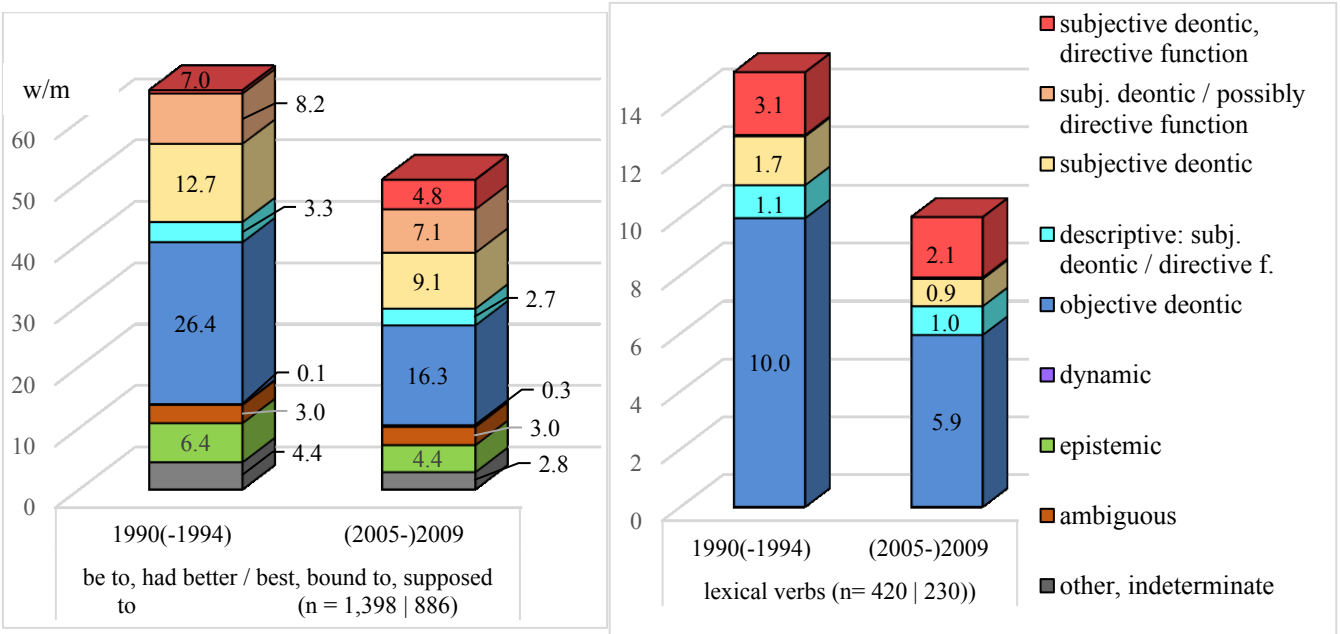


Figure 73 Changes in meaning in COCA (spoken): group 2: *be to*, *(had'd) better / best*, *be bound to*, *be supposed to*, lexical verbs (passives and performatives)

The dominant meaning of these expressions is objective deontic necessity – a feature they have in common with the analyzed lexical verbs. Yet what clearly distinguishes both groups is the use of the semi-modals in the epistemic sense and the existence of ambiguous forms. The analyzed lexical verbs exclusively express obligations, mainly those resulting from social contracts (e.g. legal documents or company rules) or somebody else's desires or orders. *Force* is also often used to refer to dynamic necessity, arising, for example, from illness or natural disasters.

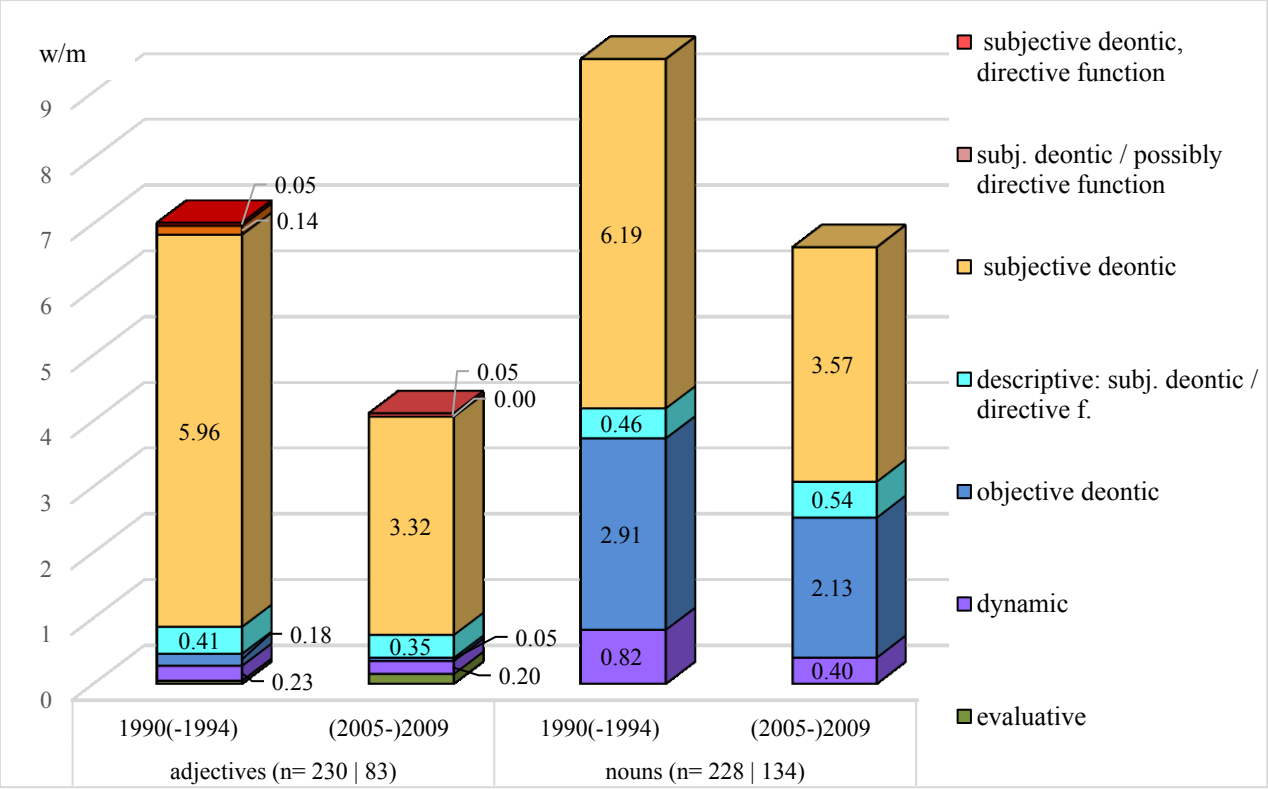


Figure 74 Changes in meaning in COCA (spoken): group 3: adjectives and nouns

Since performative uses account for almost 20% of the analyzed verb forms (n= 650), it is not surprising that we equally find a certain number of directives (20%) in my sample. By contrast, the examined adjectives are overwhelmingly used for the expression of the speaker's wishes (83%, even 90% if we include reported uses, 91% if possibly directive uses are added, cf. left panel of Figure 74). As we have seen in Ch. 6.4, the utterances that function as directives account for less than 1% of all meanings. The remaining 8% of the occurrences have objective deontic, dynamic, and evaluative meaning. By contrast, nouns completely lack the ability to express anything besides deontic and dynamic meanings. Here the lion's share is occupied by subjective deontic uses (57%), with objective deontic meanings coming in second place (~15%).

Concluding this section on the meanings of these groups of expressions, we can say that there are significant differences, not only in terms of frequency, where the emerging modals now clearly have the overhand, but also when it comes to the meanings that they usually express. Roughly seen,

objective deontic meanings dominate in the case of *be to*, *had better*, *bound to*, *be supposed to*, the analyzed lexical verbs, particularly passive forms, and the "interchangeable" nouns (but note that one third of the uses of the latter have subjective deontic meaning), whereas modal adjectives, the core modals, the emerging modals *have got to* and *need to*, and the analyzed lexical verbs and nouns mainly express subjective deontic meanings.

Another difference between these groups is evident in the use of epistemic meanings, which are still most frequent with the core modals (8%), whereas they only account for 1.9 % of all uses of *have to* and *have got to* (i.e. 16 w/m on average; *need to* is not used with an epistemic sense in my sample). The epistemic occurrences of the other semi-modals are no serious competitors of the core modals (76 w/m in 1990-94 and 53 w/m in 2005-09) in terms of frequency (on average 5 w/m) either. The compensation for the slight decrease of epistemic modals is most likely to be found in the use of other core modals such as *may* and *might*, which signal a lower degree of certainty, since evidence from Brown and Frown suggests that modal adjectives and adverbs (such as *perhaps*, *probably* etc.), periphrases (*I doubt if*, *I* guess etc.), and lexical verbs (e.g. *seem*, *appear*) do not experience any increase in usage either (cf. Kranich and Gast 2015: 8). More information from corpora that cover longer time spans is needed for further confirmation of these trends.

7.4. Collocational Profiles

Finally, with the data obtained from the multiple distinctive collexeme analysis of 23 expressions in the spoken language section of COCA (1990-2012, cf. Ch. 4.5), multi-dimensional scaling was performed (MDS, cf. Kruskal and Wish 1978, Ch. 7.1 and Hilpert 2011 and 2016 for examples of MDS with data from COHA). 1,811 attracted distinctive collexemes (1,346 different infinitives) figure in the analysis. The distinctive collexemes of *want to* are excluded since *want to* is once again an outsider. It is second only to *have to* in terms of collexeme frequency (330 vs. 371 attracted distinctive collexemes) and patterns with more activity and communication verbs than *have to* and *should* (22 attracted distinctive collexemes). Including *want to* would have minimized the differences between all other analyzed expressions.

For the visualization of the results the use of two dimensions was best suited. In Figure 75 expressions that share similarities in collocational profiles are placed closer than together than those with greater differences. *Must* and *have to* stand in striking contrast to the all other expressions which are lumped together at the bottom of the first panel. *Must* und *have to* share 34 attracted distinctive collexemes (such as *work*, *say*, *watch*, *admit*, *tell*, *confront*), but *have to* has four times more collexemes than *must*.

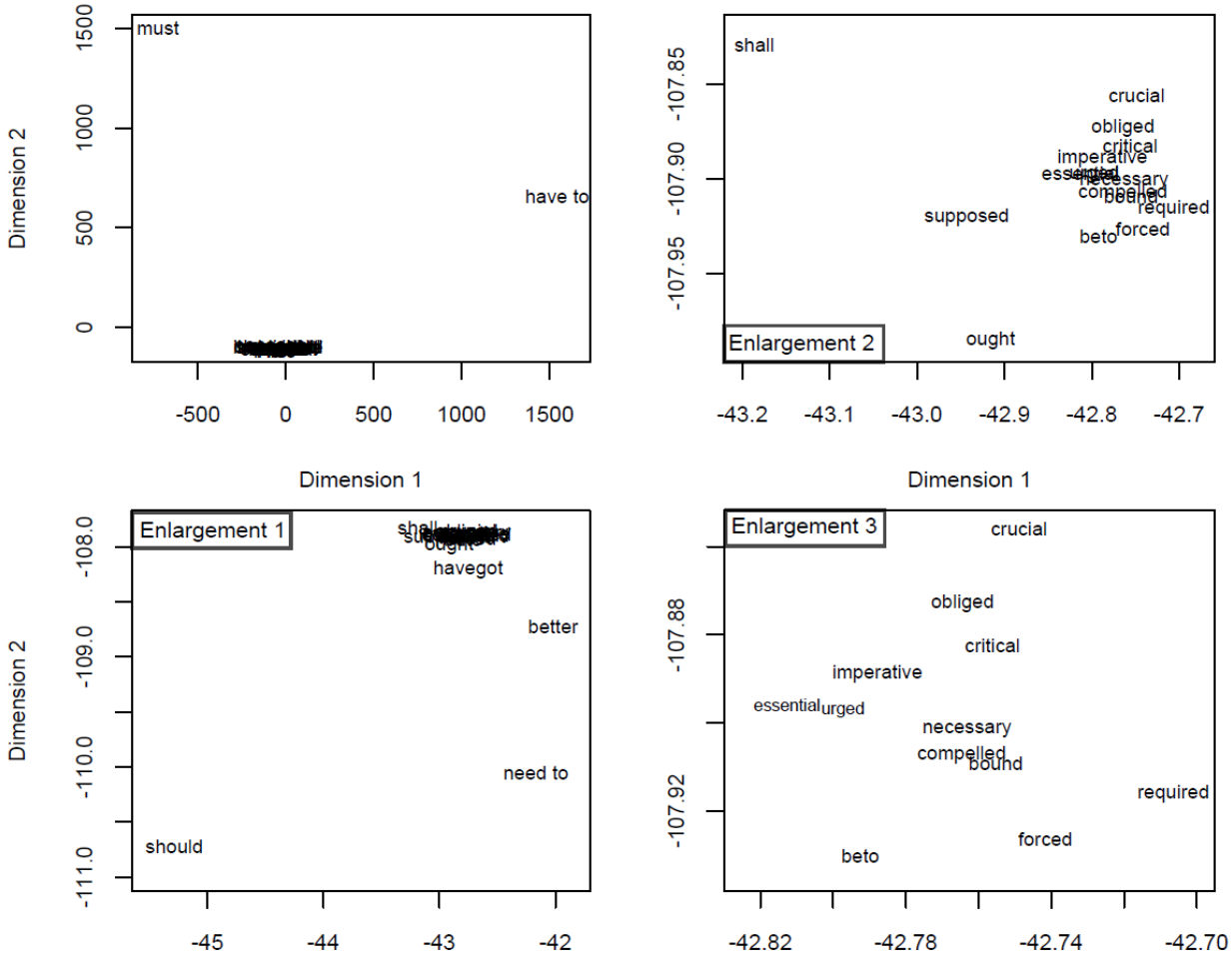


Figure 75 Collocational profiles of 23 analyzed expressions (COCA spoken, 1990-2009)

The first enlargement shows *should* in the bottom left corner and, from bottom to top, *need to*, *(had'/d) better*, and *(have) got to. Need to* and *(had'/d) better* share 30 distinctive collexemes, *(had'/d) better* and *(have) got to* only 9: *get*, *mean*, *love*, *stop*, *stick*, *figure*, *move*, *define*, and *learn*. The last six of these collexemes are shared by all three verbs. *Should*, *(had'/d) better*, *(have) got to*, and *need to* only have two verbs in common. 26 of the 232 collexemes of *should* and 214 collexemes of *need to* are identical. As expected, the number sinks down in the comparison to *(have) got to* (11 shared collexemes of 87 collexemes in total) and *(had'/d) better* (21 of 69 collexemes).

The second enlargement reveals that *shall*, *be supposed to*, and *ought to* are, like *(have) got to*, separated from the remaining "inner circle" of expressions. *Ought to* and *be supposed to* share 13 collexemes, *shall* and *be supposed to* 9 (*die*, *retire*, *rule*, *issue*, *evade*, *constitute*, *preside*, *serve*, *leap*), and *shall* and *ought to* 4 (*resign*, *set*, *provide*, *continue*). It is striking that once again we only find core modal and semi-modals. Interestingly, the "outer-circle verbs" are also the ones with the greatest number of attracted distinctive collexemes (the sole exception ranked before *(had/'d) better* is *necessary* (cf. right panels of Figure 75). The "inner circle", with expressions with less 60 than collexemes, comprises adjectives, passive forms, and *be to* with its myriad of meanings as well as the low-frequency verb *bound to* (which primarily expresses epistemic meaning).

We can thus see that the formal classification of the analyzed expressions largely coincides with similiarities in collocational profiles, which, in turn, is connected with the frequency of use of these expressions as well. Just like the analysis of the semantic profiles has shown (cf. Ch. 7.3), MDS thus underlines that the different types of expressions are used for different purposes. Unsurprisingly, the most heterogeneous semantic group, the semi-modals, is also the group that is scattered the most in the two-dimensional space visualizing differences in collocational profiles.

8. Conclusion

The study has investigated the use of selected core modals, semi-modals, modal adjectives, and lexical expressions of obligation and necessity in present-day American English. The analyses of the frequency of the core modals in COHA have confirmed the trend towards a pronounced overall decline that has been detected in numerous other studies (e.g. Leech 2003: 226, Biber 2004a: 118, Leech *et al.* 2009: 71-73). As a group, the modals of possibility, permission, and ability (*can*, *could*, *may*, *might*, and *would*) are less affected (-2% between 1990 and 2009) than the modals of prediction and volition (*will* and *shall*, -48%) and the modals of obligation and necessity (*must*, *should*, *ought to*, *need(n't)*, -60%, cf. Ch. 5). The drastic overall decrease of the modals, which is not counterbalanced by an increase of emerging modals such as *have to* or *need to*, led Geoffrey Leech (2013) to ask himself (and with him the entire scientific community) where all the modals have gone. In an attempt to shed light on this question, one of the goals of this study was to retrace the development of modal adjectives, lexical verbs, and nouns of obligation and necessity in comparison to the well-documented changes of (semi-)modal usage. In contradistinction to the widespread practice of contrasting the core modals with all forms of the semi-modals, it has been argued (cf. Ch. 4.7) that is necessary to consider only those contexts in which the speaker or writer has the choice between all (kinds of) expressions to avoid "skewed" comparisons (Johansson 2013: 374) because semi-modals, adjectives, and nouns can appear in contexts in which it is impossible to use core modals. The share of such past tense uses, non-finite forms, co-occurrences with other core modals, negations, and questions was found to be particularly high in the case of the *have to* and *need to* (75% and 58% on average in 1990 and 2009) in written English (cf. Ch. 4.7).

In full consideration of the considerable influence of the investigated text type on the results of a study, one of the largest balanced corpora available, COHA, was chosen as a database for a thorough analysis of the use of almost 30 expressions of obligation and necessity over the course of more than a century (1900-2009). Since spoken American English is "the main driving-force of change in this area" (Mair and Leech 2006: 328), a close examination of the frequency and an additional semantic analysis of more than 15,000 occurrences of these expressions in COCA (spoken) were carried out. When the results were interpreted and compared to other studies, the particularities of the composition of both corpora (e.g. a share of up to 54% fictional texts in COHA and the use of transcripts from television and radio broadcasts made by companies in the spoken language section of COCA) were taken into account. The analysis of the lemmas *HAVE to*, *HAVE got to*, *WANT to*, and *ought to* revealed their frequent use in fictional texts as opposed to *must* (and *should* towards the end of the 20th century) and *NEED to*, which are most often found in non-fiction books (cf. Figures B.3 – B.7). Information about the number of occurrences that could be substituted with core modals was not determined for the different text types since already numerous search commands (e.g. 15 in the case of *have to*) had to be used to arrive at what still remain approximate numbers. Applying them all to four text types would have made the analysis very time-consuming.

The results obtained for the entire corpus show a decrease of *must*, *should*, *be to*, *ought to*, *(had/'d) better/best*, and *bound to* between 1900 and 2009 in written American English. As expected, the semi-modals *(have) got to*, *want to*, *have to*, *supposed to*, and particularly *need to* have risen in use. Nouns of obligation and necessity – expressions that have received almost no attention so far – have also experienced an increase (by more than 500%). Adjectives have declined in use, but have kept their relative importance. Interestingly, in contrast to (semi-)modal verbs, nouns and adjectives appear to be more indirect than (semi-)modals when it comes to imposing an obligation because the focus does not lie on the addressee that has to realize the state of affairs. Halliday therefore characterizes *it is imperative / important that* as explicitly objective wordings (2014: 703). This points to a general trend towards more subtle expressions of obligation.

Lexical verbs present a mixed picture. In line with the general decrease in the use of rather formal *be*-passives (cf. e.g. Seoane 2006, Leech *et al.* 2009: 148, Smith and Leech 2013: 93, Biber and Gray 2012: 319, 2013: 112), there is a pronounced decline of the passive forms of *force*, *require*, *oblige*, *urge*, and *compel* (as well as of the passive with *be to*). Clauses with 1st person subjects, however, rise in use. This would be quite surprising if we were to consider these performative uses more face-threatening and direct than the passive constructions, which place the focus on the agents that are meant to realize the state of affairs rather than on the issuer of the directive. However, in many cases the speaker seems to be describing what s/he is doing (cf. example (476) below) instead of uttering an imperative. Consequently, the force of the request is attenuated. The increase in the use of such utterances can then also be considered to conform to the trend towards more indirect expressions (cf. Ch. 3.3).

(476) SEN-STROM-THURMOND: […] I implore this body to demonstrate to the world and especially Saddam Hussein that we are behind our President and the United Nations. A vote in support of the President is a vote for peace. I urge my colleagues to stop the debate and show our solidarity with the President... (1991/ 01/10, *PBS News Hour*, COCA)

As recognized in other studies, the increase in semi-modal usage does not compensate for the loss of the core modals (cf. the discussion of the "modality deficit" (Leech 2013: 110) in Ch. 5). In COCA (spoken), where the semi-modals surpass the core modals in frequency, it is estimated at approximately 900 w/m in the period between 1990 and 2009. (The estimate is based on a fitted linear function excluding *bound to.*) My data have also revealed, however, that despite the increase that some expressions undergo, modal adjectives, nouns, and lexical verbs with modal meanings are too infrequent to provide a satisfactory answer to Leech's question where all the modals have gone and can only partially counterbalance the decline. Their combined frequency ranges between 37 w/m at the beginning of the 20th century and 18 w/m in 2009 (values based on a fitted linear function). The situation is very similar in the spoken language section of COCA, with a frequency of modal adjectives, nouns, and lexical verbs with modal meanings that varies between 21 w/m and 41 w/m. Yet the systematic inclusion of expressions that are considered to lie at the boundaries

of what should be considered modal, i.e. *be to*, *(had/'d) better / best*, *be supposed to*, and *be bound to*, proved to be illuminating, as it showed the heterogeneity of this group, not only in terms of frequency (*be to* and *(had/'d) better / best* and *be bound to* decline, whereas *be supposed to* rises in use, + 20 w/m), but also in terms of meaning (they express a variety of additional meanings such as threats, adverse consequences, plans, expectations, or hypothetical situations). While these semi-modals or semi-auxiliaries have been the subject of many separate studies, they have not yet been analyzed together in such a comprehensive comparative study of modal meanings.

The semantic analysis has revealed that – volitional meanings of *want to / wanna* discounted – almost half of all the occurrences of the analyzed expressions have subjective deontic meanings (49%) and are thus expressions of advice, recommendations, or statements that indicate what the speaker considers desirable. The absolute decrease of this meaning between 1990(-1994) and (2005-)2009 is also more drastic than that of all others (-402 w/m), but they still account for an average of 48 % in (2005-)2009. Objective deontic and dynamic occurrences only make up about one tenth of all meanings (11% and 10%). Merely 5% of all occurrences of these expressions function as directives (another 5% possibly have a directive function). Epistemic meanings are particularly rare (4%). They only account for 8% of the meanings of *must*, *should*, *shall*, and *ought to.* The (at least) relative increase of this meaning with these modals (from 7.7% to 9.7%) is in conformity with previous research documenting a gradual grammaticalization of the root modals. Yet while the share of expressed epistemic meanings increases considerably in the case of *must*, *should*, and *have (got) to* (from 15% to 23%, 5.4% to 7.8%, and 4.5% to 6.2%), to speak of a process of specialization in spoken English (cf. Kranich and Gast 2015: 17) in which modal verbs "establish[…] themselves as grammaticalized markers of epistemic modality while gradually losing their deontic function" seems audacious when these core modals primarily express root modality. Changes were also observed in the frequency of use of the different epistemic expressions (e.g. a decrease in the use of epistemic *must* as opposed to a small increase of epistemic *should* and *have to*). Likewise, formulaic meanings (such as in *I must tell you*), which could be suspected to become more entrenched, decrease in absolute and relative frequency (-45 w/m, -27%).

Overall, the semantic analysis suggests that there is a functional division of labor between the different groups of expressions. The core modals, the emerging modals *have to*, *have got to*, *need to*, and *ought to*, and the modal adjectives mainly express subjective deontic modality, while *be to*, *(had/'d) better / best*, *be supposed to*, and *be bound to*, like the analyzed lexical verbs, primarily express objective deontic necessity. Given that 53 % of all occurrences of the core modals have subjective deontic meaning (and only 3% function as directives), it seems appropriate to consider their core meaning advice and desirability and not (directive) obligation (cf. also Van linden and Verstraete 2011: 152). In my samples from COCA (spoken), subjective deontic meaning is predominant in the case of *should*, *shall*, *ought to*, and even of *must* and *have to*, which are generally considered strong expressions of obligation.

The analysis of the frequency and the semantics of the almost 30 expressions of obligation and necessity has also yielded many other new findings and often refined previous research. Two large-scale studies in particular stand out. The first is the investigation into the use of present tense *be to*, a "semantic chameleon" that can, according to Nesselhauf (2006: 519), express as much as eight different meanings (Declerck (2010: 277-280) lists eight necessity meanings alone), in the 1930s, 1960s, and 1990s (as well as 1900-1901 and 2008-2009). 5,645 occurrences were identified in a manual examination of 17,317 strings of non-negated *is/am/are to* and the infinitive. Apart from the frequent, but declining use in *if-*/*unless*-clauses and subject-raising constructions with *what* and *who* (cf. example (477) below), both the common use of object-raising *be to blame* (which accounts for 84% of all object-raising constructions and for 3% of all occurrences of *be to* in the analyzed 34 years, cf. example (478) below) and of passive constructions (42% in COHA) are noteworthy (cf. Ch. 6.1.6). Due to the rapid decline of *be to* (-87% in COHA, 1900-2009), these uses gain in relative importance. Towards the end of the 20th century, *be to* is mainly found in the non-fiction section of COHA (43% in the 1990s), which can be considered proof of its "slightly formal or higher register flavor" (van der Auwera and Goldberg 2012: 115).

(477) Time will show us what is to become of this strange experiment (Van Loon, H. W. (1932) *Van Loon's Geography: The Story of the World We Live In.* New York: Simon and Schuster, COHA)

(478) But a central theme is emerging: Who is to blame for the prolonged […] recession? (Church, G. J. (1982/10/11) "Taking aim at Reagan." *Time Magazine*, COHA)

The second time-consuming (semi-)manual analysis sheds more light on the patterns of use of *need to* and non-assertive *need(n't)* (cf. Ch. 6.1.4). As highlighted in other studies on British and American English (cf. van der Auwera and Taeymans 2012: 63, 58, Smith 2003: 249), the data from COHA confirm that *need to* is more frequent than *need* (at least) from the 1960s on. Blend constructions become almost nonexistent in written AmE. The exhaustive analysis of 11,688 uses of non-negated[203] *need to* in COHA (1900-2009) indicates that towards the end of the 20th century it is primarily used in assertive contexts, where it does not compete with *need*, but with more direct expressions like *have to*, *must*, and *should*, which place less prominence on the addressee's interests than the strategically brilliant *need to* (cf. Ch. 3.4. and Leech *et al.*'s comments on the possibility to "camouflag[e] an imposed obligation as being in the obligatee's best interest," 2009: 110).

In contrast to *need*, *need to* is less frequent in negated clauses than in other non-assertive contexts. A close analysis of the non-assertive contexts in which *need* (n=2,554) and *need to* (n=1,537) appear has indicated that *need to* takes over some of the functions of *need* (e.g. as it increases in interrogative clauses and in combination with *all)*, but does not compensate for the decline of other uses (e.g. after *hardly* and *scarcely*, negated elements in the noun phrase, and negated objects). The use of *need* in *before*-clauses and with *little*, already infrequent at the start

[203] i.e. cases in which the negator *not (n't)* does not (directly) precede the verb.

of the 20th century, dies out completely. At the end of the 2000s, *need* is most frequently found in questions (1.4 w/m), in combination with *only* (1.2 w/m), and in the phrase *if need be* (0.9 w/m). In COCA (spoken) *need* is most common after a negation in the noun phrase. The results of a distinctive collexeme analysis provided some evidence for the claim that *need* is used to express rather abstract concepts whereas *need to* often refers to concrete and tangible aims (cf. Müller 2008: 85). Further research into the semantics of *need(n't)* and negated *need to* is needed to pinpoint the differences between the two verbs in non-assertive contexts. As my analysis shows, affirmative *need to* is primarily used to express subjective speaker judgments of what is considered necessary to realize a certain state of affairs in the spoken language section of COCA (cf. Ch. 6.2.3).

Other new findings concern the use of *want to* (cf. Ch. 6.2.5), a verb that rarely figures in studies of deontic modality, but has developed an obligative sense (cf. Krug 2000, Desagulier 2003, Verplaetse 2010). In the spoken language section of COCA *wanna* only expresses deontic meaning with a possibly directive function in 2009 (1.7 w/m), whereas such uses of *want to* increase by 25%, from 8.3 w/m to 9.4 w/m, between 1990 and 2009. Overall the share of deontic meanings of *want to* (1.8%) is lower than that of *wanna* (4.5%). To find out more about the spread of deontic *want to*, I also examined the use of *might / may / will / would want to*, which, to my knowledge, has not been done systematically in any large-scale study of the English modals. Interestingly, while the frequencies of *may* and *might* decline (-20% and -1.3%), *may* and *might want to*, the most common combinations of core modals + *want to* expressing deontic / directive meaning, rise in use (+17%, +62%). In light of the fact that these expressions allow speakers to attenuate the force of their request (cf. Desagulier 2005a: 404), it is not surprising that the use of deontic / directive *might / may / will / would want to* increases by 89% in the short time span between 1990-1994 (5.8 w/m) and 2005-2009 (10.9 w/m).

In an attempt to discover other strategies to impose obligations or to give advice that become more popular, the use of progressives with the core modals and the development of progressive *have to* and *need to* were examined. Combinations of the progressive with core modals (as well as with *used* and *dare*) rise in popularity ($\tau = 0.77$***), both per million words as well as relative to the general rise of progressive constructions ($\tau = 0.52$***) and the decline of the core modal verbs ($\tau = 0.82$***). The co-occurrence of the progressive aspect with *must* has been associated with epistemic modality (e.g. by Coates 1983: 245, Palmer 2003: 16, Celle and Smith 2010: 251, Kranich 2010: 184; cf. also example (479)), but root meanings occur occasionally with *must* (cf. example (480)) and even more often with *should.* Epistemic *(HAVE) got to be V-ing* only starts becoming dominant in the 1960s, whereas *NEED to be V-ing* still exclusively expresses root meanings (cf. Appendix D).

(479) He was having backaches more and more these days. I must be getting old, he thought, smiling grimly (Gerrold, D. (1972) *When Harlie Was One.* Garden City, New York: Nelson Doubleday, Inc., COHA)

(480) The restoration of Russia will be the the [*sic*] work of years, and we must be training the thousands of Americans who will be needed in it. (Huntington, W.C. (1919) "What the Russian situation means to America." *Scribners* (February): 369-373, COHA)

Progressive *have to* and *need to* have hardly been mentioned in the literature on modal verbs. As the data from COHA show, they are recent innovations. The first uses of the 'obligation' sense are found in 1896 and 1919 (cf. examples (481) and (482) below[204]). The spread of *BE having to* ($\tau_{1896\text{-}2009}$=0.44***, 1.2 w/m in the 2000s) and *BE needing to* ($\tau_{dec1920\text{-}2009}$=0.72**, 0.06 in the 2000s) was probably fueled by the rapid rise of the corresponding gerund-participles ($\tau_{1833\text{-}2009}$= 0.76***, 27 w/m in 2009 and $\tau_{1859\text{-}2009}$= 0.63***, 4 w/m in 2009) and the progressive forms of *have* and *need* ($\tau_{1833\text{-}2009}$=0.82***, 47 w/m in 2009 and $\tau_{1856\text{-}2009}$= 0.77**, 2 w/m in 2009).

(481) "But our dishes are not so sacred, and our Bridgets break them regularly. We are always having to buy new ones as it is. ..." (Various Authors (1896) *Holiday Stories for Young People*, COHA)

(482) And ain't he got a funny way of just talking about nothing special, only being pleasant, and then letting you find out weeks after that he did tell you something that you'd been needing to know? (Reynolds, K. (1919) *Green Valley*, COHA)

This development is in keeping with the well-documented general spread of the progressive in the 19th and 20th centuries (cf. e.g. Mair and Hundt 1995: 114, Hundt 2004: 58, Smitterberg 2005: 62, Leech *et al.* 2009: 122, Kranich 2010: 169-172, 191-193, Aarts *et al.* 2010: 157-164, Hundt and Dose 2012: 80, Aarts *et al.* 2013: 21). Progressive *have to* and *need to* are particularly common in spoken language as well as (in direct speech) in newspapers. Present tense forms dominate in COHA and COCA. Moreover, a semantic analysis shows that progressive *have to* can have both aspectual and subjective meanings and that it predominantly expresses dynamic meanings (cf. Ch. 6.2.4).

Another subject related to modality and treated in this study are complementation patterns after adjectives and nouns that can function as triggers of the mandative subjunctive. Five adjectival triggers in 750 clauses (with present tense extraposition constructions, cf. Ch. 6.4.1) and five nominal triggers (*demand*, *necessity*, *need*, *request*, and *requirement*) in 1,386 clauses in COHA were examined (regardless of the tense of the clause, cf. Appendix E.1). My data have confirmed that "mandative indicatives" are basically a Briticism (Algeo 1992: 611), as the numbers stay close to the 0% mark throughout the 20th century, increasing only towards the beginning of the 21st century (τ = 0.33 ns). The use of the subjunctive, which is considered characteristic of AmE (cf. Erdmann 1981: 126, Johansson and Norheim 1988: 30, Övergaard 1995: 89, Hundt 1998: 171, Hundt 2009: 30-31, Crawford 2009: 272-273, Leech *et al.* 2009: 55, 69), increases rapidly at the beginning of the 20th century and peaks in normalized frequency in the 1940s (the highest relative frequency is

[204] Examples (481) and (482) first appear as (295) and (297) in Ch. 6.2.4.

found in the 1950s). A drastic decline can be observed from the 1980s to the 1990s, but the subjunctive remains the preferred choice after the analyzed triggers in the 1990s and 2000s (cf. Figure E.7 in Appendix E.2). This ties in with findings from Brown and Frown, which point towards a decrease in the use of the mandative subjunctive (cf. Hundt 1998: 161, Serpollet 2001: 541), but it is at odds with the continual increase of the subjunctive that Övergaard (1995) observed. However, given that the subjunctive is used in as much as 50% of all clauses headed by one of the analyzed triggers in the first decade of the 21st century, it is safe to say that the subjunctive still has a strong foothold in American English. By contrast, the use of modal verbs after nouns of obligations and *that* (τ = -0.93***, primarily *should*, *shall*, and *must*), the strongest competitor of the subjunctive in AmE, declines even more rapidly than the general decrease that can be observed in the use of these modals.

Finally, a number of other alternatives to express obligation and desirability were briefly examined. Very few changes were detected in the use of concealed passives, imperatives, phrasal verbs, and questions with *can*, *could*, *would*, *will* + *please*. Only infinitive clauses with *what* and *when* (+116 % in COHA (1900-2009), + 20% in COCA (spoken) between 1990-94 and 2005-09) and *need* statements become more frequent (+50% with 1st person subjects between 1990-94 and 2005-09 in COCA (spoken)), whereas whimperatives, i.e. indirect questions with *will* or *would* etc., – like so many other expressions of obligation – undergo a significant decrease (τ = -0.41** in COHA).

The declining frequency of the (core) modals might mean that there is a concomitant trend towards an increased use of non-modalized declarative sentences or questions – a hypothesis that is very difficult to test in large corpora like COHA and COCA. A search for the question mark in COHA suggests that it is increasingly used ($\tau_{dec1860\text{-}2009}$= 0.46**) until the 1970s, and then decreases towards the end of the analyzed period. (A similar search could not be made in COCA.) However, to conclude that there is any link whatsoever between the decline of the modals and a supposed increase in the use of questions is impossible without further research.

An overarching tendency that could be detected in COHA is for expressions that have come to be considered old-fashioned and specialized in their use (such as *shall*, *be to*, and *ought to*) to decline drastically. The passive forms of the analyzed lexical verbs, already rare to begin with, suffer a similar fate. Other expressions that have traditionally been considered strong (such as *must*[205] and, to a lesser extent, *should*) also decrease considerably, but having been very common at the beginning of the 20th century, they still rank among the most frequent expressions of obligation and necessity in the 2000s. The emphatic verb *(had/'d) better* also decreases in use, while the frequency of the equally emotionally-colored *(have) got to* stagnates in the second half of the 20th century

[205] Note that my semantic analysis shows *must* to be primarily be used as an expression of subjective deontic modality in recent spoken AmE. Further investigations are necessary to determine if this is also the case in written AmE at the beginning of the 20th century.

after a period of increase in the first three decades examined here. The use of performative first person forms of lexical verbs and *want to*, which are clear indicators of wishes and desires, if not even orders, augments. *Have to*, *be supposed to*, nouns of obligation, and *need to* – expressions that have the reputation of being less direct and imposing than, for instance, *must* – increase even more drastically. In COCA (spoken) the "rhetorically brilliant" (Yagoda 2006) *need to* is the only expression that experiences a considerable rise in use ($\tau = 0.73$***, combinations of core modals and *want to* increase slightly), while its rivals *must* (-201 w/m), *have to* (-410 w/m), and *should* (-139 w/m) experience heavy losses.

It needs to be added that we can view these developments as signs of a trend away from verbs with moral overtones to expressions that place emphasis on human wishes and desires as well as on necessities that are (seemingly) inherent in the circumstances or the nature of the subject itself. We also witness a trend towards more indirect expressions of obligation and an increased use of mere expressions of desirability. Whether we should consider this development real progress towards a less authoritarian, more democratic society or merely as a superficial cosmetic change remains open for discussion. We would need more information on the meaning of strong expressions of obligation like *must* in the late 19th and early 20th century to determine whether there has indeed been a reduction in the expression of directive utterances (and thus if the claim that obligation is the core meaning of root modals, which was shown to be inaccurate for spoken AmE in the 21st century, can be upheld with reference to the state of the AmE a hundred years or so ago). When it comes to spoken American English, it has to pointed out that the shares of meanings that are expressed basically stay the same in the two time periods analyzed here, in spite of the changes in favored expressions and the drastic drop in absolute frequency. However, the overall decrease in the sum of all analyzed expressions of obligation and necessity suggests that there is either less need for the expression of obligation meanings, for example due to changing norms and values in society, or that there are other possibilities to express similar shades of meaning that, at least for now, pass below our radar. Further research is necessary to link the changes in the use of the modals of obligation to viable alternatives (such as imperatives and indirect expressions of requests).

Appendices

A. Corpus Information and Search Procedures

A.1. Remarks About the Number of Words in COCA and COHA

Decade	Fiction	Magazine	Newspaper	Non-fiction	TOTAL	% Fiction	% Magazine	% Newspaper	% Non-fiction
1810s	641,164	88,316	0	451,542	**1,181,022**	54.3%	7.5%	0.0%	38.2%
1820s	3,751,204	1,714,789	0	1,461,012	**6,927,005**	54.2%	24.8%	0.0%	21.1%
1830s	7,590,350	3,145,575	0	3,038,062	**13,773,987**	55.1%	22.8%	0.0%	22.1%
1840s	8,850,886	3,554,534	0	3,641,434	**16,046,854**	55.2%	22.2%	0.0%	22.7%
1850s	9,094,346	4,220,558	0	3,178,922	**16,493,826**	55.1%	25.6%	0.0%	19.3%
1860s	9,450,562	4,437,941	262,198	2,974,401	**17,125,102**	55.2%	25.9%	1.5%	17.4%
1870s	10,291,968	4,452,192	1,030,560	2,835,440	**18,610,160**	55.3%	23.9%	5.5%	15.2%
1880s	11,215,065	4,481,568	1,355,456	3,820,766	**20,872,855**	53.7%	21.5%	6.5%	18.3%
1890s	11,212,219	4,679,486	1,383,948	3,907,730	**21,183,383**	52.9%	22.1%	6.5%	18.4%
1900s	12,029,439	5,062,650	1,433,576	4,015,567	**22,541,232**	53.4%	22.5%	6.4%	17.8%
1910s	11,935,701	5,694,710	1,489,942	3,534,899	**22,655,252**	52.7%	25.1%	6.6%	15.6%
1920s	12,539,681	5,841,678	3,552,699	3,698,353	**25,632,411**	48.9%	22.8%	13.9%	14.4%
1930s	11,876,996	5,910,095	3,545,527	3,080,629	**24,413,247**	48.6%	24.2%	14.5%	12.6%
1940s	11,946,743	5,644,216	3,497,509	3,056,010	**24,144,478**	49.5%	23.4%	14.5%	12.7%
1950s	11,986,437	5,796,823	3,522,545	3,092,375	**24,398,180**	49.1%	23.8%	14.4%	12.7%
1960s	11,578,880	5,803,276	3,404,244	3,141,582	**23,927,982**	48.4%	24.3%	14.2%	13.1%
1970s	11,626,911	5,755,537	3,383,924	3,002,933	**23,769,305**	48.9%	24.2%	14.2%	12.6%
1980s	12,152,603	5,804,320	4,113,254	3,108,775	**25,178,952**	48.3%	23.1%	16.3%	12.3%
1990s	13,272,162	7,440,305	4,060,570	3,104,303	**27,877,340**	47.6%	26.7%	14.6%	11.1%
2000s	14,590,078	7,678,830	4,088,704	3,121,839	**29,479,451**	49.5%	26.0%	13.9%	10.6%
TOTAL	**207,633,395**	**97,207,399**	**40,124,656**	**61,266,574**	**406,232,024**	51.1%	23.9%	9.9%	15.1%

Table A.1 The number of words in *The Corpus of Historical American English*

Section	**Before 1900**	**After 1900**		
Fiction	Poetry	Movie scripts		
Magazine		*National Geographic* contains >70,000-180,000 words (until 1980s)		
		The Nation contains > 300,000 words (until 1980s)		
		Popular Science contains > 28,000 words (until 1980s)		
Newspaper		*Chicago Tribune*		
		New York Times Letters		
		Wall Street Journal (from 1910s)		
Non-fiction	General works			
		Military science		
		Fine arts (regularly again)		
		Agriculture > 40,000 words		
Section	**Subsection**	**1980s**	**1990s**	**2000s**
Fiction	Movie scripts	789,277	793,022	0
	Novels	8,727,391	4,968,323	9,579,431
	Short stories	1,762,112	6,598,399	4,350,240

Table A.2 Changes in the composition of COHA after the 1900s and 1980s

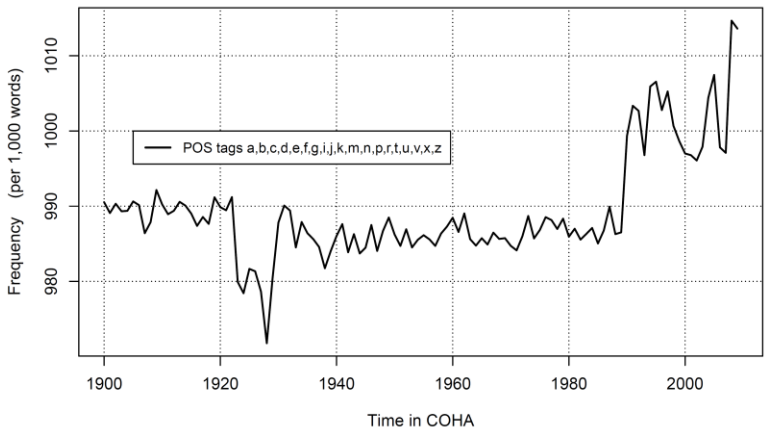


Figure A.1 Sum of POS-tagged words in COHA

COHA: There are some differences between the raw frequencies indicated online (which are probably used as the basis of the calculations) and those that can be derived from the numbers in the accompanying spreadsheet - which may explain a few of the bmps and peaks we see in many graphs. In 1922, 1929, and 1929, the differences between both counts are particularly high. In 1922 this enormous difference (105,000 words) coincides with a high word count (5,350,860 words). When measured in percentage, the differences are highest in 1924, 1927, 1928, and 1968.

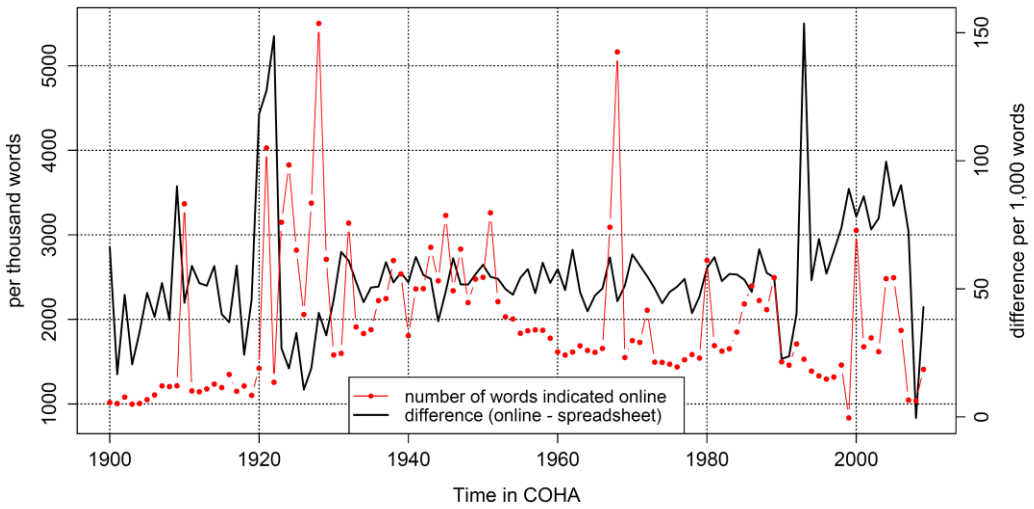


Figure A.2 Differences between the number of words indicated online and in the spreadsheet

	Spreadsheet	Online	Difference absolute	Difference in %
Average	2,477,543	2,513,629	36,086	1.5%
Standard deviation	697,822	696,612	27,041	1.3%
1924	1,321,254	1,419,626	98,372	6.9%
1925	1,774,313	1,839,395	65,082	3.5%
1926	1,129,870	1,169,833	39,963	3.4%
1927	1,338,318	1,421,762	83,444	5.9%
1928	1,924,214	2,077,827	153,613	7.4%
1968	2,072,739	2,215,244	142,505	6.4%

Table A.3 Number of words in COHA (selected years only)

Year	1990-1994	1995-1999	2000-2004	2005-2009	2010-2014	2015-2017	Total
Spoken	21,967,915	21,285,102	21,467,138	20,188,338	20,496,447	12,762,193	118,167,133
Fiction	20,258,031	19,499,437	19,712,300	20,484,607	20,729,798	12,720,562	113,404,735
Magazine	21,269,305	21,740,268	21,491,785	20,854,138	20,613,585	12,481,482	118,450,563
Newspaper	20,441,781	20,440,794	20,294,001	20,153,775	20,551,862	12,458,951	114,341,164
Academic	20,062,098	20,481,591	19,975,477	20,345,999	19,032,885	11,639,343	111,537,393
Total	103,999,130	103,447,192	102,940,701	102,026,857	101,424,577	62,062,531	**575,900,988**

Table A.4 The composition of COCA (January 2018)

Program	1990	2009	Total
ABC 20/20	253,552	104,542	358,094
ABC Nightline	1,020,633	59,927	1,080,560
ABC Primetime	242,912	70,059	312,971
PBS Newshour	1,011,878	295,989	1,307,867
Total	2,528,975	530,517	**3,059,492**

Table A.5 Number of words in selected TV programs of COCA

A.2. VNC-Analysis

I had access to two different R workspaces for VNC analyses. In the workspace e-mailed to me by Martin Hilpert in 2012 the frequencies and time spans have to be entered in comma-separated form. The periods can be seen in an amalgamation plot (cf. Figure A.3). In contrast to that, a simple table can be used as input for the VNC workspace available on the companion website of the *Oxford Handbook of the History of English* (cf. Gries and Hilpert 2012). The actual distances (in standard deviations) are listed instead of the number of clusters in this scree plot (cf. Figure A.4). The dendrograms also look slightly different since there are no horizontal lines for the different periods at a height indicating the average frequencies. Moreover, they appear in a separate window that can be enlarged up to a point where it is possible to identify the exact starting and end points of the selected periods. With these years, a vector was created in R, the average frequencies were calculated, and horizontal lines were added to the plots using the `segments` function.

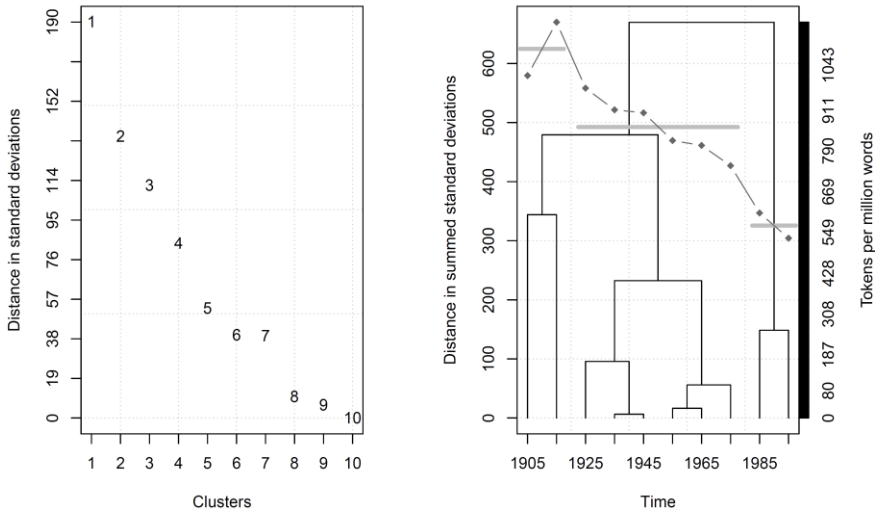


Figure A.3 VNC for the verb *must* in COHA (1900-2009, decade averages)

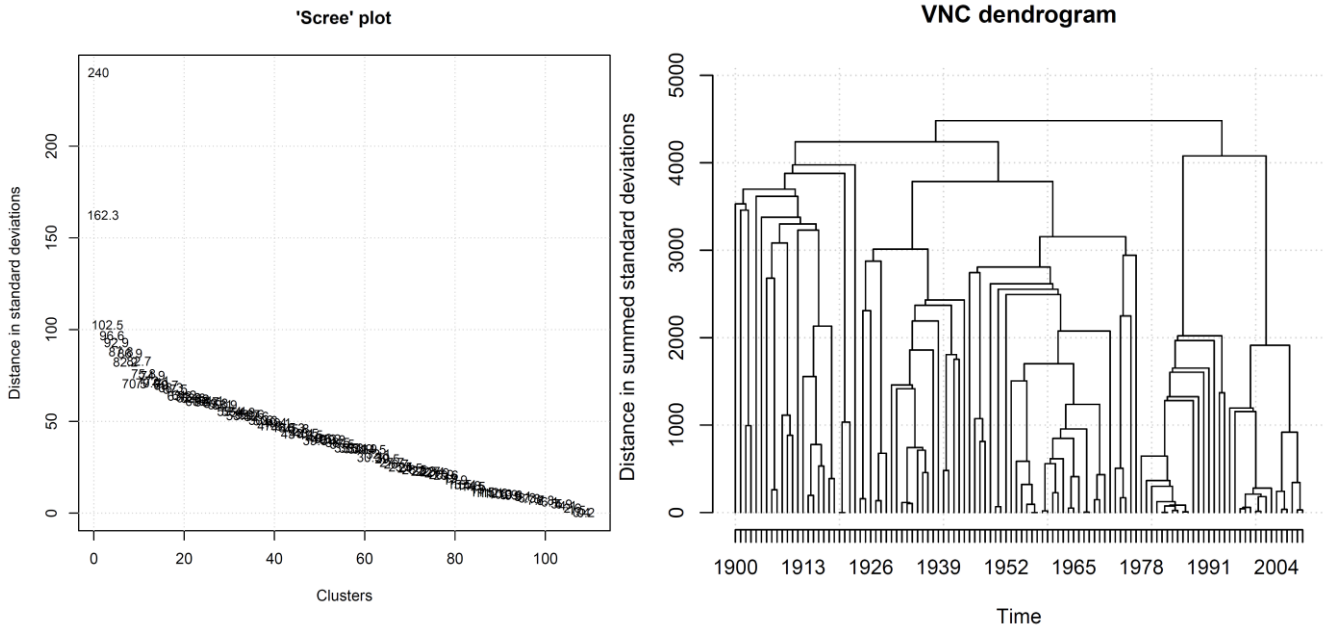


Figure A.4 VNC for the verb *must* in COHA (1900-2009, years)

A.3. Search Commands for Determining the Frequencies of "Interchangeable" Expressions

At first, CLAWS 7 was used, but the search syntax was simplified after I had completed data sampling, cf. http://corpus.byu.edu/updates2016.asp (05/01/2017).

Modal verbs (MV)

Basis:	MV [v*]	and, with an intervening adverb	MV [r*] [v*]
Subtracted are	MV [vhi*] [v?n*]	and	MV [r*] [vhi*] [v?n*]

When the use of *must* in the newspapers of COHA was analyzed, 15 pages with a maximum of 1,000 KWICs were extracted from the corpus since the frequencies of a word or a string of words / parts-of-speech cannot be listed in the corpus when the search is restricted to a particular subsection.

Have to and *need to*

Have to is taken as an example here. For *need to,* it was additionally determined that the form of *need* had to be a verb form and not a form of the noun.

The basis forms the sum of *has to* [v*] (cannot be negated), -[x*] *have to* [v*],

subtracted are:

- infinitival clauses: *to have to* [v*]
- *has,-ve to have* past participle: *has|has to* [vhi*] [v?n*]
- results manually checked for: *has|has to* [vhi*] *been* [vvn*]
- preceding modals: [vm*] *have to* [v*]
- questions [*do*] -[x*] *have to* [v*]
  [*do*] -wh* -[x*] *have* to [v*]

subtracted are also:

- the numbers for negated *have to* with adverbs interpolated between the subject and the verb phrase : [x] [r*] *have to* [v*]
- infinitival clauses: *to* [r*] *have to* [v*]
- preceding modals: [vm*] [r*] *have to* [v*], [vm*] * [r*] *have to* [v*]
  (questions with intervening adverbs have already been covered above)
- *going to have to* *going to have to* [v*]
- the phrase *X has |has to do with* -[vm*] *have|has to do with* + [x*] *have|has to do with*

Of course, this is an approximation. Other queries could have been added and alternative search commands could have been chosen.

(Had/'d) better

Basis:	[*have*] *better* [v?n*]	[y*] *better* [v*]	+ [n*] *better* [v*] +
		[p*] *better* [v*]	+ [dd*] *better* [v*]
Subtracted are:	[*have*] *better have* [v?n*]	[y*] *better have* [v?n*] ,	[n*] *better have* [v?n*]
		[p*] *better have* [v?n*] ,	[dd*] *better have* [v?n*]

The use of only one query like [*have*] *better* [v*] -[v?n*] was not possible since passive forms would have been included.

Adjectives

automatic analysis:

it [vbz*] *essential that*	*it* [vbz*] [r*] *essential that*
it [vbz*] *essential to* [v*]	*it* [vbz*] [r*] *essential to* [v*]

manually checked:

it [vbz*] *essential for* 0-3 * + *to*	*it* [vbz*] [r*] *essential for* 0-3 * + *to*

it [vbz*] ([r*]) *essential,* 0-6 intervening words + *to*|*that*
[vbz*] *essential –to* (checked for cases with *that*-omission)
Perfect constructions (*essential to have* + past participle) did not occur.

That-omission: [vbz*] *necessary –to,* [vbz*] *essential –to etc.* (list view)

Passive forms

The basis forms the sum of

[vbz*]|[vbr*]|[vbm*] *obliged to* [v*]	and	[vbz*]|[vbr*]|[vbm*] [r*] *obliged to* [v*]

subtracted are:

[vbz*]|[vbr*]|[vbm*] *obliged to* [vhi*] [vvn*]	[vbz*]|[vbr*]|[vbm*] [r*] *obliged to* [vhi*] [vvn*]
[vbz*]|[vbr*]|[vbm*] *obliged to* [vhi*] *had*|*been*|*done*	[vbz*]|[vbr*]|[vbm*] [r*] *obliged to* [vhi*] *had*|*been*|*done*

Perfomatives

I|*we urge*|*compel*|*force*|*require*|*demand that*|*to ,*
I|*we urge*|*compel*|*force*|*require*|*demand* * (*) *that*|*to*

Adverbs are not included because their meaning would be lost if the sentence was rephrased with a core modal (cf. example (485) below).

(485) Therefore, on behalf of the people of the United States, I sincerely urge that you consider it your patriotic duty to stand by your pledge of December 27, 1941… (1942/08/10, "People's Deputy", *Time Magazine*, COHA)

Progressive

[*be*] *having to* [v*]	[be] (*) *having to* [v*]	371 hits manually selected
[*be*] *needing to* [v*]	[be] (*) *needing to* [v*]	20 hits manually selected

uses of the progressive:	[*be*] [v?g*]	[*be*] * [v?g*]
going-to-future	[*be*] *going to* [v*]	[*be*] * *going to* [v*]

This search command includes code uses of BE (*) *going to*. In order to exclude cases in which somebody is literally going to a particular destination, 547+224 hits of [*be*] * *going to* [y*] would have had to be manually sorted. The effort was considered too substantial since the number of uses that could have been identified is probably rather small and thus negligible in light of the high number of uses of *BE* (*) *going to* (~105,000 uses between 1810 and 2009). The number of progressives is thus marginally higher than it should be.

gerund-participles	-[be] *having to*	-[be] *needing*
	includes a few cases of negated uses which were manually subtracted	
progressive *have* | *need*	[be] *having -to*	[be] *needing –to*
	[be] * *having -to*	[be] * *needing -to*

Modal BE + V-*ing*

[*need*].[v*] *to be* [v?g*]	[*have*] *to be* [v?g*]
must be [v?g*]	*should be* [v?g*]
and, one by one,	*can.*[v*]|may|.[v*] *be* [v?g*]
	could/may/might/ be [v?g*]

Felt…. Must / should / ought to

*felt * must -[have]* and *felt that * (*) must -[have]*

B. Lemmas in COHA

B.1. The (Semi-)Modals in COHA: Overview

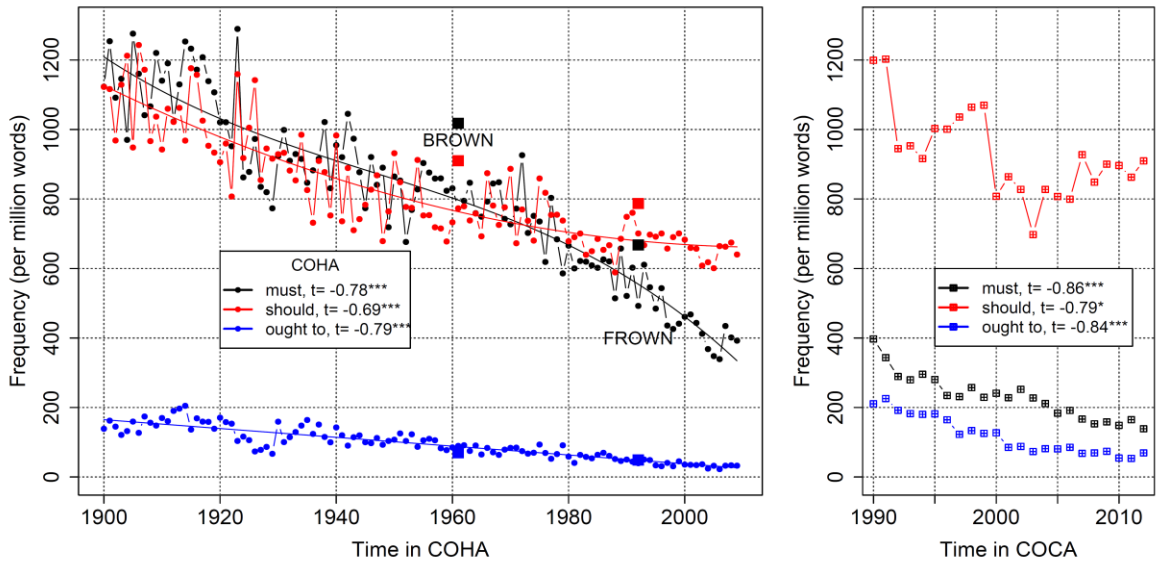


Figure B.1 *Must, should*, and *ought to* in COHA (left panel) and COCA (right panel)

As Figure B.1 illustrates, the frequencies of *must* and *should* are lower in COHA than in Brown and Frown, whereas the average frequency of *ought to* in COHA is marginally higher at the beginning of the 1960s and roughly equivalent to that in Brown and Frown in 1991/2. These differences are most likely due to differences in genre distribution: *Must* and *should* are particularly frequent in non-fiction books, whereas *ought to* is preferred in fiction (cf. Figure B.3 and Figure B.4 below). Since the share of fictional sources is much higher in COHA (fiction accounts for 53-49%) than it is in Brown and Frown (roughly 25%), it is only natural that the frequency of *ought to* should be higher in COHA than in Brown and its 1991/2 equivalent.

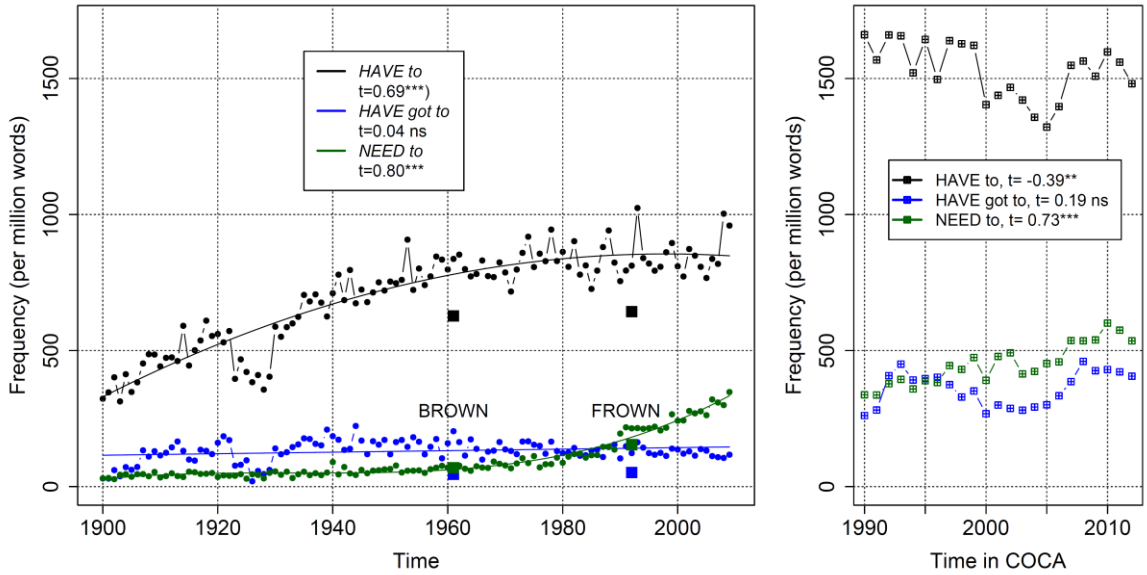


Figure B.2 *HAVE to, HAVE got to*, and *NEED to* in COHA (left panel) and COCA (right panel)

That the frequencies of *HAVE to* and modal *HAVE got to* are higher in COHA than in Brown / Frown is most likely also due to different genre preferences: *HAVE to* and *HAVE got to* are more common in fiction than in other text types (cf. Figure B.5 below).

B.2. The (Semi-)Modals in Various Text Types in COHA

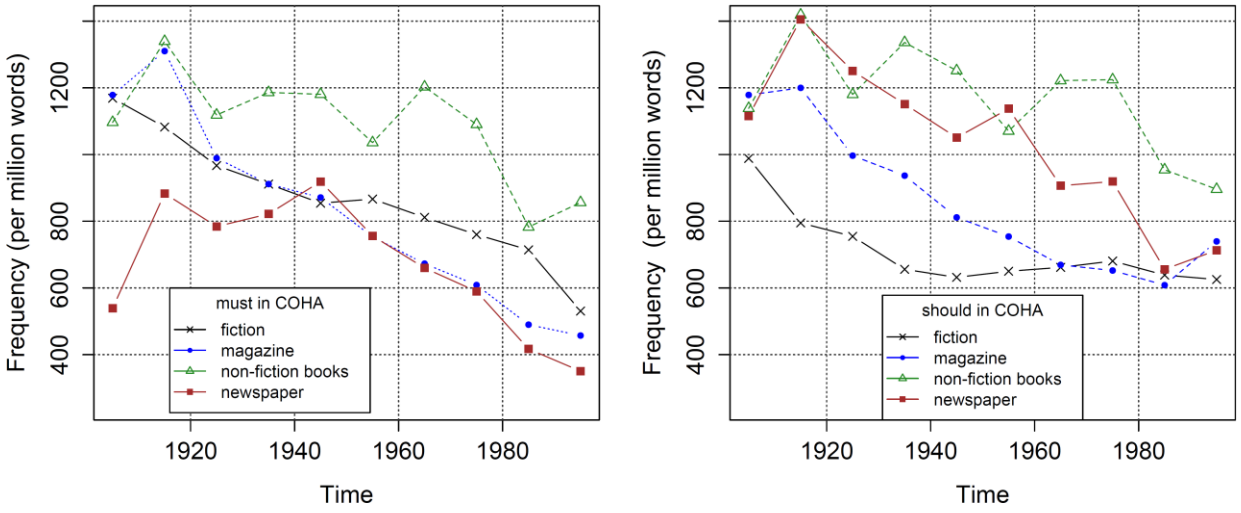


Figure B.3 *Must* and *should* in COHA (decade averages, 1900s-1990s)

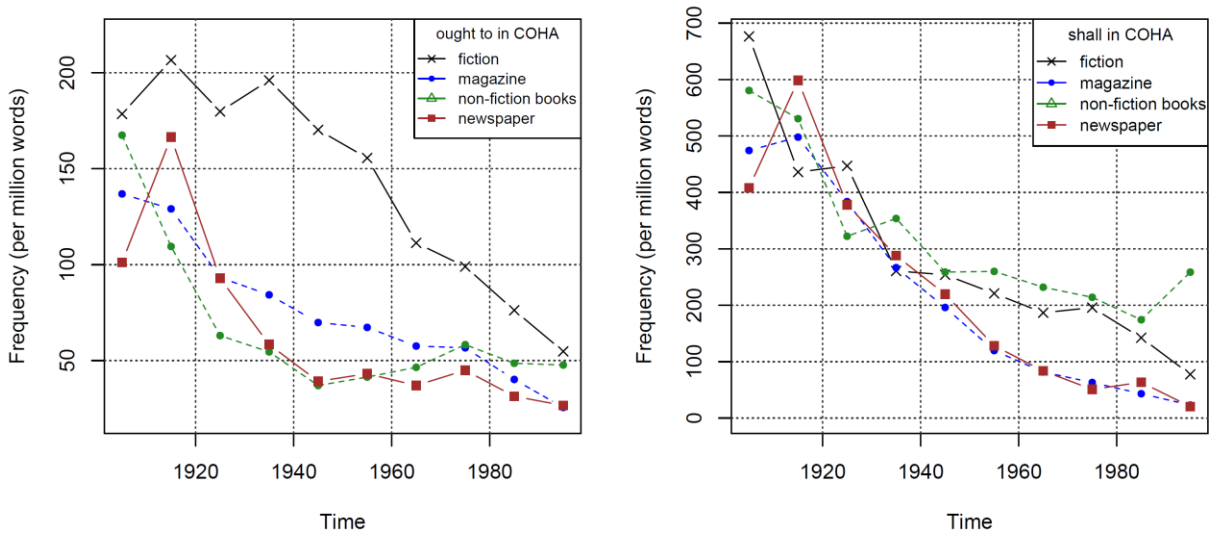


Figure B.4 *Ought to* and *shall* in COHA (decade averages, 1900s-1990s)

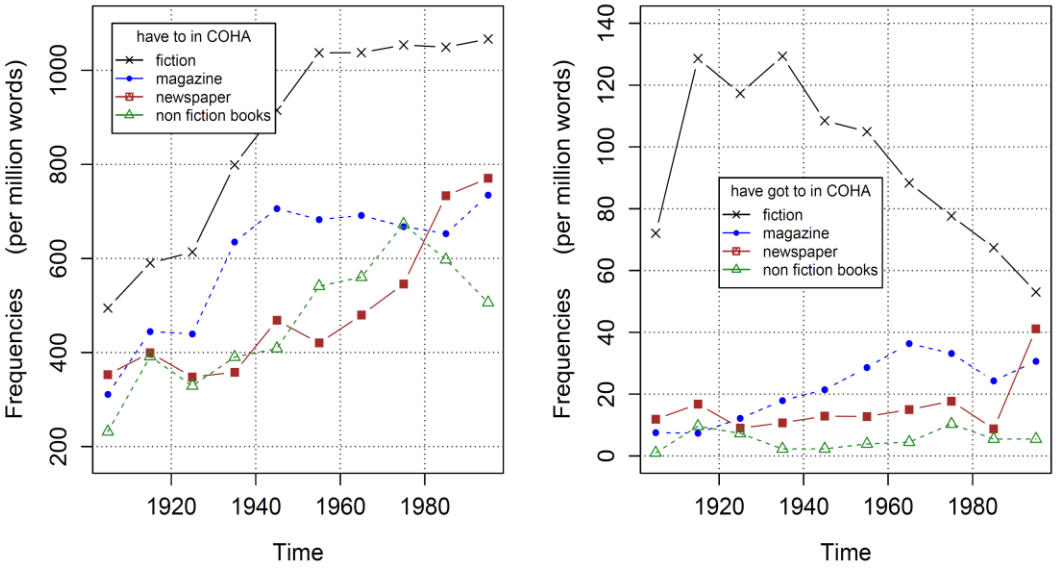


Figure B.5 *HAVE to* and *HAVE got to* in COHA (decade averages, 1900s-1990s)

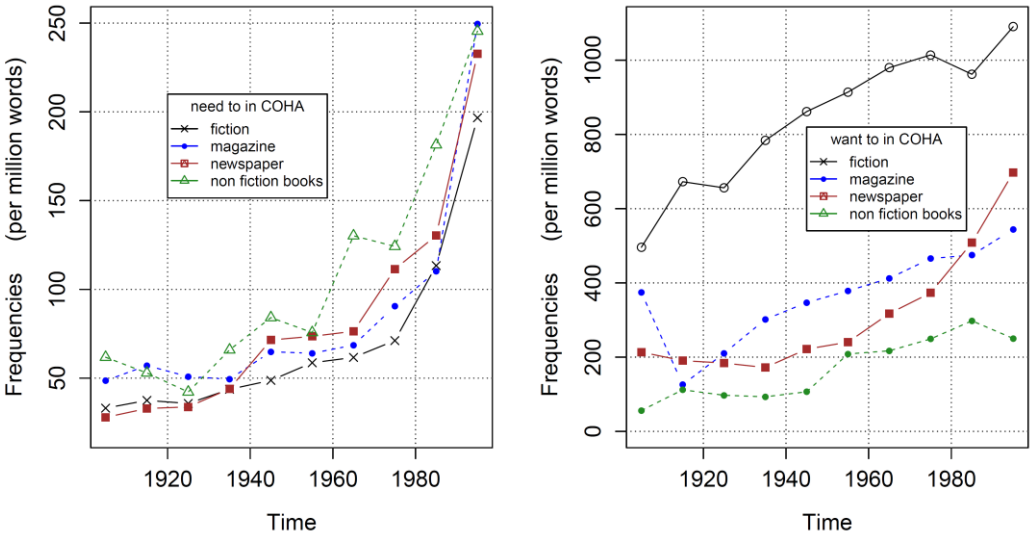


Figure B.6 *NEED to* and *WANT to* in COHA (decade averages, 1900s-1990s)

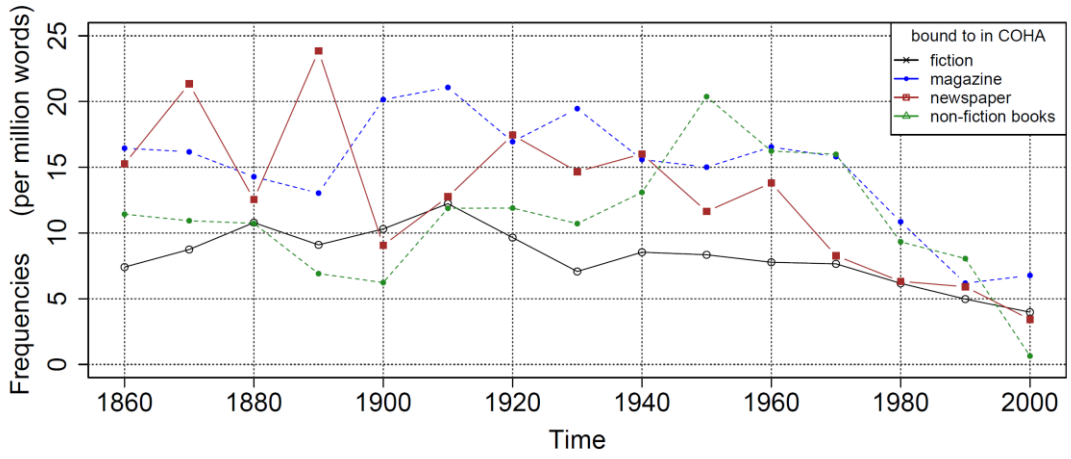


Figure B.7 *Bound to* in COHA (decade averages, 1860s-2000s)

B.3. Other Expressions of Obligation and Necessity (Lemmas)

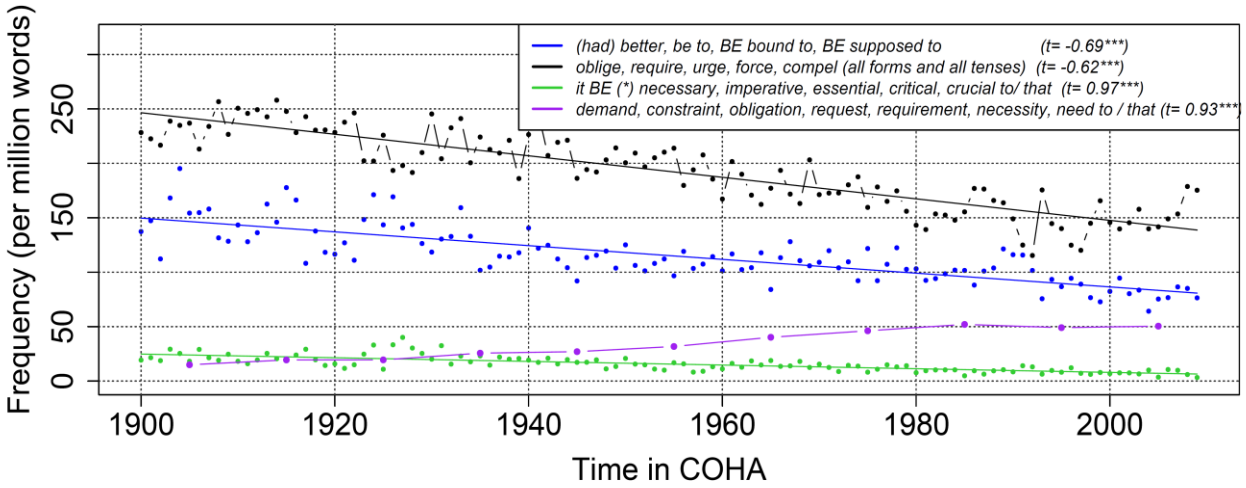


Figure B.8 Selected semi-modals, lexical verbs (all forms and tenses[1]), adjectives[2], and nouns (sg. and pl.)[3] of obligation in COHA

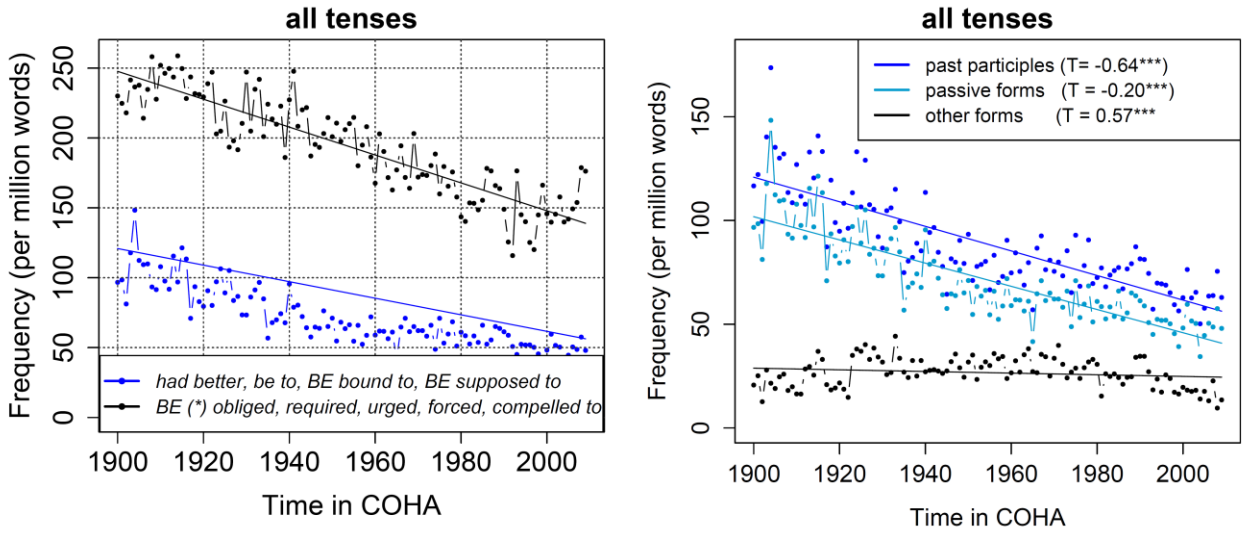


Figure B.9 Selected semi-modals and lexical verbs[4] of obligation in COHA

[1] [urge].[v*] *to*|*that*, [demand].[*v] *to*|*that*, [force].[v*] *to*|*that,* [require].[v*] *to*|*that*, [oblige].[v*] *to*|*that*
[2] It [BE] (*) *necessary* | *essential* | *imperative* | *critical* | *crucial that* | *to* [v*]
[3] The 2,424 nouns + *that* and the 8,652 uses of noun + *to* were manually examined to exclude irrelevant cases; 1,385 | 8,472 occurrences remained.
[4] Participles: *urged* | *demanded* | *forced* | *required* | *obliged to*
Passive forms: [be] (*) *urged* | *demanded* | *forced* | *required* | *obliged to*

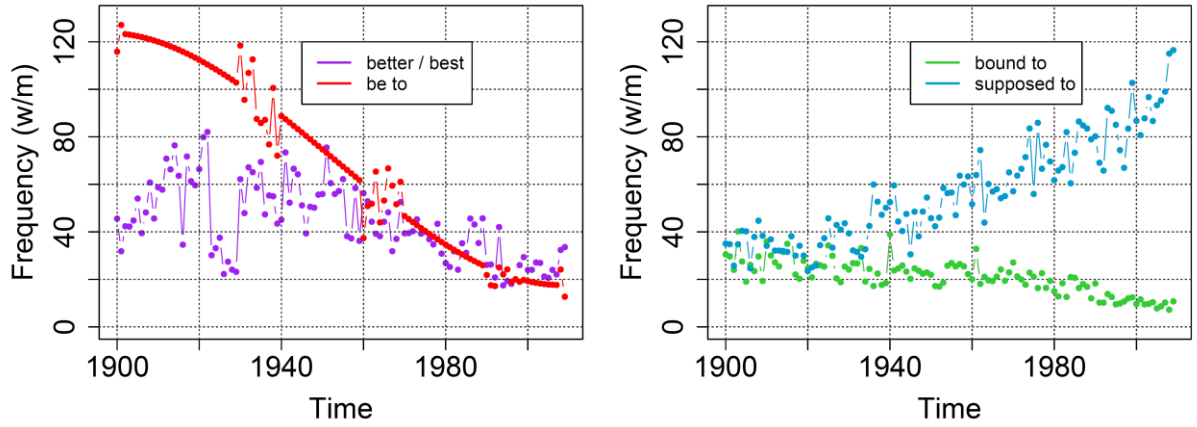


Figure B.10 Selected semi-modals of obligation in COHA

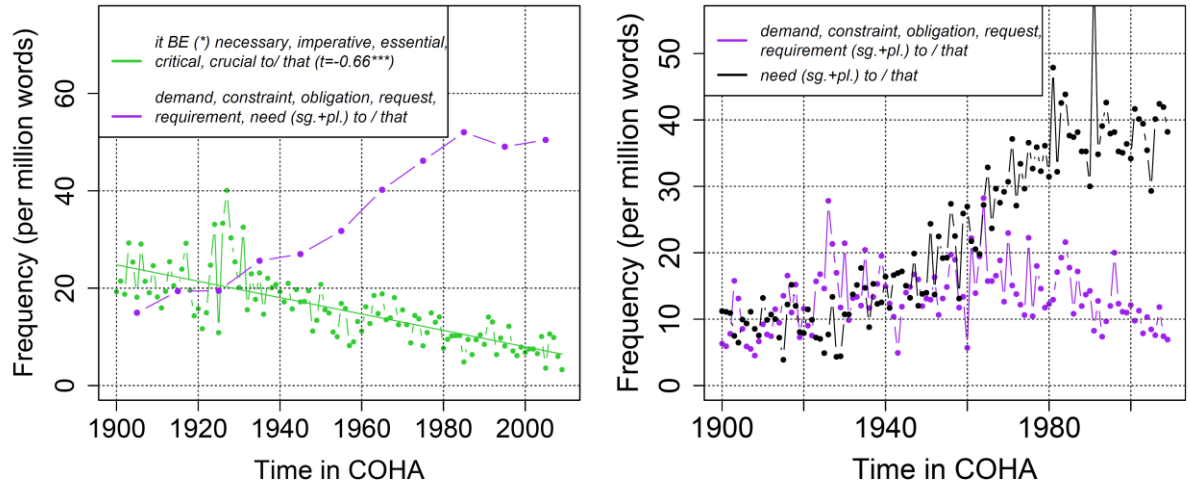


Figure B.11 Selected adjectives and nouns of obligation in COHA

As the left panel of Figure B.11 illustrates, there is a pronounced decrease in the use of the analyzed adjectives, whereas the nouns increase in use. Yet a look at the right panel clarifies that the recent increase in the use of the nouns of obligation is mainly due to an increase in the use of *need to / that.* The development of other nouns is retraced in Figure B.12 - Figure B.14.

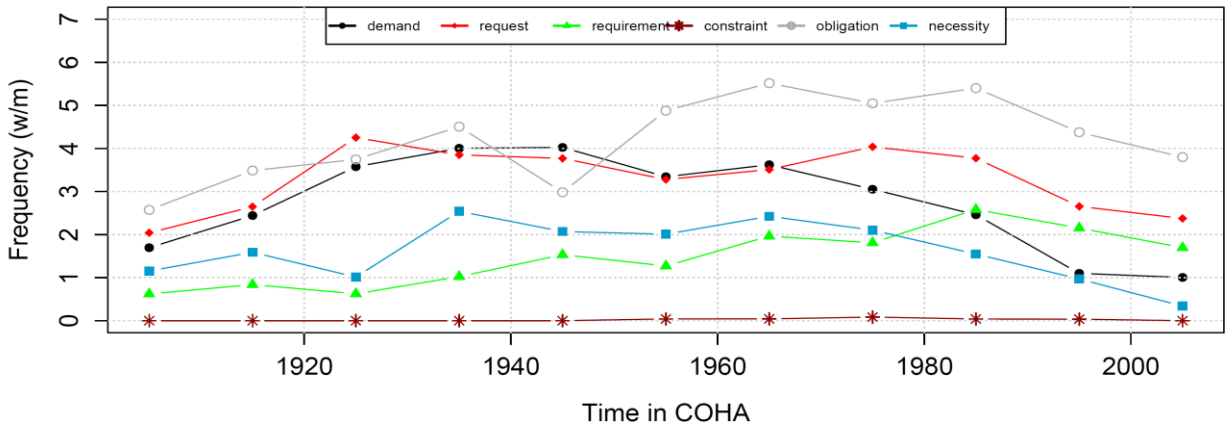


Figure B.12 *Demand* (n.), *request, requirement, constraint, obligation*, and *necessity* (sg. + pl.) + *to / that* in COHA

B.4. Nouns of Obligation: Comparison to the Brown Family of Corpora (BrE)

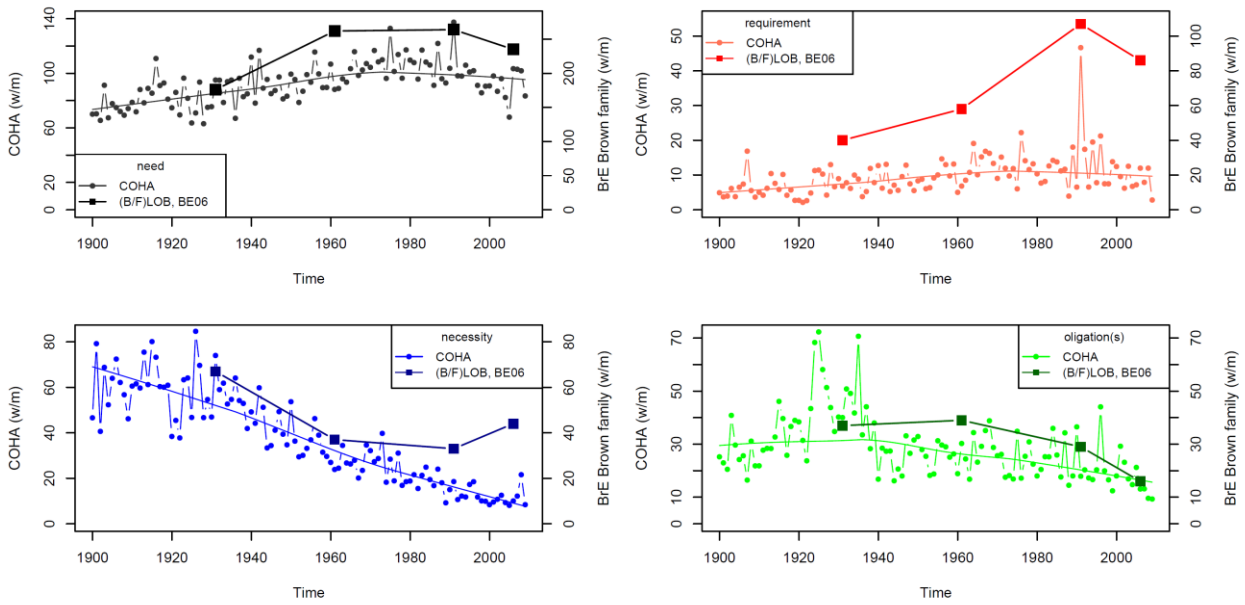


Figure B.13 The frequency of the nouns *need, requirement, necessity,* and *obligation(s)* in BLOB, LOB, FLOB, and BE06 (Leech 2013: 109) in comparison to the same data from COHA

Note that the difference in scale between the frequencies in COHA (on the left y-axis) and the Brown family of corpora (on the right y-axis) varies. It is 1:2 in the case of *need* and *requirement* and 1:1 in the case of *necessity* and *obligation(s)*. Most of the relative changes that can be observed in both data sets are very similar to each other. The only exception is the noun *requirement*, for which we find an extreme outlier in COHA, caused by a particularly high number of uses in an article in the non-fiction books section. In Brown the noun *requirement* occurs up to 8 times per document in the science section.

The frequencies from COHA are presented with non-parametric smoothers, which "smooth[…] away all the turbulence around the main trend in the data." As Baayen recommends, I used the "lowess() [function], which takes as input the X and Y coordinates of the data points and produces as output the X and Y coordinates of the smooth line. To plot this line, we fed its coordinates into lines()" (2008: 34).

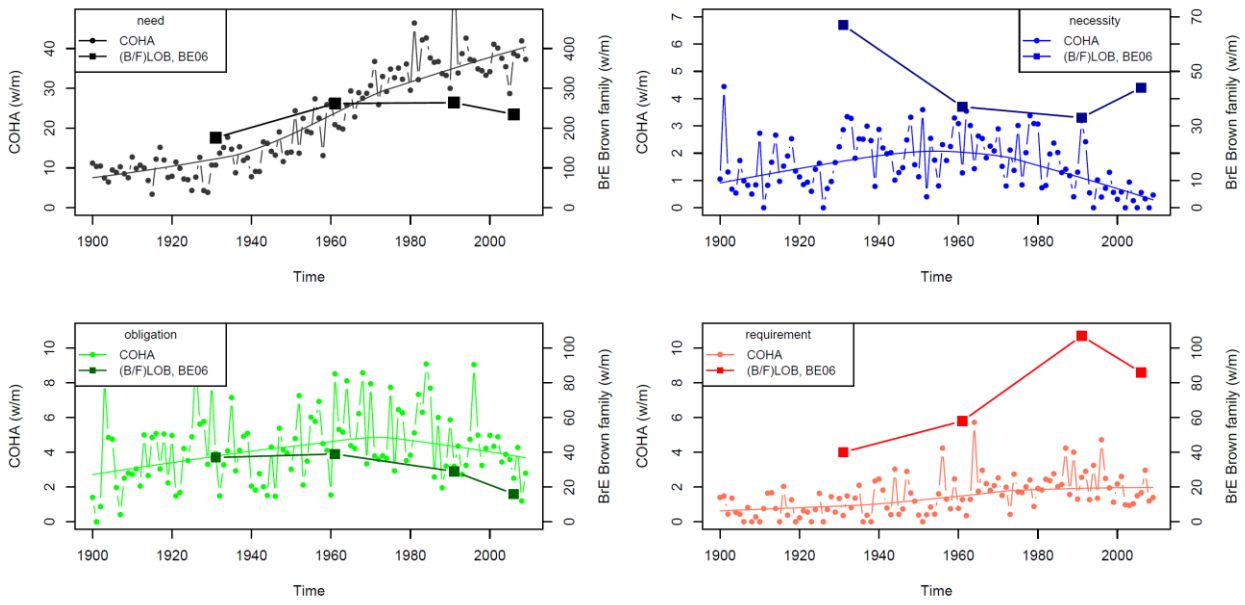


Figure B.14 The frequency of *need, requirement, necessity,* and *obligation(s)* in (B/F)LOB, and BE06 (Leech 2013: 109) compared to the frequency of the same nouns with *to* and *that* in COHA

Note that there is a difference in scale between the frequencies in COHA (on the left y-axis) and the Brown family of corpora (on the right y-axis) is 1:10.

B.5. Overview: Relative Changes of Verbs, Adjectives, and Nouns of Obligation

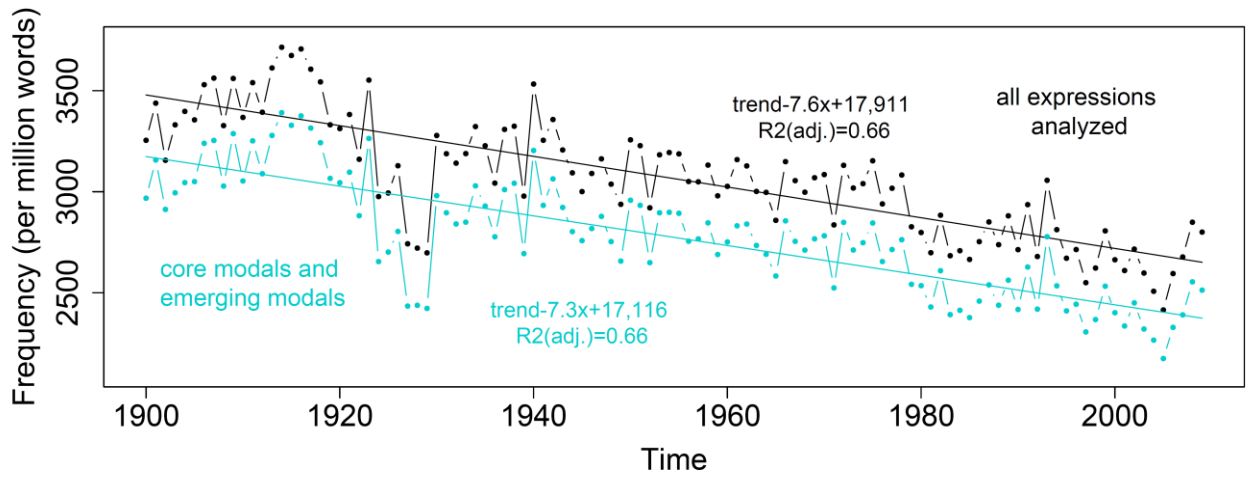


Figure B.15 The frequency of the core modals and emerging modals relative to the frequency of all analyzed expressions of obligation in COHA

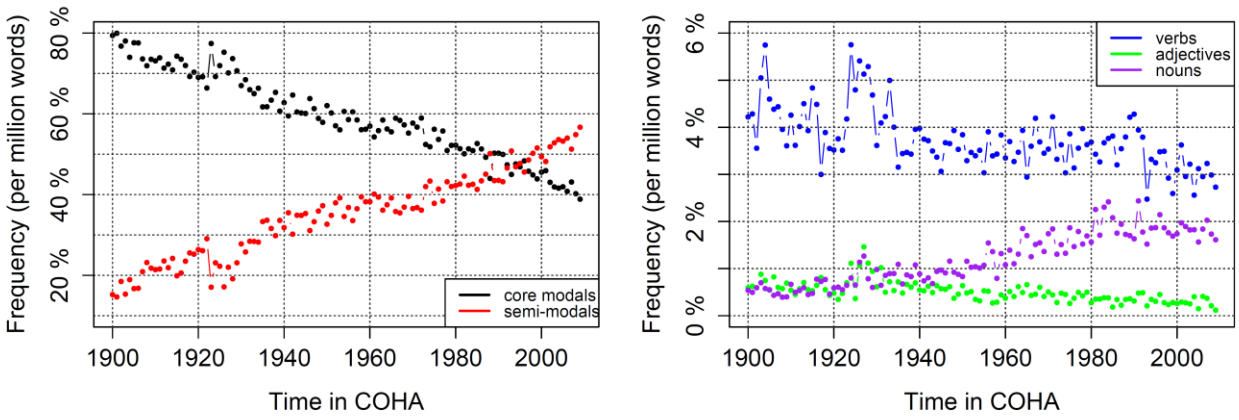


Figure B.16 Relative frequencies: core modals and emerging modals of obligation (left panel), verbs, adjectives, and nouns of obligation (right panel) in COHA

B.6. Modal Verbs in COHA: Size of Knock-Out Contexts

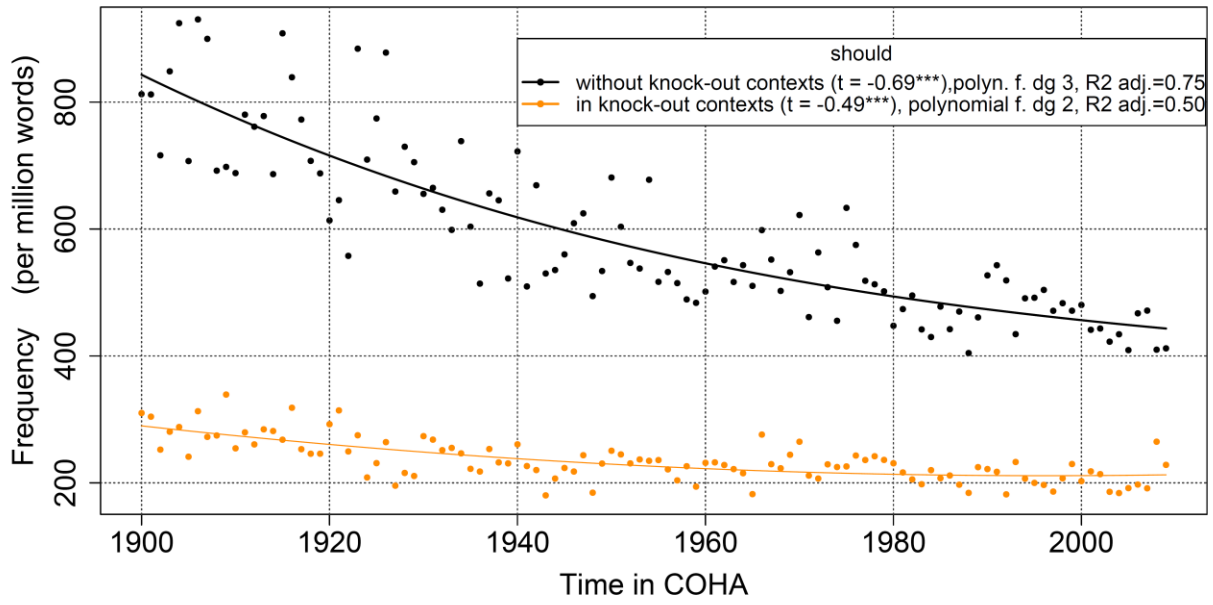


Figure B.17 *Should:* Size of knock-out contexts

C. Additional Information on Particular Expressions

C.1. *Must*

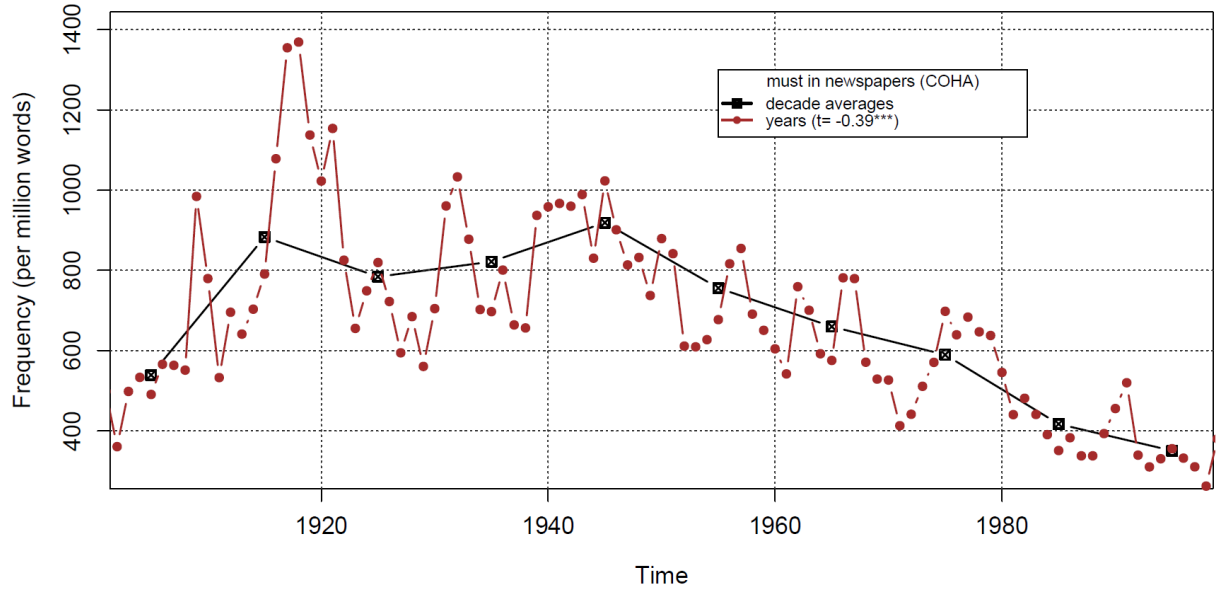


Figure C.1 *Must* in the newspapers of COHA

C.2. *Ought (to)*

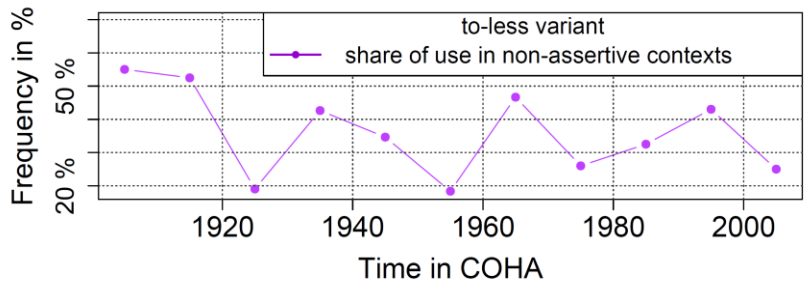


Figure C.2 Share of bare infinitives with *ought (to)* in non-assertive contexts in COHA (decade averages)

C.3. ***Be to***

Choosing a fit for *be to* in COHA

As detailed in Ch. 6.1.6 above, the number of years in which the use of *be to* is analyzed is restricted to 32 (instead of 119): 1900-1901, 1930-1939, 1960-1961, 1990-1999, 2008-2009. The decades that were chosen roughly match the compilation dates of the Brown family of corpora. There are 17,317 occurrences of a form of *be* + *to* in this period. After the elimination of irrelevant forms, 5,646 uses of present tense affirmative *be to* (*am /'m/ are / 're / is / 's)* remained and formed the basis of this analysis. Object-raising and subject-raising constructions with *who* and *what* are included.

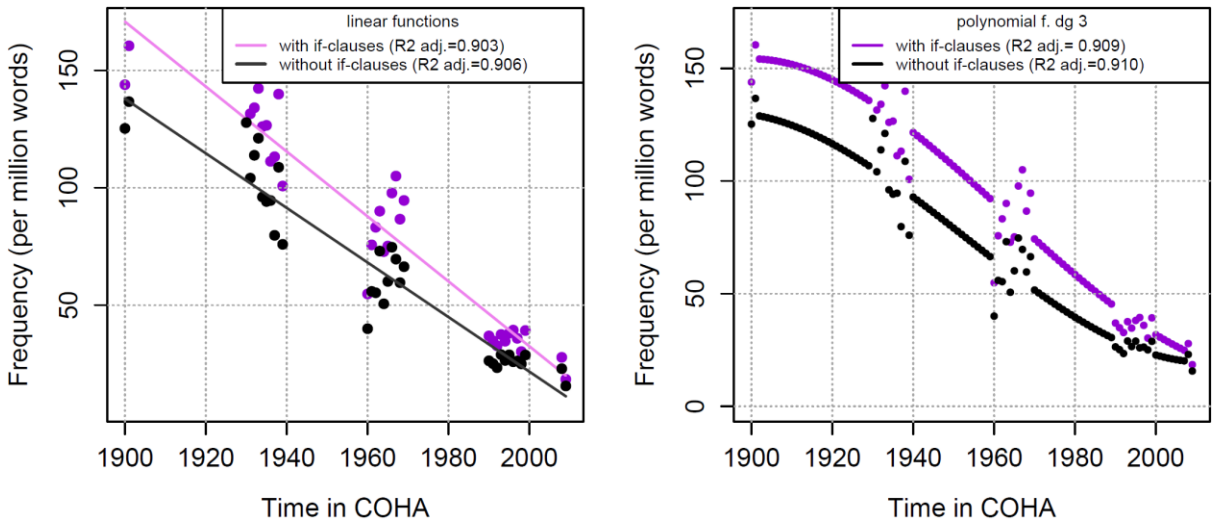


Figure C.3 Choosing a fit for *be to* in COHA (R^2 adjusted in brackets)

In Figure C.3 you see two types of fits, linear functions (left panel) and 3rd degree polynomial functions. Since the linear functions are bound to hit the zero mark soon after the 2000s and would thus suggest that *be to* becomes extinct around that time, the polynomial functions, which indicate that the decrease slows down towards the end of the analyzed time frame, illustrate the belief that *be to* may survive in some particular contexts or in certain fixed phrases. Given what we know about language use, this scenario seems more likely. Hence, the polynomial functions were chosen as models for those plots in which the frequency of *be to* had to be included.

Be to in the different text types of COHA

Year	1900	1901	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	occurrences in *if*-clauses and object-raising uses not included	
Fiction	75.5	87.7	56.1	51.1	51.3	51.4	45.4	42.7	53.3	38.3	35.7	37.5		
Magazine	248.5	150.8	107.7	92.9	129.4	124.3	92.1	94.6	77.4	69.9	77.6	55.3		
Newspaper	165.4	168.6	172.6	180.8	272.5	276.3	155.8	203.5	162.6	137.2	173.0	138.4		
Non-fiction books	107.7	118.0	278.2	133.3	130.2	105.6	226.3	114.3	157.6	146.8	274.4	175.7		
Year			1960	1961	1962	1963	1964	1965	1966	1967	1968	1969		
Fiction			32.6	30.4	23.2	42.4	13.8	38.4	43.1	37.6	35.0	23.2		
Magazine			33.7	59.1	61.4	24.9	28.3	32.3	41.6	32.4	32.3	49.0		
Newspaper			45.8	80.9	92.1	94.9	82.2	124.7	91.1	94.0	89.0	76.0		
Non-fiction books			68.2	84.8	112.3	198.4	190.2	65.2	148.4	118.4	83.4	127.0		
Year			1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2008	2009
Fiction			5.1	11.8	8.3	19.2	15.7	14.6	12.2	17.0	22.3	20.4	14.5	13.6
Magazine			23.9	15.4	21.1	24.8	29.8	26.5	17.1	21.7	4.2	19.7	88.8	4.5
Newspaper			0.0	7.8	32.2	15.9	24.3	27.9	23.9	19.8	21.3	11.0	0.0	11.2
Non-fiction books			54.7	72.0	7.2	100.6	27.2	42.5	28.0	21.5	26.3	24.7	26.2	15.7

Table C.1 *Be to* (iwcm) in the different sections of COHA (in w/m)

Fixed phrases with *be to* in COCA

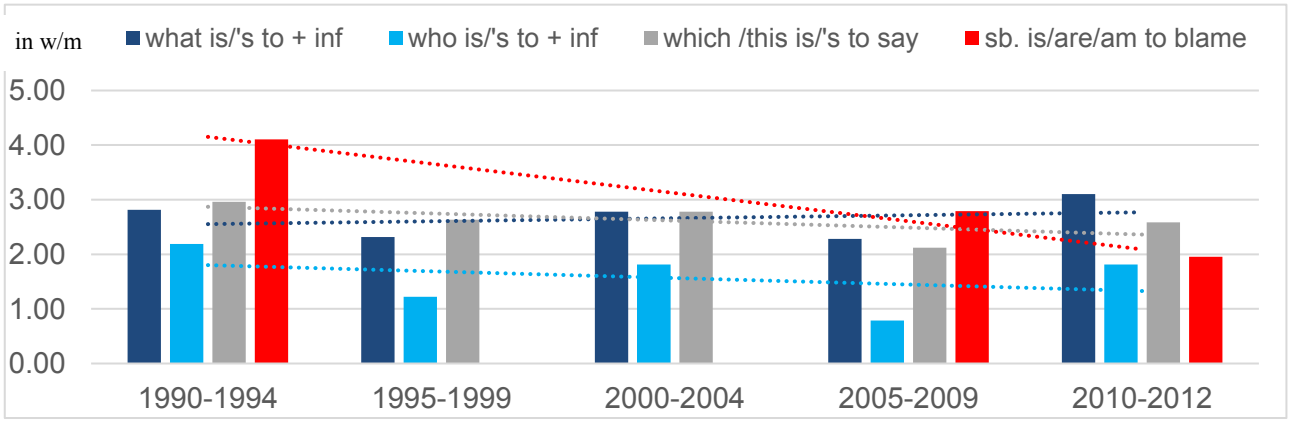


Figure C.4 Fixed phrases with *be to* in COCA spoken

C.4. *Have got to* in COHA

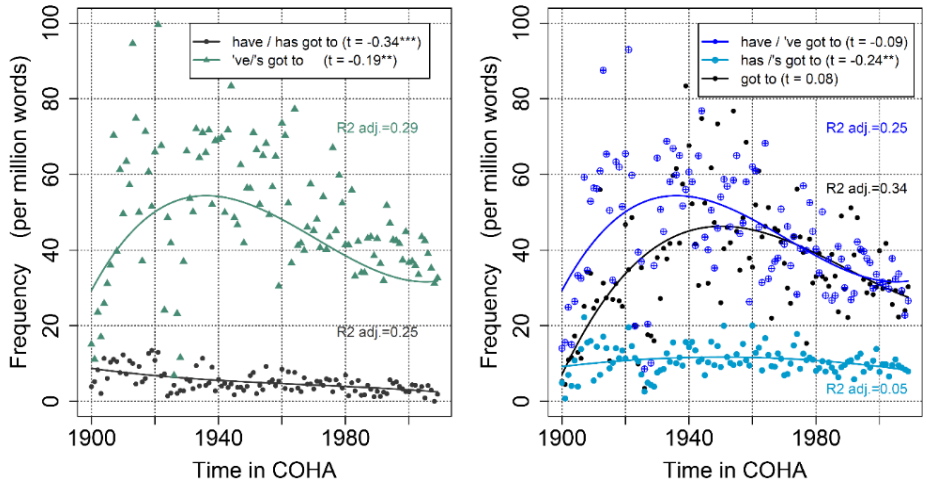


Figure C.5 Full vs. contracted forms of *have got to* + infinitive (left panel) | *have vs. has vs. Ø got to*+ infinitive (right panel) in COHA

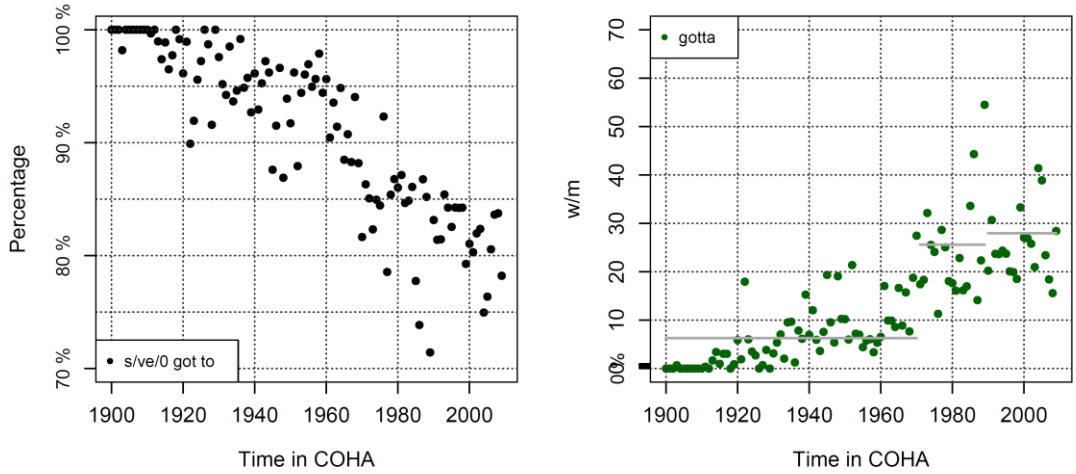


Figure C.6 Frequency of *'s / 've / Ø got to* in % of all forms (*have / has / 's / 've / Ø got to / gotta*) (left panel) in COHA and of *gotta* in w/m (right panel)

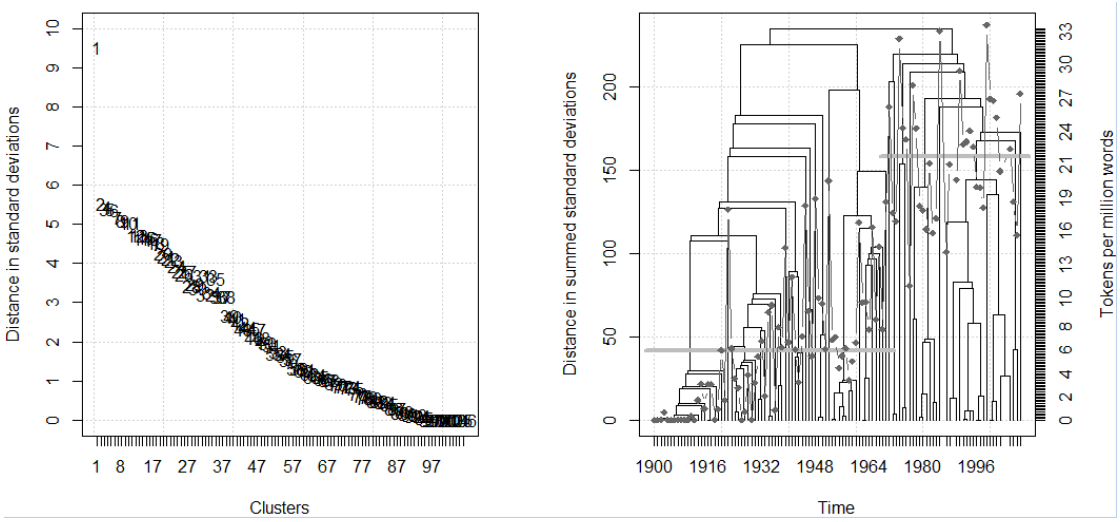


Figure C.7 VNC-analysis of *gotta* (adverb) + infinitive in COHA (after removal of outliers > 38 w/m in 1986, 1989, 2004, and 2005)

C.5. ***Need (to)***

Need to in different corpus sections of COHA

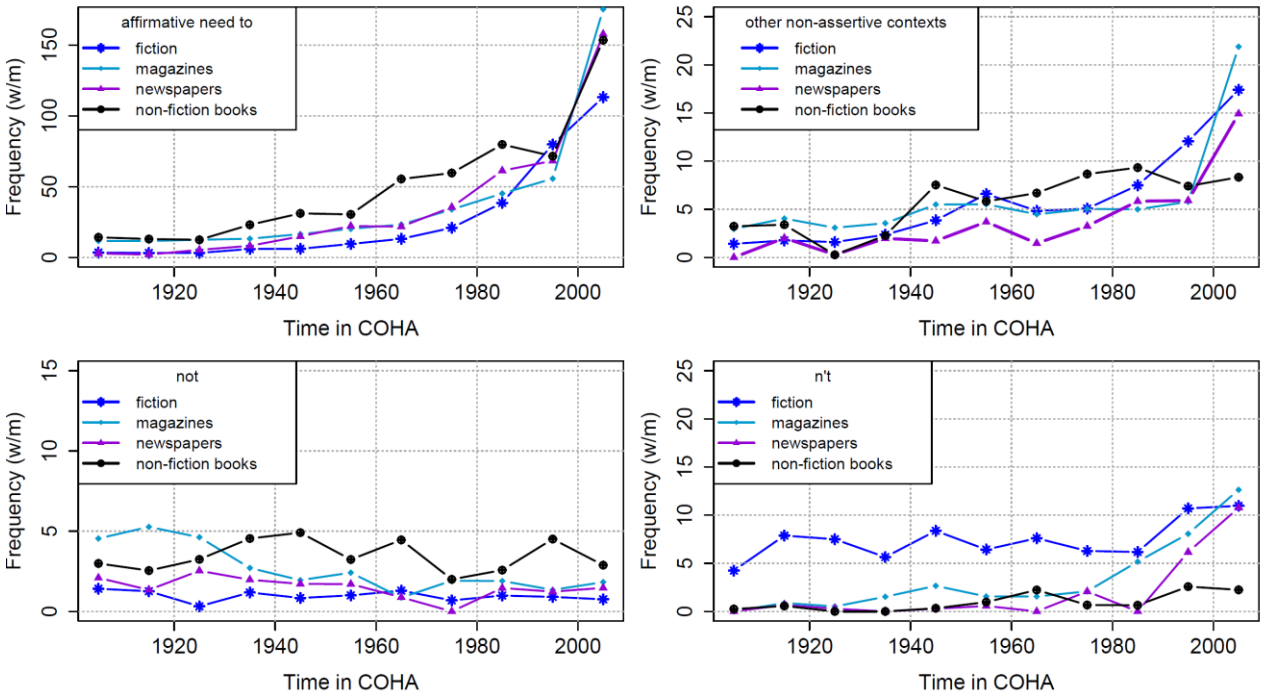


Figure C.8 *Need to* + infinitive the different corpus sections of COHA (excluding questions)

VNC-analysis of *need* (adverb) + infinitive in COHA (decades)

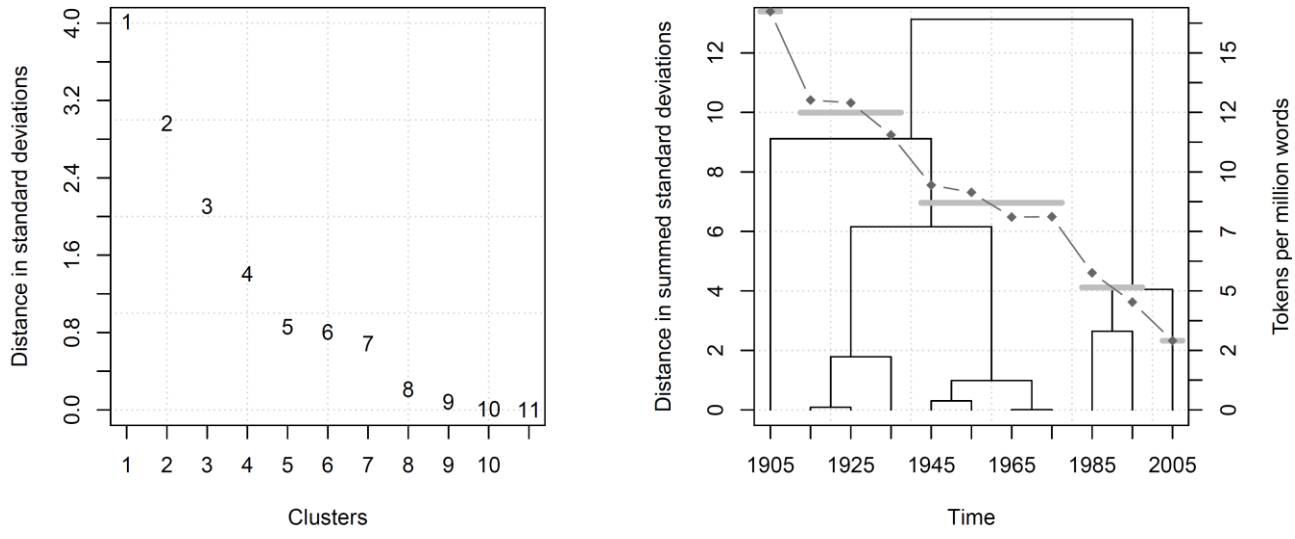


Figure C.9 VNC-analysis of *need* (adverb) + infinitive in non-assertive contexts (excluding direct negation)

Need to in the TIME corpus (cf. Jäger 2009)

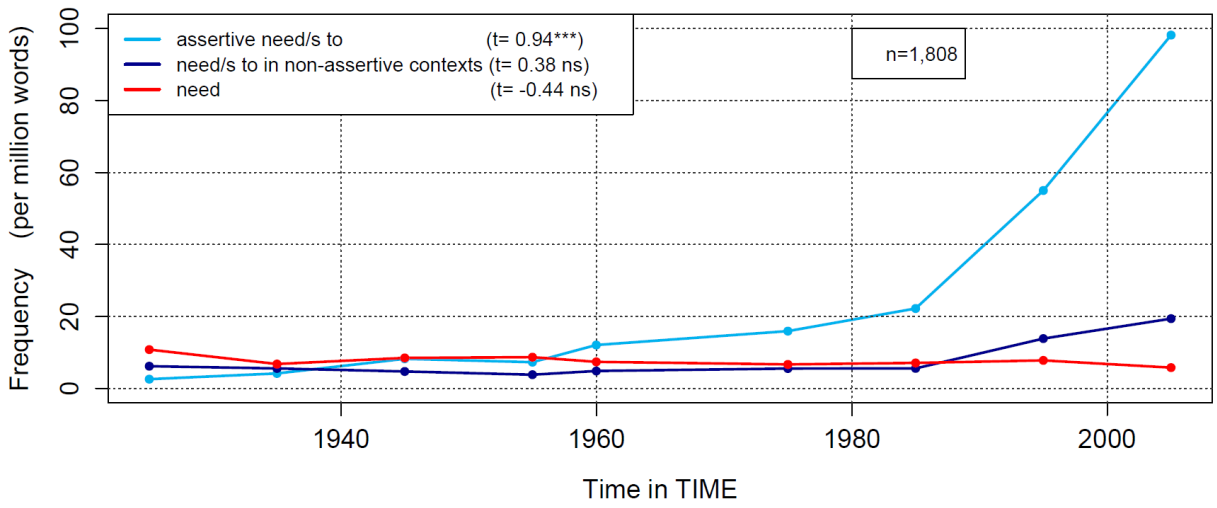


Figure C.10 *Need(n't)* and (non-)assertive *need to* + infinitive in the TIME corpus

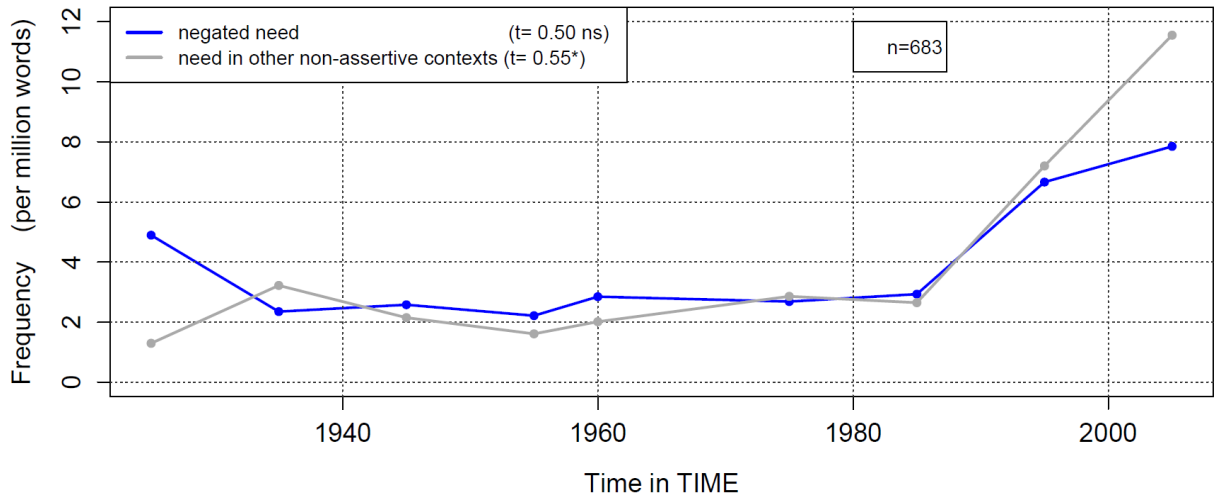


Figure C.11 *Need to* in non-assertive contexts in the TIME corpus

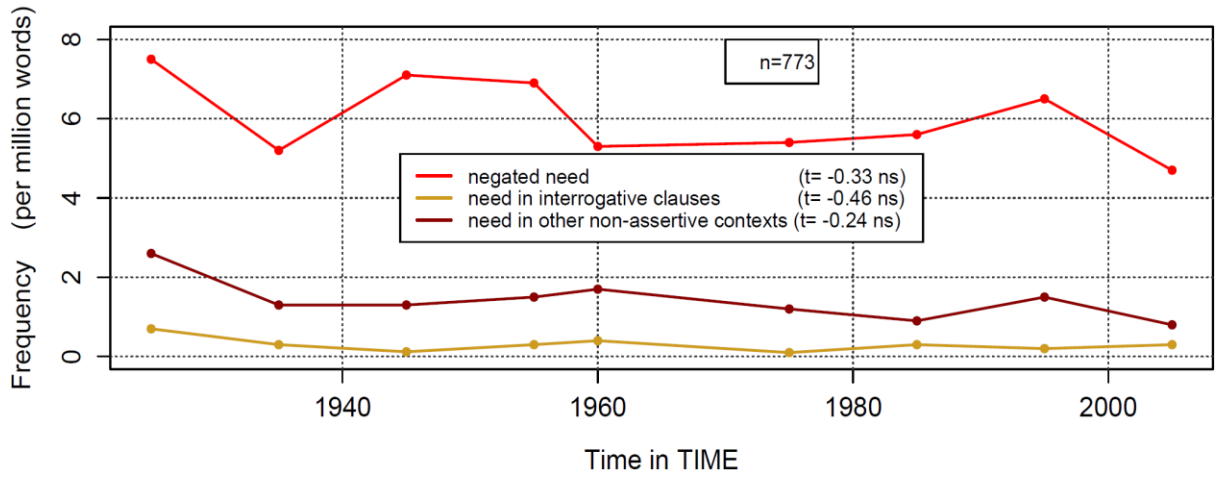


Figure C.12 *Need* in non-assertive contexts in the TIME corpus

Negative vs. non-assertive *need (to)*

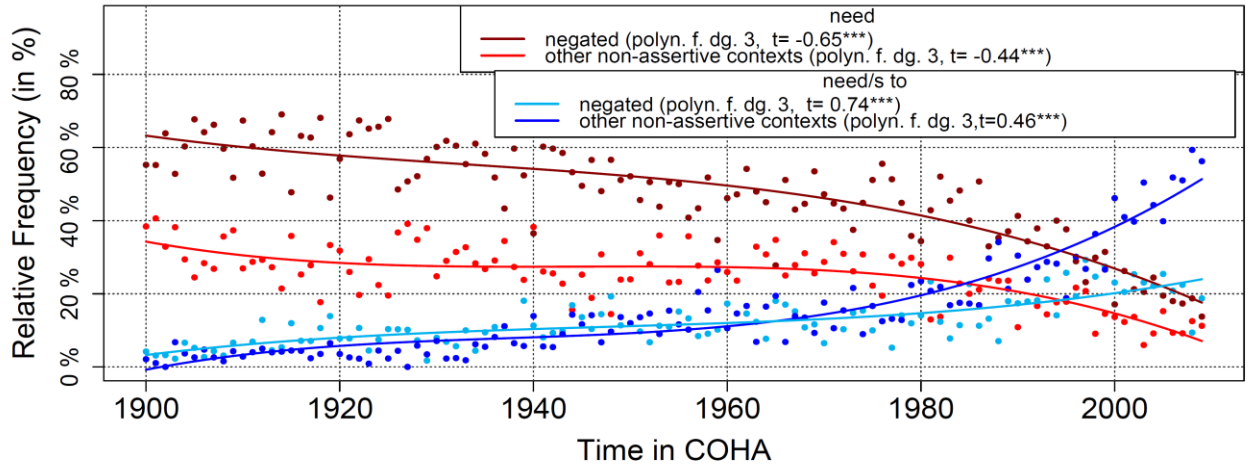


Figure C.13 Relative frequencies of negated vs. non-assertive *need (to)* in COHA

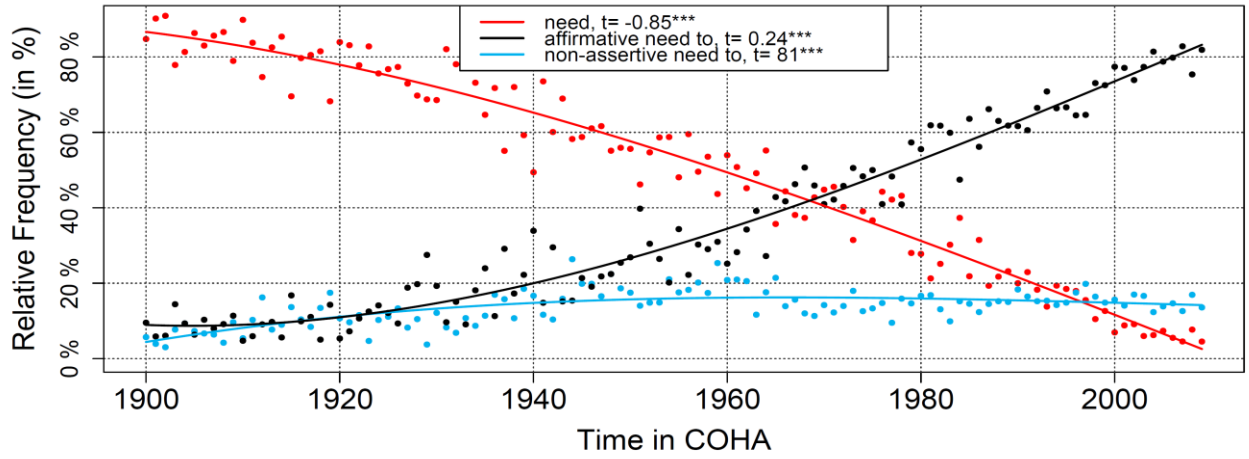


Figure C.14 Relative frequencies of non-assertive vs. affirmative *need to* and *need* in COHA

C.6. *(Had/'d) better* in COHA

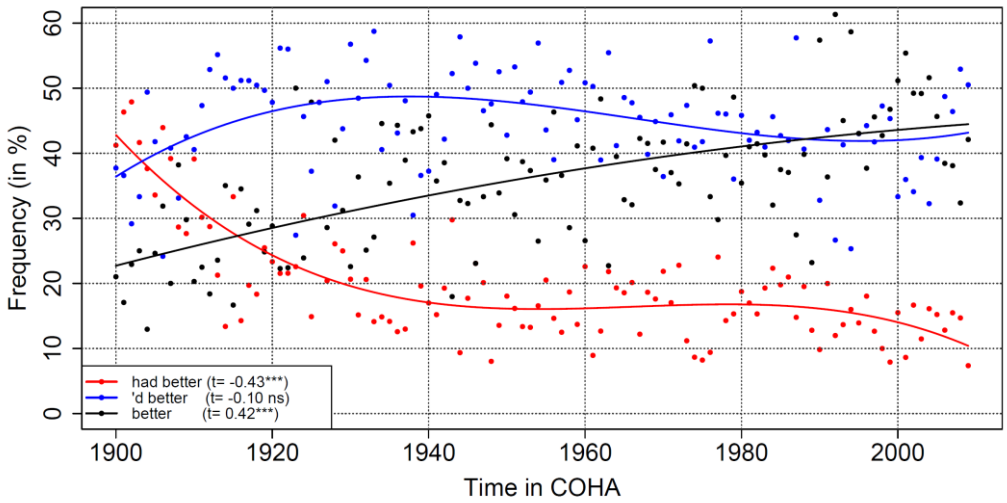


Figure C.15 Relative frequencies of (*had/'d*) *better* in COHA

C.7. Adjectives in Present Tense Extraposition Constructions in Various Text Types of COHA

critical	**1900s**	**1910s**	**1920s**	**1930s**	**1940s**	**1950s**	**1960s**	**1970s**	**1980s**	**1990s**	**2000s**
Fiction										0.08	0.07
Magazine									0.17	1.08	0.78
Newspaper							0.59				0.49
Non-fiction books											3.52
crucial	**1900s**	**1910s**	**1920s**	**1930s**	**1940s**	**1950s**	**1960s**	**1970s**	**1980s**	**1990s**	**2000s**
Fiction									0.08	0.08	0.07
Magazine							0.17	0.17	0.34	1.08	0.65
Newspaper								0.30	0.24	0.99	
Non-fiction books										0.64	0.32
essential	**1900s**	**1910s**	**1920s**	**1930s**	**1940s**	**1950s**	**1960s**	**1970s**	**1980s**	**1990s**	**2000s**
Fiction	0.17	0.08	0.32	0.17	0.17	0.08	0.09	0.26	0.16	0.08	0.27
Magazine	1.78	1.40	0.68	1.18	1.95	1.21	1.03	1.04	0.52	1.21	1.04
Newspaper	0.70	2.68	2.25	4.23	3.15	0.85	2.94	1.48	0.97	0.99	0.49
Non-fiction books	1.99	1.98	5.14	2.27	2.62	3.23	4.77	3.33	0.97	2.25	2.24
imperative	**1900s**	**1910s**	**1920s**	**1930s**	**1940s**	**1950s**	**1960s**	**1970s**	**1980s**	**1990s**	**2000s**
Fiction	0.17	0.42	0.00	0.17	0.59	0.25	0.26	0.26	0.58	0.08	0.07
Magazine	0.40	0.35	0.00	0.51	1.42	0.17	0.52	0.52	0.17	1.08	1.04
Newspaper	0.70	1.34	1.41	1.97	2.29	2.55	0.88	2.36	0.97	0.74	0.73
Non-fiction books	0.00	0.28	1.08	0.32	0.65	0.32	0.95	1.00	0.32	1.61	1.28
necessary	**1900s**	**1910s**	**1920s**	**1930s**	**1940s**	**1950s**	**1960s**	**1970s**	**1980s**	**1990s**	**2000s**
Fiction	1.58	0.34	0.72	0.51	0.75	0.58	0.43	0.34	0.33	0.23	0.07
Magazine	2.37	1.93	2.23	0.68	1.06	0.69	0.52	1.04	0.69	0.27	0.26
Newspaper	2.09	6.71	1.97	1.13	2.00	0.85	0.29	0.30	0.00	0.00	0.24
Non-fiction books	6.23	2.83	8.92	4.54	3.60	4.20	3.50	3.00	1.93	0.97	0.64

values in red font
= highest value per decade

Table C.2 Extraposed *that*-complements of the adjectives per decade and text type in COHA(in w/m)

critical	**1900s**	**1910s**	**1920s**	**1930s**	**1940s**	**1950s**	**1960s**	**1970s**	**1980s**	**1990s**	**2000s**
Fiction									0.17	0.67	0.52
Magazine									0.24		0.98
Newspaper									0.64	1.29	2.24
Non-fiction books									0.17	0.67	0.52
crucial	**1900s**	**1910s**	**1920s**	**1930s**	**1940s**	**1950s**	**1960s**	**1970s**	**1980s**	**1990s**	**2000s**
Fiction								0.09	0.08		
Magazine							0.17	0.17	0.34	0.81	1.04
Newspaper										0.74	0.49
Non-fiction books									0.32	1.93	0.96
essential	**1900s**	**1910s**	**1920s**	**1930s**	**1940s**	**1950s**	**1960s**	**1970s**	**1980s**	**1990s**	**2000s**
Fiction		0.08		0.08	0.08	0.17	0.09	0.09	0.16		0.14
Magazine	0.40	1.40	1.03	0.85	0.53	0.69	1.03	0.87	1.03	0.94	0.65
Newspaper	0.70		0.28	1.41	1.14	0.85	0.88	1.18	0.24	0.25	
Non-fiction books	0.75	0.57	1.89	1.62	1.96	2.26	3.18	3.00	1.61	3.22	1.28
imperative	**1900s**	**1910s**	**1920s**	**1930s**	**1940s**	**1950s**	**1960s**	**1970s**	**1980s**	**1990s**	**2000s**
Fiction	0.08	0.00						0.09		0.15	
Magazine	0.20	0.18						0.00		0.13	0.39
Newspaper			0.56	0.28	0.57		0.59	0.59		0.25	0.24
Non-fiction books	0.25	0.28	0.54	0.00	0.33	0.65	0.64	0.00	0.32	0.32	
necessary	**1900s**	**1910s**	**1920s**	**1930s**	**1940s**	**1950s**	**1960s**	**1970s**	**1980s**	**1990s**	**2000s**
Fiction	2.58	1.09	1.36	1.94	2.26	1.92	1.90	1.38	0.74	0.45	0.69
Magazine	18.57	20.55	13.01	14.55	8.68	5.69	5.00	4.00	2.58	2.42	2.47
Newspaper	5.58	17.45	12.38	11.85	8.86	8.52	7.34	4.14	2.67	1.97	0.49
Non-fiction books	25.15	32.25	38.13	43.17	30.76	28.46	35.97	26.97	17.05	18.04	8.01

values in red font
= highest value per decade

Table C.3 Extraposed *to*-complements of the adjectives per decade and text type in COHA (in w/m)

C.8. Nouns

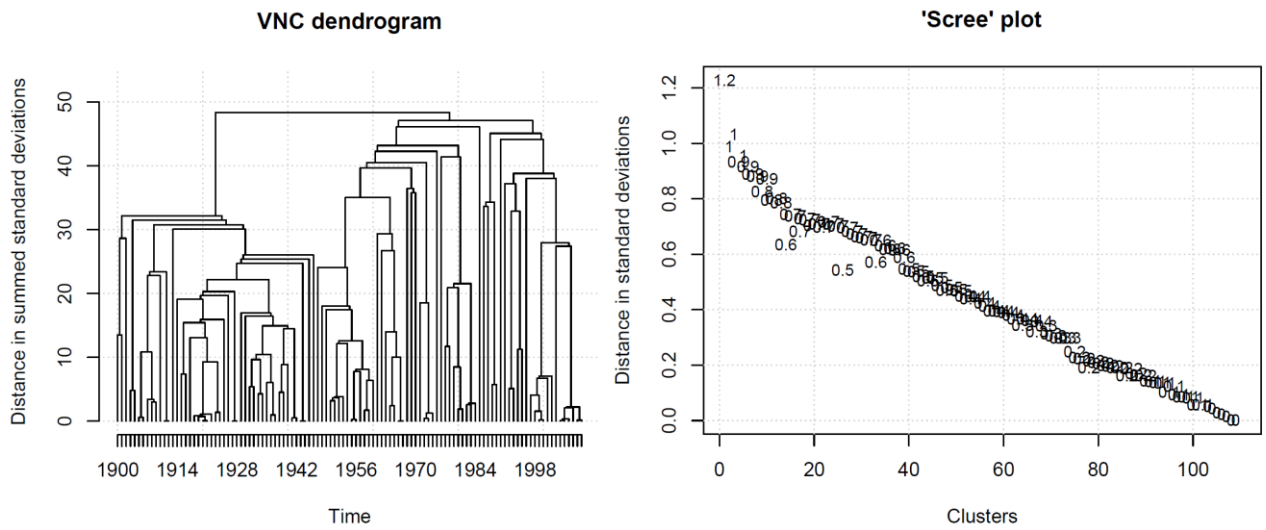


Figure C.16 VNC-analysis of the frequency of the analyzed nouns (iwcm) in COHA

D. The Progressive

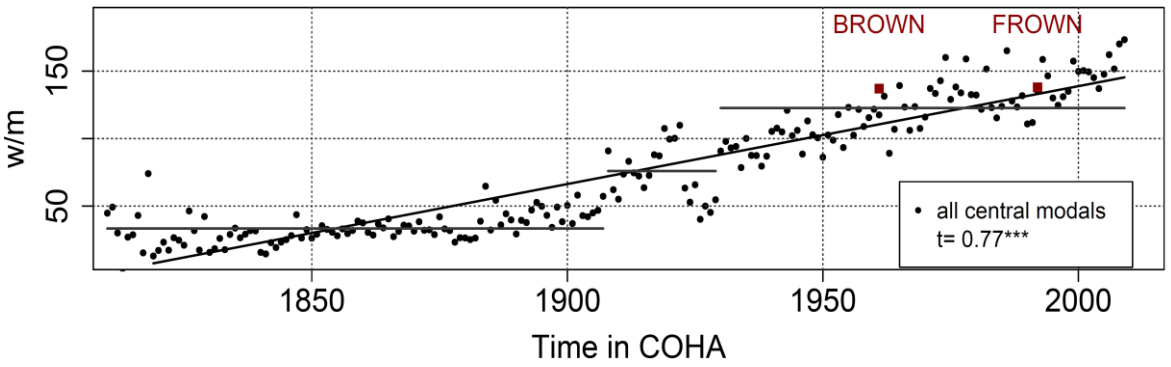


Figure D.1 Modal + *be* V-*ing* in COHA

A look at the use of the progressive (active voice only) with the core modals as well as *ought, used, need,* and *dare* (i.e. all the verbs tagged with *vm*) in COHA provides a more detailed view than previous findings reported by Smitterberg (who observes a decrease in the use of the progressive with the core modals in the 19th century in COHA, 2005: 134) and by Leech *et al.* (who do not find any significant change in frequency between Brown and Frown, 2009: 288). After extreme values at the beginning of the 18th century, there is a small increase until 1907 ($\tau = 0.41$***), followed by a period of steeper increase until 2009 ($\tau = 0.68$***).

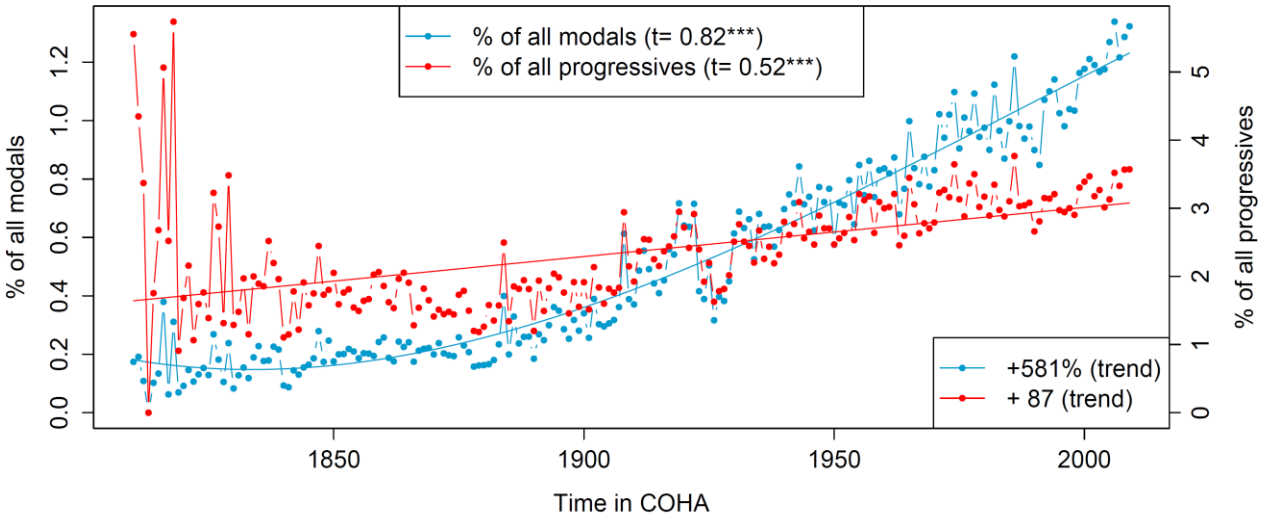


Figure D.2 Increase in the use of modal + *be* V-*ing* in relation to the development of the core modals (red) and progressive forms (blue) in COHA

Modal + *be* V-*ing* constructions increase both relative to the overall frequency of progressive constructions (red line) and to the frequency of the core modals overall (light blue line). Their contribution to the overall frequency of the modals is very low in the 19th century and only reaches ~1.2% in 2009 (trend line). However, with 1.6% in 1810 and 2.8% in 2009 (trend line), they gain in importance and should hence not be neglected in future studies.

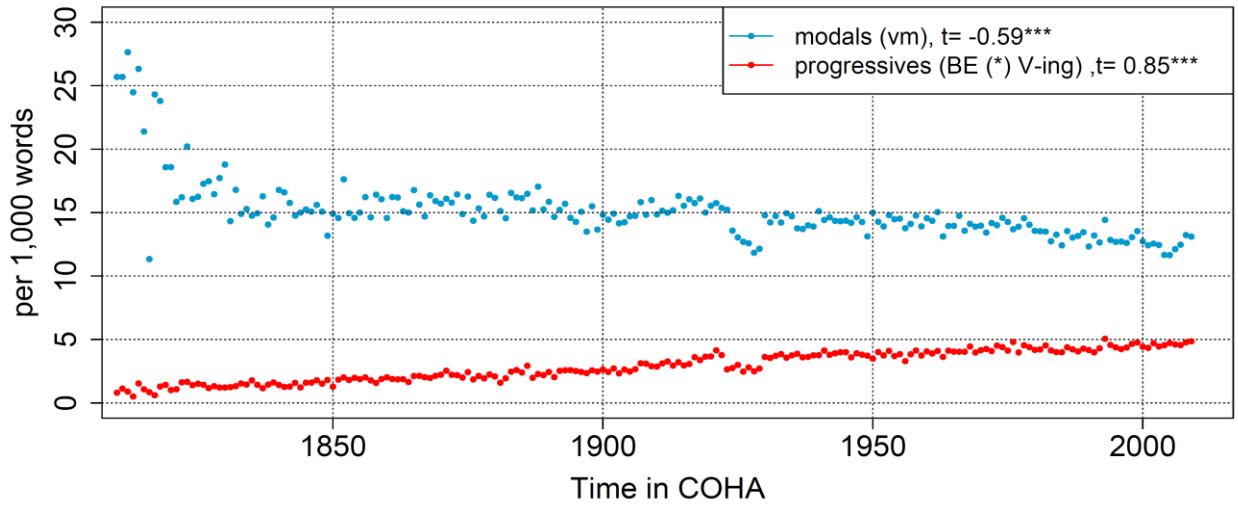


Figure D.3 Modals and progressives (excluding *BE going to*) in COHA

There is a considerable increase in the use of all modals of obligation and necessity with *be* + *-ing* in COHA, most pronounced in the case of *should* (cf. example (486) below[5]). The use of the progressive aspect in combination with *must* has been associated with epistemic modality (cf. e.g. Coates 1983: 245, Palmer 2003: 16, Collins 2009: 40, Celle and Smith 2010: 251, Kranich 2010: 184, de Haan 2012: 273), but root meanings occur occasionally, i.e. when the speaker wants to signal that s/he should already be in the process of leaving a particular place (cf. examples (487) and (488) below). De Haan's analysis of ARCHER suggests that "the rise of epistemic (*must* + progressive) seemingly represents a relatively recent change in English." Most of the deontic examples he finds date back to the 19th century (2012: 724).

[5] Please note that Furmaniak finds no occurrences of *must be* V*ing* in 17th – 19th century BrE plays (2011: 55). There might thus be differences between BrE and AmE.

(486) POP It's not like you to take off in the middle of the day. You should be doing your work. (Brown-Guillory, E. (2002) *When the Ancestors Call,* COHA)

(487) "I'm sorry, Jasper, I really must be going. Thanks for the coffee, though." (Cooke, J. P. (2004) "Serostatus". *Fantasy & Science Fiction* 106.1: 136, COHA)

(488) "…But we must be moving now. We've wasted time enough." (Drake, R. L. (1900) *The Boy Allies with the Victorious Fleets. The Fall of the German Navy*, COHA)

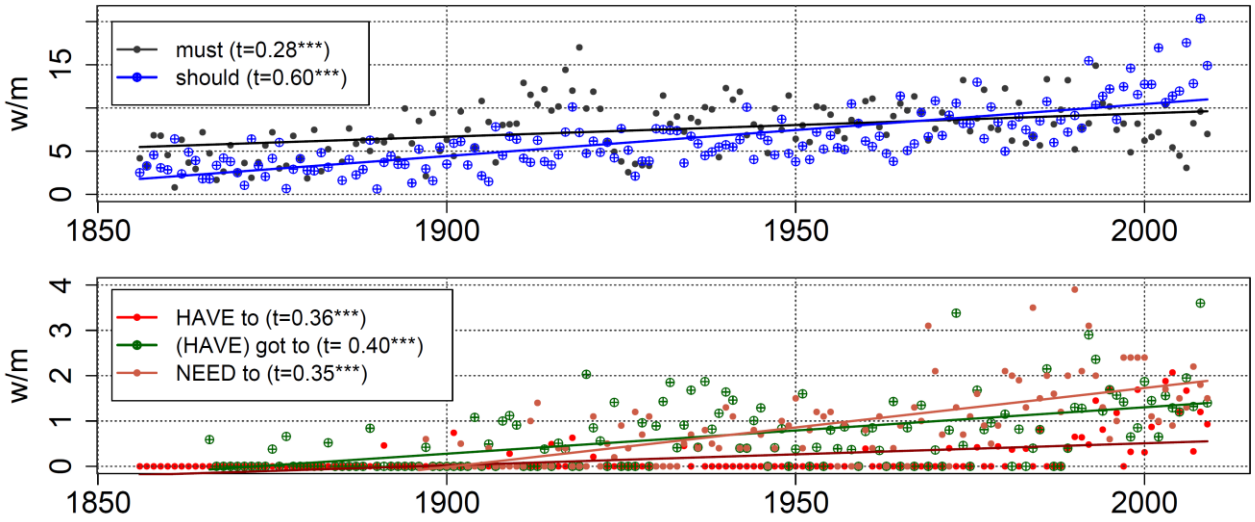


Figure D.4 (Semi-)Modals + *be* V-*ing* in COHA (1854-2009)[6]

While deontic uses are rare in the spoken language section of COCA, they appear to be more frequent in COHA, especially at the beginning of the 20th century. Deontic meanings of *must be going* occur with a frequency of 9.2 w/m in the 1900s and 13.2 w/m in the 1910s, and they decline significantly in use towards the end of the 20th century (τ_{dec}= -0.85***). Other verbs that are found in this sense are *getting*, *moving*, *running*, *hurrying* etc. In contrast to *must, should* is more often used to signal desirability or obligation. *NEED to be* V-*ing* exclusively expresses root meanings, whereas there are 16 epistemic uses (of 48 in total) of present tense affirmative *have to be* V-*ing* (without preceding modals) in COHA (cf. example (489) below). (*HAVE*) *got to be* V-*ing* (τ = 0.40*** between 1866 and 2009) is mainly used to express root necessity (102 of 106 occurrences until 1964) until epistemic meanings, particularly the phrases *got to be joking / kidding,* start becoming more frequent in the 1960s (91 epistemic uses vs. 50 root uses between 1966 and 2009). Root meanings occur primarily with verbs of movement (in order of decreasing frequency: *going, getting (back), running, moving, moseying, hurrying, leaving* etc., cf. example (490) below), but they are also found when emphasis is placed on the future (e.g. *thinking, looking*).

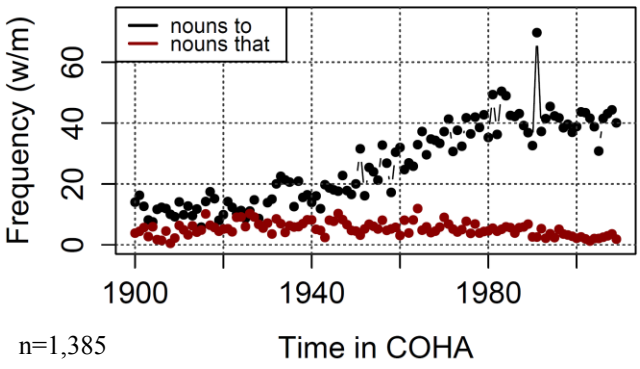
(489) But it's impossible for her to be pregnant. The bitch has to be lying, he thought. (Stringer, V. M. (2006) *Dirty Red: A Novel,* COHA)

(490) AUGUSTA SAWYER *(rising)* Actually, I've got to be going. Let me help you with the dishes and I'll be on my way. (1986, *Violets are Blue.* Movie Script, COHA)

[6] *must*|*should be* [v?g*] and [*have*]|*got*|[*need*]. [v*] *to be* [v?g*]

E. The Subjunctive

E.1. A Few Comments on the Use of the Subjunctive after Nouns of Obligation



Another topic that deserves mention are complementation patterns of the analyzed nouns of obligation. In Figure E.1 we see that *demand, necessity, need, request,* and *requirement* (singular and plural forms) occur much more frequently with *to* than with *that.* There is a pronounced increase in the use of these nouns with the *to*-infinitive (τ = 0.71***), but a considerable decrease with *that* (τ = -0.22***). Note that *obligation* was thus excluded from the comparison in Figure E.1 since it rarely figures as a trigger of the mandative subjunctive in the analyzed data.

Figure E.1 Nouns of obligation (sg., pl.): *to* vs. *that*-complements in COHA

As we can see in Table E.1, *demand, request,* and *requirement* are primarily used with *that*-complements, whereas the other nouns prefer *to*-infinitives. In contrast to findings by Övergaard in data from Brown / LOB and her specifically assembled comparable data for 1900, 1920, 1940, 1990, which indicate that *requirement* is a rare trigger of *that*-complements, *requirement* is the most frequent deontic noun in Kanté's study of the deontic nouns *constraint, demand, request,* and *requirement* in the BNC (cf. 2010: 282). Kanté takes all types of complements into account. *Need* is by far the most frequent noun with *to*-infinitives in my sample.

	demand	*necessity*	*need*	*obligation*	*request*	*requirement*
that	570	39	32	3	390	351
to	188	390	6,184	1,152	508	54

Table E.1 Number of *that*- / *to*-complements of selected nouns (sg., pl.) in COHA (1900-2009)

Since nouns of obligation can also function as triggers of the mandative subjective, the 1,385 clauses with these nouns + *that* found in COHA were analyzed, regardless of the tense of the clause in which they occurred. Uses in which *that* is omitted were not examined (cf. Hundt's observation that *that* is omitted in a little more than 8% of all mandative sentences in FLOB, 1998: 168). Hundt also cites Hoffmann's (1997: 71) finding that 19% of all mandative *-be* subjunctives lack *that*.

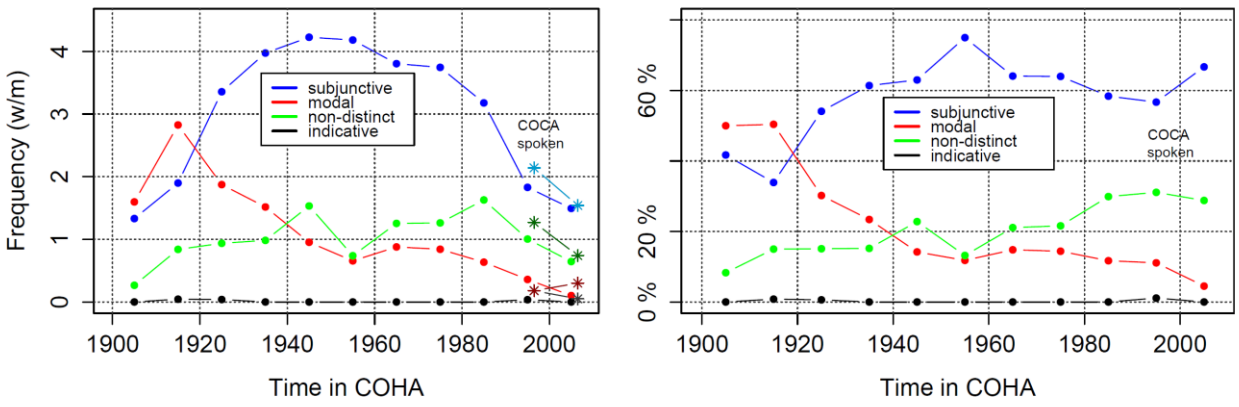


Figure E.2 Subjunctives, modals, non-distinct forms, and indicatives after nouns of obligation (sg., pl.) + *that* in COHA and COCA spoken, average frequencies per decade / 1990-94 and 2005-09

Figure E.2 illustrates the results of this analysis. Note that there are only four uses of the "mandative indicative," which Algeo considers a Briticism (1992: 611). My findings (as well as those made for the use of adjectives) seem to confirm his observation. Yet the number of non-distinct cases is very high. I chose to indicate their numbers here (cf. Ch. 6.4.1 for a discussion of various approaches) to show how many non-distinct occurrences we are dealing with.

The subjunctive is the most common choice after a noun of obligation + *that* from the 1920s on (both in w/m and in %). At the same time, modals become less frequent. Övergaard (1995: 55) makes the same observation on the basis of her data, stating that the subjunctive already surpasses the modals in popularity in 1920. When we look at the right panel of Figure E.1, which shows the relative frequency, the two developments seem almost diametrically opposed from the 1940s on. A VNC-analysis suggests that the time period in which the use of the subjective after nouns of obligation peaked was from the beginning of the 1920s to the early 1960s (cf. Figure E.3).

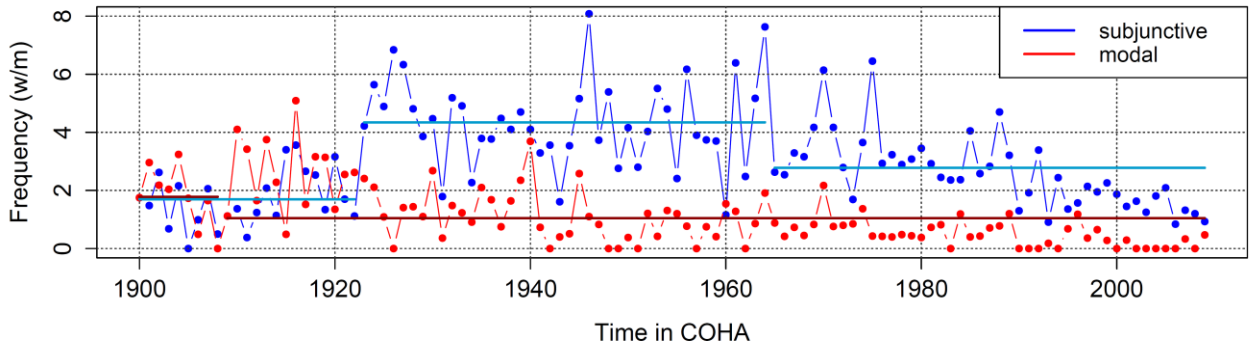


Figure E.3 The subjunctive and modal auxiliaries after selected nouns of obligation + *that* in COHA

In the course of the analyzed period, the modals continually decrease in use (τ= -0.48***). The most frequent ones after the nouns of obligation analyzed here are the necessity modals *should* (45% of all modals), *shall* (22%), and *must* (21%). *Might* and *would* only account for about 4 % / 3 % (cf. examples (491) and (492) below) and constitute more polite attempts at persuasion.

(491) Then came their request that they might be allowed to go back that night into the mine (Husband, J. (1910) "A year in a coal-mine". *The Atlantic Monthly* (Nov.): 577, COHA)

(492) …the lawyer sent up his card to her with the request that she would grant him a private interview. (Sheldon, G. (1891) *True Love's Reward,* COHA)

Decade averages (in w/m)	1900s	1910s	1920s	1930s	1940s	1950s	1960s	1970s	1980s	1990s	2000s	total
should	0.67	1.37	0.74	0.94	0.54	0.29	0.42	0.38	0.12	0.04	0.03	0.48
shall	0.4	1.06	0.59	0.37	0.08	0.04	0.08	0	0.12	0	0	0.24
must	0.18	0.13	0.35	0.2	0.21	0.2	0.25	0.38	0.32	0.18	0.07	0.22

Table E.2 Modals after noun triggers of the mandative subjunctive in COHA

The left panel of Figure E.4 shows the absolute frequencies of the three most frequent modals + *that* as well as all other modals (*can, could, may (not), might, need, ought, will,* and *would*) + *that* per million words. On the right side, these frequencies are considered in relation to the overall frequency of these verbs without any restrictions in use (i.e. without *that*). The aim here was to determine whether the decrease in the use of the modals after these nouns is more or less pronounced that the general decrease in the use of the modals in this time frame. It can be observed that the decline of *shall, should,* and *must* after nouns of obligation + *that* is progressing more rapidly than the general decrease in the use of these modals. If we look at all modals, the difference is less pronounced.

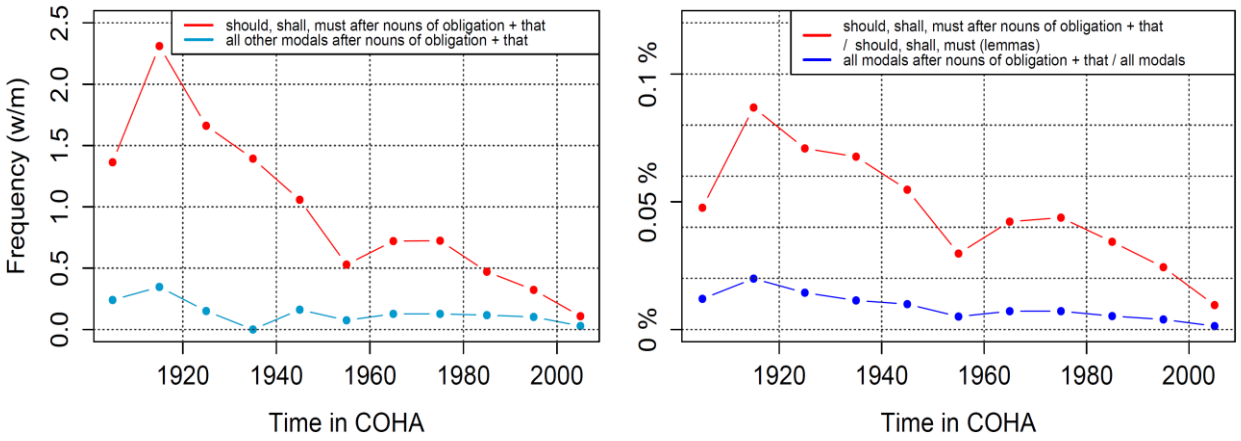


Figure E.4 Modals after nouns of obligation (sg. and pl.) + *that* in COHA (n=296), absolute frequency (left panel) and frequency relative to the number of modals in the corpus

The mandative subjunctive is often considered rather formal (cf. e.g. Jespersen 1924: 318, Quirk *et al.* 1985: 157), but has also been found to lose its formal connotation in BrE (Leech and Smith 2009: 58). It is therefore interesting to have a look at different text types. Figure E.5 illustrates that there is indeed a small continual increase in the use of the subjunctive in non-fiction in COHA (τ_{dec} = 0.71**) where it is most frequently triggered by *requirement.* Yet the text type with a tremendous number of subjunctives in the middle of the 20th century are newspapers. The most frequent triggers in newspapers are *demand* (47%) and *request* (34%). The subjunctive is also quite common in the spoken language section of COCA (cf. Figure E.2 above). This might be explained by the great share of institutionalized discourse in the broadcast transcripts of COCA (cf. Ch. 4.1).

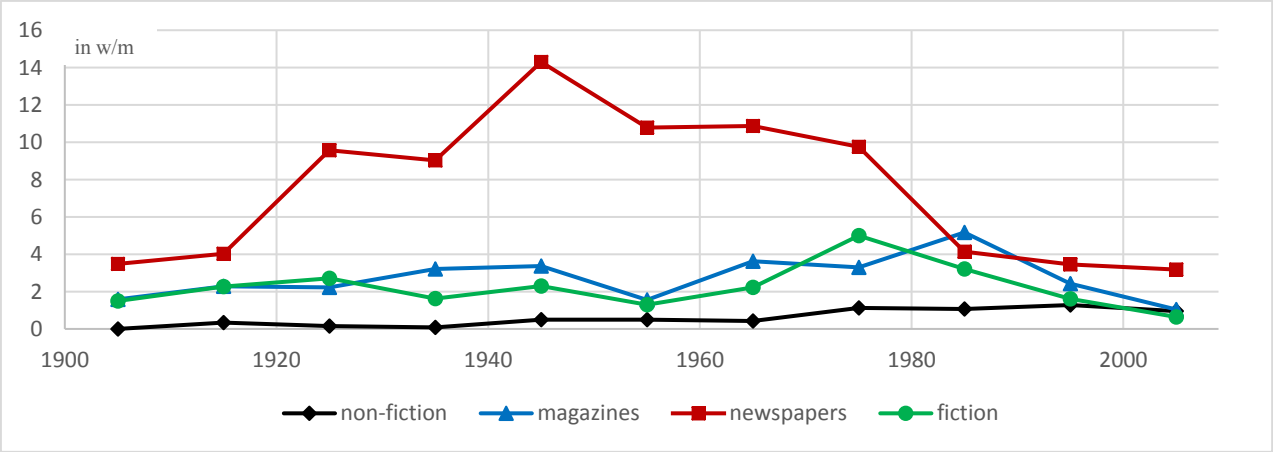


Figure E.5 The subjunctive in various text types in COHA

	demand	*necessity*	*need*	*request*	*requirement*
Fiction	38.8%	1.0%	2.0%	54.1%	4.1%
Magazine	55.8%	1.8%	0.4%	25.7%	16.4%
Newspaper	47.1%	1.1%	-	33.9%	18.0%
Non-fiction books	32.5%	3.5%	0.9%	16.7%	46.5%

Table E.3 Noun triggers of the mandative subjunctive in different text types in COHA (1900-2009)

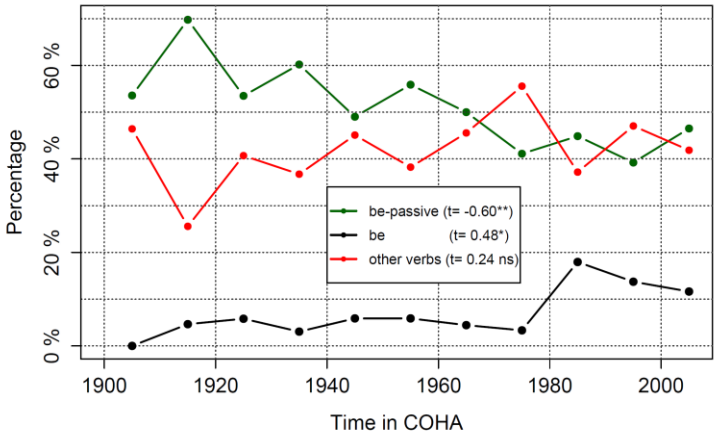


Figure E.6 The *be*-passive, *be,* and other verbs after noun triggers of the subjunctive in COHA

There is a pronounced decrease in the use of *be*-passives in our sample (τ= -0.60**), whereas the use of the simple form *be* (+ adjective) slightly increases (τ = 0.48*). Other verbs also gain in relative importance.

E.2. The Subjunctive after Nouns and Adjectives

When the information about the use of the adjectives *necessary, essential, imperative, critical,* and *crucial* (present tense only) and the nouns of obligation are combined, an even clearer picture of the main developments in the use of the subjunctive, the modals, and the mandative indicative emerges. The left panel of Figure E.7 illustrates the absolute frequencies of these forms whereas the right panel shows the relative frequencies in percentage.

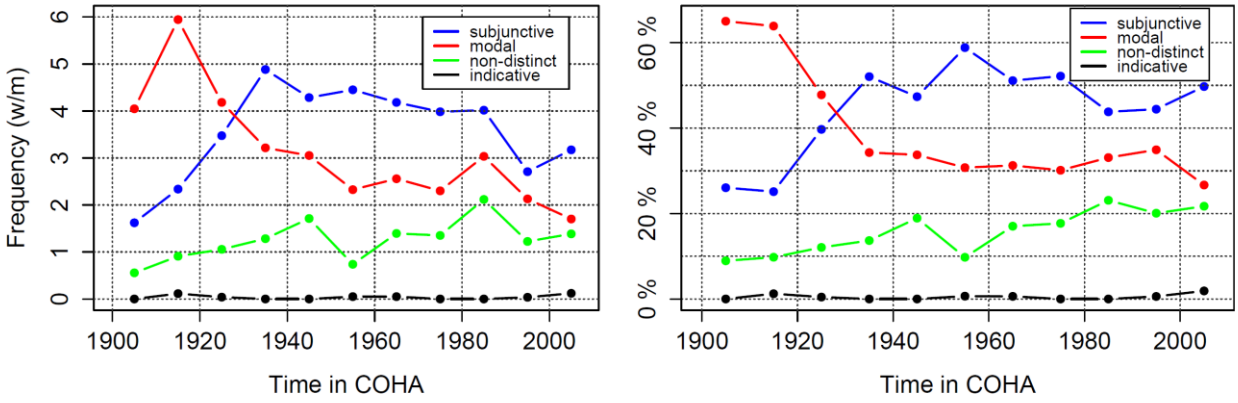


Figure E.7 Subjunctives, modals, non-distinct cases, and indicatives after adjectives and nouns of obligation (sg. and pl.) + *that* in COHA

In the course of the analyzed period, there is a pronounced decrease in the use of the modals (τ= -0.93***) and a slight but statistically insignificant increase in the use of the indicative towards the end of the 20th century (τ= 0.33 ns). The subjunctive rapidly rises at the beginning of the 20th century and peaks in absolute frequency (w/m) in the 1940s (the peak in relative frequency is situated in the 1950s). A particularly drastic decline can be observed from the 1980s to the 1990s. This reverse-U-shaped development of the subjunctive presents a contrast to the continual absolute (and relative, τ= 1*) increase in the use of the subjunctive after adjectives (n = 50) and all analyzed expressions (adjectives, nouns, and verbs, n= 488) observed by Övergaard. (Only in her data for nouns is the share of subjunctives in 1990 lower than in 1960. This deviation is caused by the use of a single indicative form in 1990 – the only indicative in Övergaard's American data.)

Various factors might explain this difference:

1. I have analyzed much more data from COHA (n= 2,176) than Övergaard (n= 488).
2. My data are more fine-grained; various changes that may have taken place between 1960 and 1990 are not captured in Övergaard's data.
3. There are substantial differences in corpus composition (~55% fiction in COHA vs. drama, fiction, (belles lettres), expository and press texts in Övergaard's self-compiled corpus and in the Brown corpus + one drama and a film script for 1960 in Övergaard, cf. 1995: 127-131)
4. Övergaard considers a variety of triggers (~ 25 verbs, 20 adjectives, and 30 nouns in her American data), whereas I only discuss 5 noun triggers and 5 adjectival triggers here. These adjectives and nouns account for only 3%-9% of the occurrences in Övergaard's data. The "missing" expressions might trigger different patterns than those identified here.

F. Multiple Distinctive Collexeme Analysis in COCA Spoken (1990-2012)

The input for this MDCA was created by searches for

must *should* *shall* *ought to*	[vvi*]	*had* *'d*	*better* *best*	[vvi*]	*need.*[v*] *needs.*[v*] *has* *have* *want* *wants*	*to* [vvi*]	Subtracted are: [vm*]|[x*] *need.*[v*] [vm*]|[x*] *have.*[v*] [vm*]|[x*] *want.*[v*]	*to* [vvi*]

The occurrences of *be to* were manually identified in 1990-1994 and 2005-2010.

[vbm*]|[vbz*]|[vbr*]	*bound* *supposed* *forced* *required* *compelled*	*to* [vvi*]	[vbm*]|[vbz*]|[vbr*]	*necessary* *essential* *imperative* *critical* *crucial* *essential*	*to* [vvi*] *that*

The infinitives in complement clauses with *that* were manually identified. A total of 241,310 pairings of modal expressions + infinitives formed the input of the MDCA.

	Attracted Lexical Verbs	Repelled Lexical Verbs
$p \leq 0.001$	*work, write, yield, say, wear, win, watch, weigh, confess, admit, disarm, feel, act, comply, tell, remain, confront, decide, withdraw, remember, rely, disband, understand, stop, approve, respect, uphold, reject, inform, realize, accept, recognize, maintain, struggle, pass, face, warn, obey, complete, ensure, submit, insist, undergo, declare, cease, restrict, leave, list, endure, guard, surrender, notify, demonstrate, overcome, honor, undertake, bear, hate*	*see, get, like, talk, happen, hear, help, call, want, go, make, imagine, look, put, lose, bring, argue, use, cost, expect, hope, play, send, take, run, give, cause, buy, kill, require, grow, read, start, suggest, find, turn, become, sit, thank, cut, last, disagree, hit, think, walk, catch, beat, push, ask, sing, count, show, benefit, fix, guess, receive, recall, discuss, spend, affect, explain, sell, deliver, worry, lead, prefer, save, join, describe, create, finish, result, pick, relate, shoot, touch, fit, eat*
$p \leq 0.01$	*disclose, prove, hurry, protect, enforce, guide, register, exercise, file, state, transform, convince, abide, fulfill, seize, cope*	*comment, react, forget, wake, try, hire, bet, surprise, let, visit, come, hang, vote, blame, introduce, pursue, hurt, pull, veto, shut, blow, support, indicate, challenge, clear, judge, extend, recommend, spread, welcome, commit, change, debate, expand, slow, claim, marry, figure, manage, sleep, fall, assume*
$p \leq 0.05$	*follow, embrace, intervene, unite, emphasize, end, acknowledge, proceed, meet, trust, forgive, cooperate*	*wind, enable, name, predict, repeat, hide, fail, survive, gain, raise, kick, allow, wish, quit, express, point, drink, impose, correct, deny, open, cook, order, perform, prevent, laugh, lower, settle, add, emerge, conduct, throw, listen, handle, place, earn, communicate, compare, test, reveal, shake, trigger, smell, ban, limit, roll, reflect, sue, fire, generate, knock, threaten, gather, review, tend, burn, cry, investigate, ride, launch, oppose, jump, examine, stress, switch, cover, grab, recover, feed, separate, shift, ignore*

Table F.1 Distinctive collexemes of affirmative *must* in COCA spoken (1990-2012)

	Attracted Lexical Verbs	Repelled Lexical Verbs
$p \leq 0.001$	*point out, mention, know, note, resign, stay, try, stop, remain, look, apologize, behave, underestimate, respect, say, care, explain, step, focus, concern, pardon, pay, stick, consider, let, emphasize, confuse, condemn, pause, withdraw, refrain, boycott, beware, proceed, disturb, recuse, strive, concede, go, reflect, panic, reconsider, seek, disqualify, denounce, start, demand, concentrate, treat, err, normalize, honor, avoid, invade, listen, quit, stand, warn, disclose, apply, receive, race, base, exaggerate, ignore, fear, enlist, terminate, underscore, state, back, legalize, outlaw, consult, forfeit, remind, adopt, act, add, dictate, remove, lift, forego, scale, guide, heed, rethink, insist, intervene, skate, contact, include, obey, bomb, drop, foot, mind, bear, serve, enact, tread, cool, clarify, subsidize, wait, dump, discourage, ban, leave, happen, exist, fire, follow, condone, give, tax, celebrate, embrace, shop, engage, vote, hand, exercise, regulate, view, reject, negotiate, feel, pursue, elect, caution, judge*	*see, like, find, hear, make, imagine, seem, agree, argue, tell, hurt, help, show, want, cause, get, disagree, catch, bring, prove, cost, guess, recall, walk, save, mean, love, convince, affect, create, wonder, prefer, kill, suggest, describe, join, relate, identify, face, talk, become, thank, turn, hope, figure, survive, work, sell, beat, interrupt, blow, change, admit, indicate, involve, recommend, claim, overcome, strike, wind, predict, repeat, hide, lead, drive, gain, achieve, demonstrate, protect, prevent, miss, deal, ensure, confront, cook, perform, laugh, jump, deliver, emerge, watch, improve, live, communicate, shake, trigger, smell, hate, depend, generate, solve, threaten, buy, confess, gather, tend*
$p \leq 0.01$	*compensate, reward, suspend, expect, possess, prepare, excuse, count, read, fund, supply, direct, comply, reinforce, rule, uphold, move, welcome, stress, observe, matter, conduct, take, review, profit, request, defer, keep, own, hang, realize, nominate, refuse, rush, ease, drill*	*grab, recover, feed, sound, conclude, grow, disappear, harm, experience, ruin, speculate, influence, pose, sign, land, travel, come, notice, form, reach, collapse, confirm, detect, e-mail, produce, endure, delay, satisfy, strengthen, connect, suspect, urge, steal, monitor, paint, break, train, surprise, resist, raise, yield, believe, permit, promise, develop, educate, persuade, fall, build, sustain, undermine, climb, dance, tie, comment, compete, cure, double*
$p \leq 0.05$	*date, shut, investigate, submit, wash, cover, seize, invite, acknowledge, distinguish, impose, enhance, address, smoke, publish, retain, check, reopen, update, belong, speak, invest, release, relax, rest, abide, recognize, convict, function, dress, participate, sue, campaign, spare, respond, forgive, oppose, charge, lock, sacrifice, eliminate, interfere*	*damage, track, block, split, touch, wake, jeopardize, violate, fix, meet, sense, explode, quote, bet, discover, backfire, defeat, wipe, offer, cast, drag, tear, think, put, dig, pop, remember, translate, grant, offend, breathe, heal, log, mark, rally, repeal, search, download, fulfill, stimulate, appear, organize, propose, withstand, weigh, require, answer, end, inspire, handle, record, slip, trace, fit, provide, evaluate, object, favor, transform, spell, win, carry, differ, register, trade, cut, donate, escape, sink, boost, dream, link, flow, host, embarrass, question, present, bend, combine, target, destroy, ask, constitute*

Table F.2 Distinctive collexemes of affirmative *should* in COCA spoken (1990-2012)

	Attracted Lexical Verbs	Repelled Lexical Verbs
$p \leq 0.001$	*overcome, return, remain, inherit, resign, see, pass, live, vacate, behold, commence, weep, conceive, dwell, rejoice, rename, reap, receive, mount, forfeit, vanish, fold, set, suffer, consist, retire, possess*	*say, get, go, happen, talk, work*
$p \leq 0.01$	*befall, bind, cleave, dash, disfigure, displace, dwindle, faint, furnish, humble, mourn, persevere, rid, smooth, solicit, treasure, worship, bomb, cease, evade, rule, hoist, manage, make, prevail, establish, specify, die, contradict, mistake, permit*	*like, tell, come, ask, change, take*
$p \leq 0.05$	*lure, declare, issue, abide, dissolve, enact, tread, serve, renew, ensue, linger, conquer, preside, discuss, utilize, leap, skip, erase, fail, sleep, shine, shop, reinforce, judge, enter, exceed*	*understand, want, think, stay, move, help, put*

Table F.3 Distinctive collexemes of affirmative *shall* in COCA spoken (1990-2012)

	Attracted Lexical Verbs	Repelled Lexical Verbs
$p \leq 0.001$	*look, try, let, know, focus, consider, go, resign, quit, announce, step, take, concentrate, apologize, start, pay, stick, stay, encourage, get, rethink, keep, back, send, cut, examine, release, stand, proceed, listen, read, reform, recognize, pursue, spell, lay, treat, acknowledge, ban, vote, kick, eliminate, give, act, count, stop*	*like, see, want, say, lead, imagine, mean, tell, write, love, cause, believe, thank, save, point, seem, answer, become, die, prove, walk, cost, hope, wear, win*
$p \leq 0.01$	*insist, set, spend, raise, learn, shut, follow, close, apply, balance, investigate, review, lift, roll, share, put, run, address*	*hear, reach, break, carry, eat, affect, hurt, offer, show, play, figure, handle, require, drive, grow, increase, serve, suggest, reduce, survive, agree, sign*
$p \leq 0.05$	*care, move, fix, wait, pull, provide, slow, open, trust, remember, welcome, realize*	*fall, assume, find, last, prevent, lose, appear, disagree, control, mention, hit, sound, solve, produce, catch, draw, determine, beat, push, jump, develop, fly, improve, occur, remind, defend, teach, sing, force, help, benefit, buy, guess, receive, recall, miss*

Table F.4 Distinctive collexemes of affirmative *ought to* in COCA spoken (1990-2012)

$p \leq$	Attracted Lexical Verbs	Repelled Lexical Verbs
0.001	*cause, backfire, occur, lead, legislate, come, fail, fall, respect, raise*	*say*
0.01	*raise, annoy, disintegrate, excoriate, intersect, resurface, worsen, blast, bowl, collapse, complicate, ensue, happen, trigger, follow, produce, disappoint, offend, energize, jeopardize, change, isolate, screw*	*know*
0.05	*reduce, rub, claim, oppose, run, affect, seem, add, appeal, cooperate, reflect*	

Table F.5 Distinctive collexemes of affirmative *be to* in COCA spoken (1990-94, 2005-09)

	Attracted Lexical Verbs	Repelled Lexical Verbs
$p \leq 0.001$	*pay, wait, worry, say, take, remember, understand, wonder, deal, tell, think, prove, realize, rely, recognize, walk, face, decide, leave, put, agree, assume, suffer, admit, work, offer, report, struggle, sacrifice, travel, start, figure, sit, interrupt, sign, disagree, wrestle, swallow, train, pull, prepare, sort, register, contend, trust, stand, use, respect, convince, stop, plan, accept, testify, spend, shoot, pretend, separate, adapt, raise, wrap, endure, admire, wind, re-evaluate, peel, rehearse, pack, reconcile, prioritize, watch, purchase, pinch, pitch, bend, bear, adjust, answer, pick, search, look, settle, absorb, scramble, cope, promise, rush, tighten, choose, persuade, react, recruit, depend, treat, want, produce, sift, repay, differentiate, retrain, undergo, upgrade, boil, downsize, tailor, wade, resolve, submit, tolerate, ratify, regroup, recall, track, police, guess, round, scrub, weed, anticipate, fill, navigate, process, relinquish, resist, abide, split, hope, wake, imagine, evaluate, differ, pace, relearn, time, approve, earn, readjust, trim, screen, deliver, analyze, pump, sleep, rotate, ship, fear, climb, fake, pledge, refinance, reschedule, retract, swipe, sympathize, toast, tow, dig, reassess, sneak, balance, defend*	*get, hear, know, thank, talk, see, help, call, mention, bring, make, yield, go, join, point, ask, feel, give, continue, emphasize, add, focus, welcome, avoid, introduce, encourage, show, move, come, buy, marry, back, write, resign, comment, die, achieve, keep, kill, clarify, note, eliminate, remain, cut, wish, begin, become, accomplish, let, check, express, meet, congratulate, ban, increase, extend, preserve, apologize, eat, expand, explore, happen, change, win, build, create, mean, quit, ensure, stress, adopt, control, hold, warn, hang, enjoy, open, destroy, discuss, cry, cause, hurt, improve, allow, celebrate, head, miss, assure, promote, remind, lead, send, grow, quote, seem, impose, invite, bet, contact, jump, apply, care, behave, expect, forget, repeal, direct, drink, blame, debate, own, lose, prevent, abolish, reiterate, love, end, lift, maintain, play, challenge, limit, elect, smell, deny, beat, close, overthrow, poison, lower, discourage, drop, attract, conduct, save, listen, harm, grab, succeed, find, caution, pardon, insist, benefit, underestimate, fly, include, advance, convict, echo, reinforce, share, lock, represent, update, donate, overturn, fix, read, affect, portray, cooperate, stick*

$p \leq 0.01$	*toss, rethink, translate, account, teach, satisfy, beg, guard, sell, reveal, chase, crush, elevate, juggle, schedule, shoulder, tuck, specify, suspect, swear, transport, trick, grapple, rescue, scratch, accommodate, relive, relate, presume, rebuild, dial, tinker, withstand, solve, smile, yell, re-examine, subsidize, like, replace, conclude, rub, calculate, scrutinize, tone, violate, whisper, align, craft, fend, infer, partition, prescribe, print, program, purge, redesign, redirect, roam, sense, shrug, smuggle, stare, strap, subtract, toil, urinate, perform, live, provide, position, pass, break, pray, confront, steal, memorize, tend, hide, rally, tread, wage, overcome, credit, renounce, scrap, unload, voice, restrain, veto*	*commit, reform, cheer, interfere, profit, explain, demand, dictate, reward, redistribute, reduce, attack, follow, honor, engage, name, minimize, switch, receive, free, dance, highlight, inherit, reply, commend, hurry, contribute, disarm, invest, spread, believe, kick, tax, argue, criticize, confuse, motivate, volunteer, capture, ignore, disturb, gamble, appear, fail, handle, fund, scare, illustrate, influence, outlaw, state, nationalize, provoke, refrain, guide*
$p \leq 0.05$	*witness, compress, confer, delineate, disguise, lug, prop, sanitize, shower, stab, stipulate, strain, sweat, twist, tear, wash, pivot, regard, spank, surround, educate, repair, supply, compromise, attribute, research, spray, acknowledge, repeat, audition, supervise, commute, fish, heat, persevere, recycle, refine, sprinkle, unfold, water, feed, tip, strike, tie, gain, rise, cheat, reinvent, shape, stabilize, plug, evacuate, clean, undercut, await, backtrack, brief, budget, button, cop, estimate, hop, mitigate, pander, pare, patrol, phone, precede, proclaim, rank, recalibrate, recapitalize, reinvigorate, rejigger, resubmit, retell, retype, revere, sample, scrimp, scrounge, second, signal, slug, spit, sprint, strategize, suit, tether, uproot, value, wet, yearn, compete, tackle, mobilize, ratchet, threaten, suspend, redouble, warm, bite, relieve, undertake, plead, bake, grasp, hustle, originate, package, persist, picture, plow, polish, reckon, solidify, suck, summon, top, visualize, reach*	*clear, inform, stay, concentrate, exist, defeat, associate, result, punish, boycott, fire, address, finish, urge, visit, proceed, paint, beware, launch, date, describe, chime, disrupt, recap, venture, condemn, guarantee, throw, hug, sound, vote, complain, impress, lend, march, maximize, screw, sustain, aspire, diminish, display, exaggerate, jeopardize, panic, prohibit, rid, tick, whip, investigate, boost, emulate, re-elect, ruin, weaken, kiss, enhance, bomb, interview, last, enter, isolate, reclaim, oppose, uphold, try, participate, enable, starve, host, liberate, possess, bash, chill, criminalize, discriminate, downplay, e-mail, embarrass, export, offend, phrase, politicize, strangle, restore, require, broaden*

Table F.6 Distinctive collexemes of affirmative *have/ has to* in COCA spoken (1990-2012)

$p \leq$	Attracted Lexical Verbs
0.001	*get, stop, come, go, figure, convince, change, hurt, hone, deal, sink, decide, grow, prompt, lay, win, deliver, lure*
0.01	*give, taste, appeal, become, kick, defend, mean, hang, grab, make, surround, move, step, nail, happen, stand, stick*
0.05	*pop, rein, broach, bug, crystalize, cue, disprove, freshen, joke, quell, re-orient, re-regulate, regret, scurry, snitch, triumph, motivate, scratch, level, persuade, answer, dance, cool, collect, swim, devour, drown, extricate, outrun, restart, spark, hit, boggle, butt, flirt, tack, define, roll, love, learn, lose, administer, blink, effect, exert, hedge, maneuver, mend, succumb, unify, issue*

Table F.7 Distinctive collexemes of affirmative (*have/ has) got to* in COCA spoken (1990-2012)

	Attracted Lexical Verbs	Repelled Lexical Verbs
$p \leq 0.001$	*know, get, focus, look, find, address, learn, change, fix, move, understand, develop, step, grow, keep, build, back, improve, educate, calm, reform, figure, happen, survive, chill, strengthen, act, rebuild, broaden, engage, evolve, create, loosen, sustain, discuss, reconnect, adjust, explore, cut, wake, protect, invest, tweak, check, increase, lower, identify, conserve, open, examine, let, make, start, concentrate, restore, attract, regain, monitor, ensure, re-look, vent, vet, recover, corroborate, repent, retrieve, continue, stop, clean, pray, inspire*	*accept, argue, offer, throw, wish, mean, submit, withdraw, give, read, disagree, participate, testify, weigh, sell, hurt, marry, watch, confess, use, warn, assume, want, hope, agree, work, join, note, rely, die, kill, prove, remain, face, vote, remember, serve, expect, walk, share, suffer, run, see, believe, live, admit, worry, wear, leave, yield, write, mention, try, show, point, wonder, play, pay, wait, ask, thank, tell, say*
$p \leq 0.01$	*re-examine, shore, communicate, lighten, decrease, nurture, replicate, stabilize, test, modernize, bolster, breath, decompress, rethink, slow, feel, explain, diversify, correct, spread, encourage, assert, cook, reach, articulate, arrest, re-engage, videotape, evacuate, investigate, shift, support, grind, harden, rediscover, reshape, revitalize, consider, lend, consolidate, abate, accumulate, compute, hush, layer, marginalize, park, quadruple, reassert, remedy, replenish, shorten, spike, stiffen, safeguard, distinguish, reinforce, stimulate, empower, exercise*	*tax, imagine, repeat, jump, avoid, rule, destroy, please, sign, endure, like, resign, dig, tear, report, ignore, struggle, decide, travel, shoot, love, deal, receive, pick, choose, bear, introduce, ban, blame, congratulate, welcome, add*

$p \leq 0.05$	*substitute, recognize, manage, land, expand, maintain, tighten, drink, enforce, redefine, assist, define, battle, drain, retool, finish, hire, cease, simplify, listen, straighten, demonstrate, confirm, redouble, confine, entice, federalize, meditate, out-innovate, override, partner, penetrate, re-, service, snap, stuff, function, rally, track, control, contact, reclaim, supervise, utilize, breathe, form, restrain, upgrade, catch, clarify, generate, conduct, fund, lose, import, accelerate, base, acquire, carve, line, recoup, secure, decorate, initiate, mend, neutralize, pin, rebound, rehabilitate, soften, toughen, trace, unify, plan, organize, rise, account, level, study, assess, reduce, plug, fill*	*buy, cast, return, turn, drive, burn, climb, swallow, represent, stress, hide, fly, speculate, trust, last, comment, operate, sacrifice, commend, conclude, wipe, sing, rush, announce, call, bet, publish, reiterate, follow, guess, emphasize, direct, veto, disclose, pretend, purchase, quote, respond, date, describe, miss, touch, abide, reveal, trade, strike, invite, sound, negotiate, raise*

Table F.8 Distinctive collexemes of affirmative *need/s to* in COCA spoken (1990-2012)

	Attracted Lexical Verbs	Repelled Lexical Verbs
$p \leq 0.001$	*ask, show, make, get, bring, join, call, go, play, introduce, kill, buy, comment, help, give, emphasize, marry, congratulate, welcome, wish, jump, add, accomplish, share, stress, avoid, quote, express, achieve, remind, e, reiterate, repeal, read, cut, assure, clarify, hurt, destroy, cry, turn, commend, describe, beat, preserve, abolish, eat, echo, expand, blame, overthrow, poison, paint, warn, harm, touch, challenge, head, bet, miss, switch, dance, grab, throw, smell, extend, die, forget, interview, argue, explore, promote, overturn, volunteer, influence, invite, meet, save, tax, ban, hang, direct, cheer, compliment, send, advance, urge, minimize, create, associate, starve, run, donate, impress, please, defeat, portray, nationalize, privatize, illustrate, adopt, encourage, blow, impose, trade, claim, delay, emulate, reply, deny, build, update, sell, chime, venture, kiss, date, eliminate, march, maximize, mess, rock, finish, check, limit, shake, clear, convey, live, keep, cash, diminish, criticize, punish, applaud, control, name, become, debate, secede, project, mix, repeat, move, attract, alert, boost, re-elect, ruin, weaken, respond, celebrate, ensure, characterize, divorce, screw, criminalize, downplay, e-mail, embarrass, phrase, politicize, strangle*	*pay, understand, worry, remember, wait, take, say, work, realize, think, deal, happen, decide, recognize, stop, look, wonder, prove, face, step, rely, yield, tell, consider, respect, resign, stand, admit, watch, accept, figure, act, wear, note, expect, agree, report, want, leave, assume, suffer, start, mean, trust, write, confess, provide, remain, prepare, win, treat, struggle, fear, overcome, convince, walk, bear, rethink, pass, address, rise, pull, occur, allow, approve, behave, care, learn, plan, sacrifice, determine, comply, choose, like, register, proceed, wake, sit, offer, include, depend, explain, reflect, adjust, submit, train, hope, sign, educate, testify, abide, withdraw, apply, weigh, interrupt, endure, wrestle, sort, confront, support, produce, adapt, demand, last, prevail, swallow, receive, distinguish, cope, fill, re-examine, reconcile, count, supply, undergo, feel, pray, concern, appreciate, contend, upgrade, acknowledge, travel, guard, track, concede, reject, disclose, seek, evacuate, complete, react, hurry, rebuild, re-evaluate, tolerate, undertake, declare, separate, operate, obey, tighten, answer, wind, account, listen, file, exist, police, stabilize, tread, release, lie, focus, guide, notify, peel, rehearse, sift, spell, intervene, slow, benefit, beware, prioritize, rally, shape, resist, exercise, fix, clean, view, admire, anticipate, cease, cost, pitch, reassess, smile*
$p \leq 0.01$	*increase, underscore, wipe, lower, accuse, capitalize, disrupt, recap, tap, caution, exchange, gamble, host, silence, frame, insure, exploit, hug, redistribute, stir, prevent, believe, reassure, attack, salute, amplify, assassinate, avert, book, chat, disown, manipulate, pet, spin, sum, summarize, tame, escape, participate, block, expose, bust, gut, humiliate, prohibit, tick, whip, convict, record, speculate, drive, bury, coach, inflict, provoke, redeem, undermine, consume, highlight, reward, point, smoke, rewrite, pose, visit, drink, discuss, censure, champion, cuddle, deconstruct, distort, flash, label, leak, lump, prejudge, remarry, slice, splurge, spoon, tweet*	*suspend, reconsider, develop, concentrate, beg, compensate, coordinate, differentiate, retrain, teach, review, drop, defend, enable, result, rule, forgive, resolve, persuade, manage, stick, uphold, settle, condemn, level, pinch, recuse, translate, match, fall, remove, break, base, evolve, grapple, pardon, readjust, repay, rescue, resume, scratch, trim, enforce, lead, examine, replace, follow, articulate, conform, foot, list, ratify, regroup, rein, request, rotate, ship, supervise, tweak, utilize, love, monitor, absorb, boycott, disqualify, diversify, enact, matter, navigate, process, redouble, refuse, relinquish, scramble, warm, evaluate, disagree, imagine*
$p \leq 0.05$	*refer, catch, dismiss, instill, store, connect, suggest, commit, drag, zoom, bash, box, cap, censor, deport, depose, discriminate, filibuster, impeach, complain, freeze, rip, elect, advertise, bid, damage, demonize, dominate, indict, remake, slap, upset, hide, close, devote, entertain, recommend, attach, motivate, dress, squeeze, reduce, fly, indicate, link, bother, contest, scream, auction, brown, commercialize, defraud, deprive, harass, jinx, mock, vomit, lock, cook, appease, clone, duplicate, intimidate, jeopardize, preach, cooperate, burst, exclude, exempt, kidnap, slam, reclaim, cancel, nail, smack, empower, sing, own, sue*	*seem, protect, judge, serve, carry, pause, define, attempt, loosen, research, screen, spray, tinker, verify, withstand, consult, survive, balance, pack, disarm, subsidize, boil, downsize, err, inherit, memorize, mobilize, ratchet, sneak, tailor, tend, wade, wrap, promise, shoot, veto, place, involve, unite, rush, detect, forfeit, pivot, possess, regard, round, scrub, sink, spank, specify, surround, suspect, transport, trick, weed, justify, deliver, pretend, handle, function, satisfy, bend, conclude, stay, reveal, compete, arrest, assemble, authorize, calculate, differ, forego, heed, line, mind, object, pace, permit, re-engage, recoup, refrain, relearn, scrutinize, spare, time, tone, vacate, videotape, whisper, split, find, restrain*

Table F.9 Distinctive collexemes of affirmative *want/s to* in COCA spoken (1990-2012)

	Attracted Lexical Verbs	Repelled Lexical Verbs
$p \leq 0.001$	*govern, protest, hesitate, manage, loosen, label, worry, kick, starve, provoke, utilize, scale, preview, star, melt, tweak, reproduce, leak, re-educate, peel, specify, harm, suppose, arrive, shrink, incite, rehearse, hone, picture, operate, patrol, stir, thread, store, tear, prompt, arrest, resurface, sharpen, worsen, load, overturn, multiply, assist, resent, seek, tend, smile, legalize, upset, incur, behave, steal, qualify, represent*	*say, see, take, make, go, tell, like, look, know, happen, help, find, work, think, put, use, keep, hear, pay, start, show, understand, continue, change, want, call, stay, ask, stop, try, move, win, play, turn, live, buy, spend, imagine*
$p \leq 0.01$	*tap, weather, visualize, waive, incorporate, flow, oppose, wave, activate, advance, assemble, buck, disapprove, dissuade, dive, espouse, evoke, exemplify, fan, flatter, germinate, function, offend, preserve, hook, conduct, laugh, lower, settle, account, adjust, dismantle, evade, litigate, surround, attend, precede, safeguard, winnow*	*read, expect, lose, wait, vote, mean, let, watch, hold, become, lead, write, leave, sit, love, cause, kill, face, learn, argue, save, join, raise, support, remember, pick, pass, point, answer, deal*
$p \leq 0.05$	*spare, invite, accomplish, impress, measure, certify, net, comfort, hamper, lighten, reform, care, master, stifle, pump, announce, dislike, implicate, oil, topple, toughen, act, refrain, diagnose, level, quibble, recite, trickle, warm, witness, matter, maneuver, whistle, pop, set, tax, explode, deteriorate, display, heat, jeopardize, wind, bury, counter, depart, hinder, market*	*meet, prove, run, send, walk, explain, add, hope, remain, agree, stand, bring, allow, listen, protect, wear, sell, reach, break, affect, hurt, respond, offer, address, pull, admit, come, step*

Table F.10 Distinctive collexemes of affirmative *be supposed to* in COCA spoken (1990-2012)

	Attracted Lexical Verbs	
$p \leq$	*compelled to*	*urged to*
0.001	*object, correct, acquiesce*	*convert*
0.01	*attend, enforce*	*donate, reconsider, attend, contact, visit*
0.05	*withdraw, stop, invest, testify, teach, act*	*sell*

Table F.11 Distinctive collexemes of affirmative *be compelled, urged to* in COCA spoken (1990-2012)

$p \leq$	Attracted Lexical Verbs	Repelled Lexical Verbs
0.001		*say*
0.01	*revolve, continue, distinguish, notice, revitalize, discover*	
0.05	*concentrate, keep, send, conform, anticipate, nominate, meet, consolidate, develop, vote, allow, prevail*	*give, ask, go, pay*

Table F.12 Distinctive collexemes of affirmative *be important to* in COCA spoken (1990-2012)

G. Synopses

G.1. Changes in Frequency

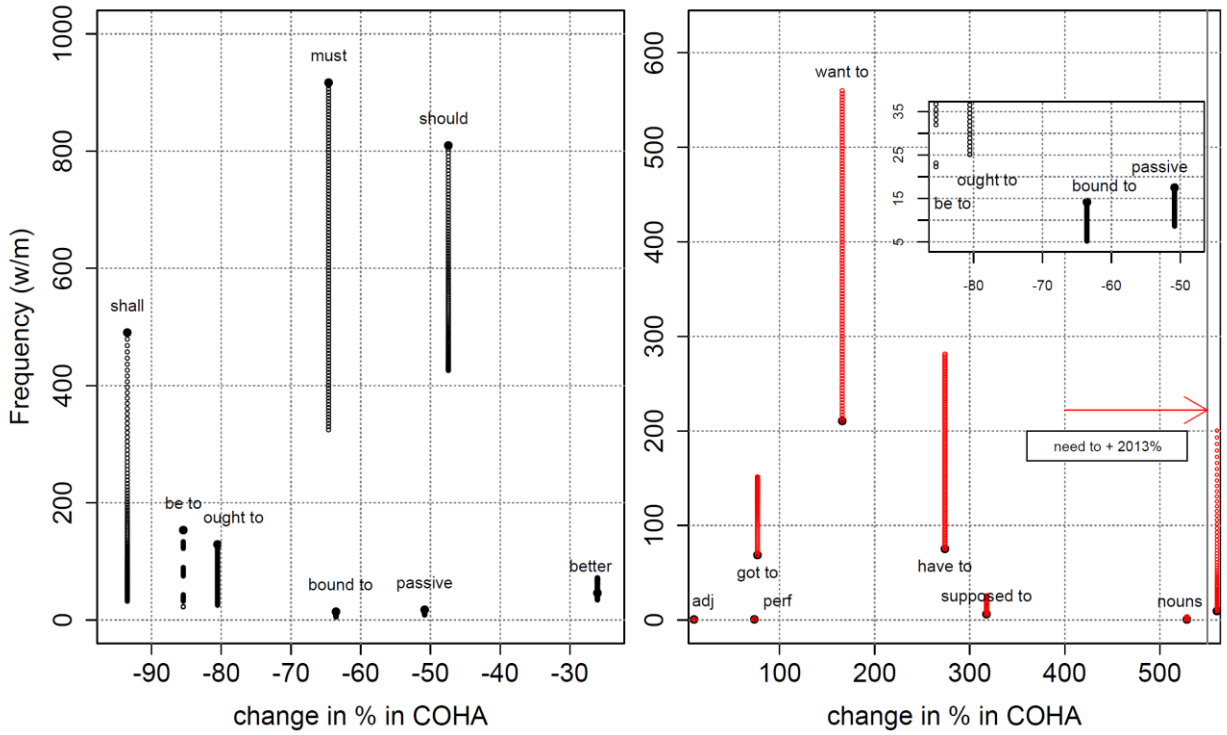


Figure G.1 Synopsis of the absolute changes in COHA (values of fitted functions)

The values derived from the fitted functions (not the actual values) are indicated on the y-axis. The relative changes are calculated on the basis of the first and last values of the fitted functions. The starting values are indicated by big black dots.

expressions	Function				expressions	Function			
	Diff. (%)	De-gree	1st value in w/m	last value in w/m		Diff. (%)	De-gree	1st value in w/m	last value in w/m
shall	-93.48	2	490.38	31.97	*(had/d) better / best*	-26.05	3	45.99	34.01
be to	-85.45	3	153.36	22.31					
ought to	-80.54	2	128.94	25.09	performative forms (lex. v.)	73.42	1	0.68	1.18
adjectives	-71.14	1	18.79	5.42					
must	-64.61	3	916.84	324.44	*(have) got to*	76.73	3	68.68	121.39
be bound to	-63.55	2	14.17	5.17	*want to*	165.89	1	210.56	559.85
passive (lexical verbs)	-50.83	1	17.51	8.61	*have to*	273.88	3	75.24	281.32
					supposed	317.59	2	6.17	25.75
should	-47.44	2	809.63	425.56	nouns	528.41	3	0.53	3.33

Table G.1 Relative changes in frequency (all analyzed expressions) in COHA, based on fitted functions

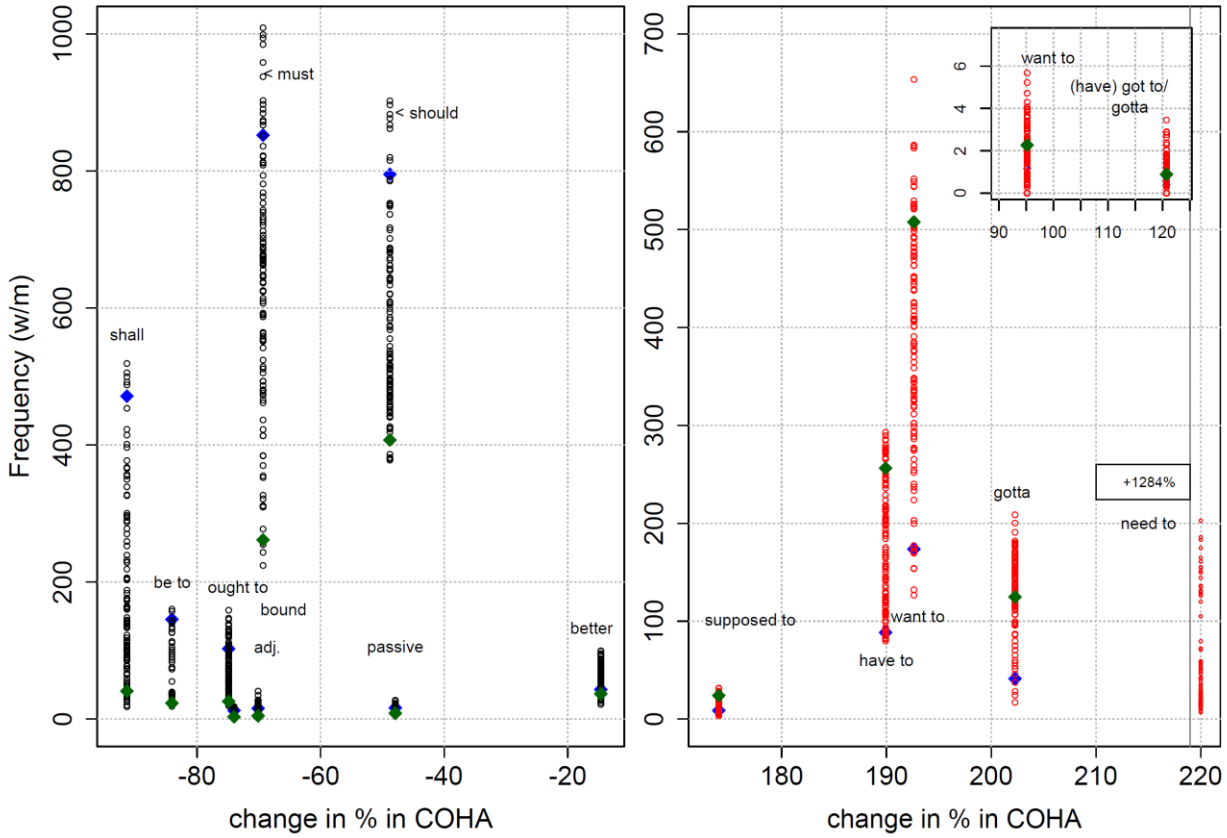


Figure G.2 (Changes in) the frequency of all analyzed expressions (based on frequencies in w/m in 1900-04 and 2005-09) in COHA (including *shall* and *want to*)

expressions	Diff. (%)	Average Frequency 1900-05 (in w/m)	Average Frequency 2005-09 in w/m
shall	-91.35	471.19	40.78
be to	-84.06	145.43	23.18
ought to	-74.88	102.54	25.76
bound to	-74.01	12.63	3.28
adjectives	-70.11	15.57	4.65
must	-69.31	852.08	261.50
should	-48.78	795.02	407.21
passive (lexical verbs)	-47.90	16.30	8.49
(had/'d) better / best	-14.63	43.16	36.84
nouns	95.17	1.16	2.26
performative forms (lexical verbs)	120.73	0.40	0.89
supposed to	174.00	8.77	24.03
have to	189.92	88.40	256.30
want	192.62	173.50	507.70
gotta	202.27	41.27	124.75
need to	1283.68	12.67	175.34

Table G.2 Relative changes in frequency (synopsis, all analyzed expressions) in COHA, based on average frequencies for 1900-1905, 2005-2009

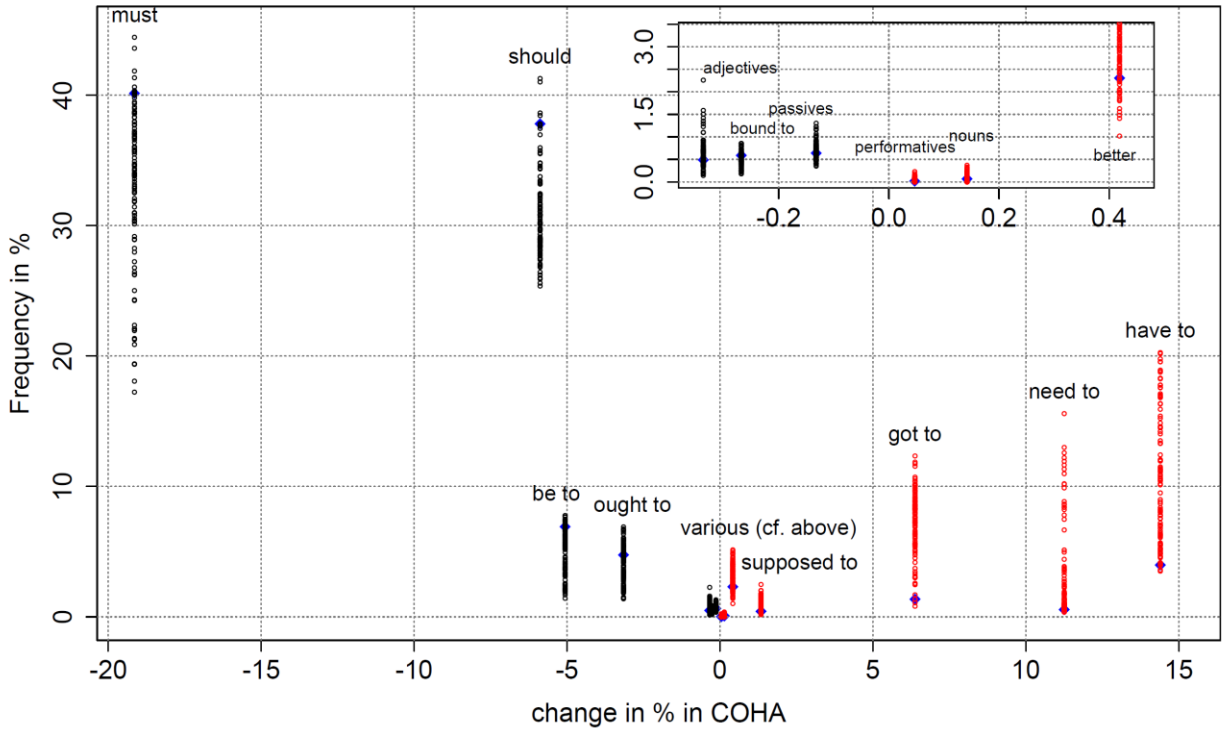


Figure G.3 (Changes in) the frequency of all analyzed expressions in relation to the combined frequency of all expressions (COHA) (excluding *shall* and *want to*)

expressions	Diff. (%) (average 1990-94, 2005-09)	Frequency in 1990 (in w/m)	Frequency in 2009 in w/m
ought to	-67.61	186.95	63.03
bound	-59.77	7.07	1.28
must	-57.82	340.42	92.84
shall	-38.35	13.91	8.94
nouns	-35.89	13.62	6.05
passive (lexical verbs)	-35.89	20.04	8.52
be to	-31.59	7.85	5.95
performative forms (lexical verbs)	-18.69	1.65	3.41
should	-13.82	749.91	560.01
have to	-7.99	976.23	788.70
supposed to	-2.65	43.38	45.57
(had/'d) better / best	0.25	24.52	47.70
want to	17.23	1057.32	1462.00
(have) got to, gotta	18.81	241.41	363.26
need to	60.40	249.19	409.26

Table G.3 Relative changes (synopsis, all analyzed expressions) in frequency in COCA (spoken), based on fitted functions

G.2. Multidimensional Scaling

Data that includes *shall* (volitional and future uses desregarded), but excludes (*might/ may…) want to:*

Expressions	X1	X2	Expressions	X1	X2
be to	287.324	-50.602	*have to*	-62.032	-0.172
be having to	5.734	-21.247	*must*	-62.024	-0.229
performatives	-61.890	-1.844	*be supposed to*	-61.998	-0.193
be bound to	-61.935	-0.497	participles	-61.993	-0.175
shall	-62.024	-0.229	*be having to*	-61.949	-0.200
participles	-61.949	-0.200	*shall*	-61.935	-0.497
be needing to	-61.998	-0.193	performatives	-61.923	-0.124
be supposed to	-61.993	-0.175	*be bound to*	-61.890	-1.844
adjectives	-62.032	-0.172	*be to*	-61.673	-0.044
nouns	-61.552	-0.144	nouns	-61.552	-0.144
better	-61.923	-0.124	*be needing to*	-61.490	1.195
must	-61.673	-0.044	adjectives	5.734	-21.247
ought to	-61.490	1.195	*better*	8.666	2.060
(have) got to	8.666	2.060	*ought to*	70.011	8.305
need to	92.974	3.915	*need*	92.974	3.915
should	70.011	8.305	*(have) got to*	215.749	59.996
have to	215.749	59.996	*should*	287.324	-50.602

Table G.4 Point coordinates of a MDS of the meanings of all analyzed expressions

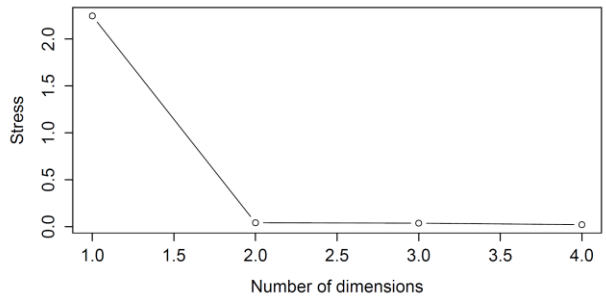


Figure G.4 Stress plot (excluding *(might/ may…) want to*) for MDS based on meaning

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Zusammenfassung in deutscher Sprache

In der vorliegenden Arbeit werden der Gebrauch und die Häufigkeitsveränderungen von dreißig Ausdrücken der Obligation und Notwendigkeit im gesprochenen amerikanischen Englisch analysiert, das als treibende Kraft für Sprachinnovationen gilt (vgl. Leech 2003). Als Grundlage dafür dienen Daten des *Corpus of Contemporary American English (COCA)* aus den Jahren 1990 bis 2009. Ergänzend werden Gebrauchshäufigkeiten im *Corpus of Historical American English (COHA)* ermittelt, wobei aufgrund weitreichender Änderungen im Korpusaufbau um 1900 erst Daten ab diesem Jahr genutzt wurden. Beide Korpora waren zum Zeitpunkt ihres Erscheinens die größten für linguistische Zwecke aufbereiteten und automatisch durchsuchbaren Textsammlungen. Dank einer konstant großen Zahl an Texten verschiedener Register ist auch die Analyse seltener Konstruktionen möglich bei gleichzeitig geringer Gefahr von Verzerrungen aufgrund von Ideolekten und ungewöhnlichen Ereignissen, die Einzug in das Textmaterial finden.

Im Gegensatz zu bisherigen Studien über Modalverben im Englischen werden nicht nur die zentralen Modalverben (wie z.B. *must, should*) untersucht, deren Abnahme im britischen und amerikanischen Englisch in der zweiten Hälfte des 20. Jahrhunderts eingehend dokumentiert wurde, und die im letzten Jahrzehnt zunehmend in den Fokus geratenen semi-modalen Verben (wie *have (got) to, need to*) einbezogen, die an Popularität zunahmen, allerdings nicht in dem Maße als dass sie den Rückgang der zentralen Modalverben erklären können. In dem Bestreben, herauszufinden, welche Veränderungen im System Modalität vonstattengehen und welche Funktionen die einzelnen Ausdrücke übernehmen, werden überdies auch Adjektive (wie *necessary, essential, critical*), Nomen (wie *obligation, need*) und lexikalische Verben (wie *force, require, urge*) mit ähnlicher Bedeutung analysiert. Da diese Sprechern jederzeit alternativ zur Verfügung stehen, werden auch sie untersucht, damit ein vollständiges Bild vom System Modalität und dessen Umgestaltung gewonnen werden kann. Dabei werden Vergangenheitsformen, infinite Verbformen und andere Kontexte, in denen die zentralen Modalverben nicht gebraucht werden können, ausgeschlossen, um Verzerrungen dieses Bildes zu vermeiden.

Insgesamt werden die Bedeutungen von mehr als 15.000 modalen Ausdrücken in der Sektion „gesprochene Sprache“ in COCA zu zwei verschiedenen Zeitpunkten (1990-1994 und 2005-2009) bestimmt und Veränderungen dokumentiert. Es wird dabei nicht nur zwischen epistemischer Bedeutung, bei der Sprecher logische Schlussfolgerungen über den Zustand der Welt ziehen, und nicht-epistemischer Notwendigkeit (auch sog. root-Bedeutung), bei der die Realisierung einer Situation notwendig ist bzw. erscheint, unterschieden. Überdies werden fünf Unterkategorien von nicht-epistemischer Bedeutung verwendet. Das angewandte detaillierte Klassifizierungsschema ermöglicht dabei selbst die Identifikation kleiner Bedeutungsunterschiede und Gebrauchsveränderungen. Eine multiple distinktive Kollexemanalyse aller Ausdrücke in der „gesprochenen Sprache“ in COCA (vgl. Gries und Stefanowitsch 2004) ergänzt die Informationen, indem sie z.B. die Verwendung mit (in-)formellen oder für eine bestimmte Bedeutung typischen Infinitiven zeigt. Besonders hervorzuheben sind auch die neuen Erkenntnisse über *be to, need(n't)* und *need to* aus einer semi-automatischen bzw. manuellen Analyse von rund 23.000 Vorkommnissen dieser Verben zwischen 1900 und 2009 in COHA. *Need to* erlebt einen brillanten Aufstieg in affirmativen Sätzen, legt aber auch in nicht-assertiven Kontexten zu und übernimmt einige der Funktionen von *need,* das im Rückgang eine Nische in Fragen, in Sätzen mit *only* und in der Phrase *if need be* sucht. *Be* to schwindet ebenfalls zunehmend, jedoch gewinnen *be to blame*- und Passivkonstruktionen an relativer Bedeutung. *Want to* hingegen dient verstärkt als Mittel zu Handlungsaufforderungen, auch insbesondere in Verbindung mit *may* und *might.* Da die untersuchten Adjektive als Auslöser für den mandativen Subjunktiv fungieren, konnten auch Einsichten in dessen Gebrauch im amerikanischen Englisch gewonnen werden.

Die Ergebnisse zeigen, dass die Verwendung der untersuchten Ausdrücke – sowohl in Wort als auch in Schrift – insgesamt signifikant abnimmt. In COHA wird im Laufe des 20. Jahrhunderts ein Großteil der untersuchten Ausdrücke seltener – nur *got to, want to, have to, supposed to, need to, want to,* die Nomen und 1. Person-Singular-Formen der lexikalischen Verben nehmen im Gebrauch zu. Auch wenn die Zahl an Adjektiven sinkt, werden sie anteilig nicht weniger. Die Inklusion bisher vernachlässigter Ausdrücke kann zwar aufgrund deren geringer Häufigkeit den Rückgang der zentralen Modalverben nicht vollständig kompensieren, zeigt aber interessante Tendenzen auf. So zeichnet sich ein Trend zu mehr indirekten Formen des Ausdrucks von Verpflichtungen und Notwendigkeiten ab.