Mentoring angehender Lehrkräfte.

Gelingensbedingungen und Auswirkungen auf die professionelle Entwicklung und das Wohlbefinden im Vorbereitungsdienst.

Mentoring Beginning Teachers.

Conditions for Success and the Consequences for Professional Development and Well-being During Teacher Training.

Inauguraldissertation

zur Erlangung des Akademischen Grades

eines Dr. phil.,

vorgelegt dem Fachbereich 02 - Sozialwissenschaften, Medien und Sport

der Johannes Gutenberg-Universität Mainz

von

Julian Burger

aus Ludwigshafen

Mainz

2023

Referent*in: [Personenbezogene Angaben finden Sie in der Print-Version dieser Dissertation, einsehbar im Bestand der Universitätsbibliothek der Johannes Gutenberg-Universität.]

Korreferent*in 1:

Korreferent*in 2:

Tag des Prüfungskolloquiums: 02. Juni 2023

Table of Contents

List of Tables

List of Figures

Summary

In many teacher induction programs worldwide, mentoring is a core component implemented to support the professional development and well-being of beginning teachers (Blömeke & Paine, 2009; Howe, 2006). While the novices highly value the support from an expert teacher during induction in general (Marable & Raimondi, 2007), a variety of studies have suggested that the full potential of school-based mentoring often remains unexploited (e.g., Hobson & Malderez, 2013; Hoffman et al., 2015; Mena et al., 2017; Richter et al., 2013). At the same time, much remains unknown regarding the determinants within and beyond the mentor-mentee dyad that influence how mentoring unfolds as a promoter of the skills required to meet the demands of the profession (cf. Hobson et al., 2009). Via three empirical quantitative studies, the present PhD project contributes to the research on mentoring, its consequences for the professional development of beginning teachers, and the mechanisms involved in its effectiveness. The present studies use various subsets of data acquired by means of a large online survey among novice teachers undergoing their post-university practical training in a region of Germany.

With regard to the consequences of school-based mentoring, results of the three studies highlight the benefits associated with instructional support oriented towards constructivist principles of learning for beginning teachers' well-being (Study 1), professional self-efficacy (Study 2), and generic pedagogical knowledge (Study 3). In contrast, transmission-oriented mentoring interactions largely failed to foster the professional skills and well-being of beginning teachers across the present studies. Moreover, neither of the two mentoring approaches under investigation reliably buffered against the novices' maladaptive emotional management within Study 2, and neither approach appeared to be associated with their ability to cope with classroom disturbances within Study 3.

Regarding the mechanisms underlying school-based mentoring practices, Study 1 firstly shed light on the mediating role of the beginners' need for autonomy in the beneficial effect of constructivist mentoring on mentees' emotional exhaustion. Transmissive mentoring, in turn, did not elicit feelings of autonomy in the mentees, and consequently did not lower their exhaustion. Furthermore, a moderating effect of beginning teachers' initially transmissive beliefs about teaching was found within the influence of constructivist mentoring on self-efficacy in Study 2, indicating that a mismatch of mentors' and mentees' learning orientations may stimulate the professional development of the beginners. Lastly, the interplay between formal mentoring support and informal sources of support at the training schools of beginning teachers was investigated in the framework of an exploratory, person-centered analysis in Study 3. Here, the results suggest a complementary relation of formal and informal support, while no distinct compensatory relation can be derived from the analysis.

Comparing different approaches and including further influential factors involved, the present research project improves our insight into the effectiveness of school-based mentoring and contributes to the advancement of a central learning opportunity for beginning teachers during their induction into the profession.

Zusammenfassung

In vielen Berufseinstiegsprogrammen für Lehrkräfte zählt Mentoring weltweit zu den zentralen Bausteinen, implementiert zur Unterstützung der professionellen Entwicklung und Gesundheit des angehenden Lehrpersonals (Blömeke & Paine, 2009; Howe, 2006). Während Novizen die Unterstützung durch eine erfahrene Lehrkraft im Berufseinstieg grundsätzlich als sehr wertvoll einschätzen (Marable & Raimondi, 2007), deuten verschiedene Studien darauf hin, dass das volle Potenzial von schulbasiertem Mentoring oft nicht ausgeschöpft werden kann (z. B. Hobson & Malderez, 2013; Hoffman et al., 2015; Mena et al., 2017; Richter et al., 2013). Zugleich ist nur wenig bekannt bezüglich der Determinanten innerhalb und außerhalb der Mentor-Mentee-Dyade, die beeinflussen, inwieweit Mentoring als Förderer jener Fähigkeiten wirksam wird, die zum Bewältigen der beruflichen Anforderungen nötig sind (vgl. Hobson et al., 2009). Mittels drei empirischer, quantitativer Studien trägt das vorliegende Projekt dazu bei, die Konsequenzen von Mentoring für die professionelle Entwicklung angehender Lehrkräfte sowie seine Wirkmechanismen hierbei zu erforschen. Die vorliegenden Studien nutzen dafür mehrere Teildatensätze aus einer breiten Online-Befragung angehender Lehrkräfte, die ihren Vorbereitungsdienst in einem Bundesland in Deutschland zum Zeitpunkt der Befragung absolvierten.

Im Hinblick auf die Konsequenzen von schulbasiertem Mentoring heben die gegenwärtigen Ergebnisse die positiven Einflüsse von instruktioneller Unterstützung, die sich an konstruktivistischen Grundsätzen des Lernens orientiert, auf das Wohlbefinden (Studie 1), die professionelle Selbstwirksamkeit (Studie 2), und das generische pädagogische Wissen von angehenden Lehrkräften (Studie 3) hervor. Dagegen zeigten sich Mentor-Mentee-Interaktionen, die auf die direkte Transmission von Wissen ausgelegt waren, als weitgehend unwirksam bei der Förderung von professionellen Fähigkeiten und dem Wohlbefinden des jungen Lehrpersonals über die vorliegenden Studien hinweg. Des Weiteren konnte in Studie 2

für keinen der beiden untersuchten Mentoring-Ansätze verlässlich festgestellt werden, dass er ein maladaptives Management von Emotionen der Lehrnovizen senkt. Auch konnten keine positiven Zusammenhänge zwischen den Mentoring-Ansätzen und einem effektiven Umgang der angehenden Lehrkräfte mit Unterrichtsstörungen innerhalb Studie 3 festgestellt werden.

Bezüglich der Wirkmechanismen von schulbasiertem Mentoring konnte in Studie 1 zunächst die Autonomie-Unterstützung als Vermittler des günstigen Effekts einer konstruktivistischen Mentoring-Praxis auf die emotionale Erschöpfung der Mentees identifiziert werden. Demgegenüber konnte transmissives Mentoring kein Empfinden von Autonomie in den Novizen fördern, und somit auch deren Erschöpfung nicht senken. Zudem zeigte sich in Studie 2 ein moderierender Effekt von initialen, transmissiven Lehr-Lern-Überzeugungen der Mentees innerhalb des Einflusses von konstruktivistischem Mentoring auf deren Selbstwirksamkeit, der auf Vorteile von eingangs unterschiedlichen Lehrorientierungen von Mentor und Mentee für die professionelle Entwicklung hindeutet. Schließlich wurde das Zusammenspiel von formellem Mentoring und informeller Unterstützung an den Ausbildungsschulen der angehenden Lehrkräfte im Rahmen einer explorativen, personenzentrierten Analyse in Studie 3 untersucht. Hier deuten die Ergebnisse eine komplementäre Beziehung zwischen formeller und informeller Unterstützung an, während sich kompensatorische Mechanismen nicht eindeutig von den Analysen ableiten lassen.

Durch den Vergleich distinkter Ansätze und die Berücksichtigung weiterer Einflussfaktoren liefert das vorliegende Forschungsprojekt Einblicke in die Wirksamkeit von schulbasiertem Mentoring und trägt damit zur Weiterentwicklung einer zentralen Lerngelegenheit für angehende Lehrkräfte in der Berufseinstiegsphase bei.

1. Introduction

The transition from university life to a full teaching position is a challenging phase for beginning teachers. Lacking practical experience and still developing their professional skills (Tynjälä & Heikkinen, 2011), new teachers are immediately confronted with a variety of demands inside and outside the classroom. Many initial teacher education programs tend to focus heavily on theoretical and content-related matters (cf. Blömeke & Paine, 2009), while insufficiently preparing their students for the "hands on"-pedagogical and -psychological tasks that lie ahead. At the same time, discipline problems in the classroom, teacher-student conflicts, time management issues, and parents' expectations are among the most prominent stressors in a teacher's life and pose a threat to novice teachers' self-esteem and mental health (Dicke et al., 2018; Harmsen et al., 2018; Prilleltensky et al., 2016; Skaalvik & Skaalvik, 2017). Consequently, the experience of exhaustion and stress is frequent among beginning teachers (Chang, 2009a; Chaplain, 2008; Clandinin et al., 2015; Darius et al., 2021) and may lead to their decision to leave the profession early. The burden carried by the new teaching workforce manifests itself in high attrition rates in the first years of teaching in many countries (Dupriez et al., 2016; Ingersoll & Smith, 2003; O'Brien et al., 2007; Organisation for Economic Cooperation and Development [OECD], 2005) and an intensifying shortage of teachers that challenge policymakers worldwide (cf. Berry & Shields, 2017; Burns & Darling-Hammond, 2014; Eurydice, 2012; Klemm & Zorn, 2019).

To support beginning teachers in this challenging time of transition, school-based mentoring has been introduced as a key component of many teacher induction programs worldwide (Blömeke & Paine, 2009; Howe, 2006; OECD, 2005). In general, a plethora of findings suggest that formal teacher mentoring is beneficial for beginners' development of professional skills (e.g., Dunst et al., 2019; Klassen & Durksen, 2014; Stanulis & Floden, 2009), preservation of well-being (Kessels, 2010; Voss et al., 2017), and retention in the

profession (Callahan, 2016; Ingersoll & Strong, 2011). However, in contrast to these benefits, there is also considerable evidence suggesting that not all mentoring relationships result in a fruitful collaboration between mentor and beginning teacher. Judgmental, dominant, and directive approaches taken by mentors have been found to be ineffective for, in part even to hinder mentees' professional development, self-esteem, and well-being (Hobson & Malderez, 2013; Mena et al., 2017; Richter et al., 2013; Yuan & Lee, 2016). Consequently, researchers' attention has been drawn to different qualities of mentoring, their implications, and further influential factors that determine the success of the school-based relationship. Among those factors, the pedagogical beliefs that beginning teachers bring into the preparation program are assumed to affect the uptake of professional learning opportunities offered by mentors, but their role within mentored learning to teach remains largely unknown (Hobson et al., 2009; Levin, 2015). Moreover, informal, self-organized forms of support are considered as a potential complement to or compensation for the beginners' formal mentoring experience (Desimone et al., 2014), extending and intertwining with the dyadic mentoring relationship. Thus, in shaping effective, school-based mentoring support for beginning teachers, characteristics of the mentor, the mentee, and the social context surrounding the dyad need to be taken into account.

This research project pursues the goal to improve our insight into the conditions for effective, school-based mentoring for beginning teachers. Amidst the background of evidence above (or lack thereof), three empirical studies will each consider different influential variables that contribute to a mentoring relationship and its professional outcomes, i.e., the mentor's approach to their practice, the beginning teacher's prior pedagogical beliefs, and the informal support surrounding the mentoring relationship at the respective supervisory school.

Thereby, each study will make a distinct contribution to our knowledge regarding the following, guiding research questions of the present PhD project:

1. How favorable are distinct approaches to mentoring beginning teachers with regard to the beginners' professional development and well-being?
2. How do additional factors within and beyond the mentor-mentee dyad influence the effectiveness of mentoring support during induction?

In the following theory section, I will first outline a conceptualization of mentoring and a model representation of teachers' professional development that are relevant to this research project. Having established this theoretical background, I will proceed to introduce a working model that provides an integrated overview on the central, precise research aims of the empirical studies conducted in the framework of this PhD project.

2. Mentoring Beginning Teachers

2.1 Mentoring in the Teacher Education Context – a Definition

In employing the term ‘mentor’ in the teacher education context, one typically refers to “a wiser, more experienced teacher (with a reduced teaching load), assigned to guide the new teacher through the probationary period, and to observe and provide the new teacher with instructional support and feedback” (Pirkle, 2011, p. 43). Extending the functions of mentoring, Hobson (2017) defines it as “a one-to-one relationship between a relatively inexperienced teacher (the mentee) and a relatively experienced teacher (the mentor), which aims to support the mentee’s learning, development and well-being […]” (p. 335). These definitions align well with an earlier notion by Gold (1996), who already distinguished between instructional support and psychological support provided by mentor teachers, and correspond well to analogous distinctions made for mentoring functions in a broader business context (cf. Wanberg et al., 2003). Psychological support can be understood as individual help in coping with the stress and negative emotions that arise from early, professional challenges and subjective failures in the classroom. Instructional support, in turn, refers to assistance and guidance in lesson planning and structuring, classroom management, assessment, and related professional tasks. This well-established dichotomy has sometimes been complemented by a third function of mentors, namely role modeling (Richter et al., 2013; Wanberg et al., 2003). Accordingly, mentors further act as an exemplary teacher model. By observing how their mentor acts in their professional roles, mentees are socialized into the culture of the profession and enabled to develop an own understanding of the roles associated with the term ‘teacher’. In the teacher education context, instructional support can generally be considered as the central function of mentor teachers (cf. Hascher & Kittinger, 2014; Hobson et al., 2009; Richter et al., 2013), due to the strict orientation towards curricular requirements within formalized induction programs.

In providing instructional support, mentor teachers' effectiveness has been shown to vary considerably as a function of the approach underlying the learning interactions between them and their mentees (e.g., Feiman-Nemser, 2001; Hobson et al., 2009; Hofmann & Springer, 2014). The next section outlines a fundamental distinction between two mentoring approaches that will form a conceptual framework for the present empirical studies on conditions for effective mentoring in teacher education.

2.2 Approaches to Mentoring Beginning Teachers – a Conceptualization

Multiple researchers have suggested that different approaches to school-based mentoring support need to be distinguished (e.g., Crasborn et al., 2011; Feiman-Nemser, 2001; Heikkinen et al., 2008; Wang & Odell, 2002). In a valuable contribution to research on mentoring effectiveness, Richter and colleagues (2013) juxtaposed selected theoretical distinctions of mentoring approaches still relevant to the field and argued that these "show similarities to two paradigms of learning theory" (Richter et al., 2013, p. 168), i.e., behaviorist and constructivist learning theories. Consequently, they integrated these distinctions (Cochran-Smith & Paris, 1995; Feiman-Nemser, 2001) into their conceptualization of 'constructivist-oriented' (synonymous: 'constructivist') and 'transmission-oriented' mentoring (synonymous: 'transmissive'), representing two distinct approaches to instructional support (Richter et al., 2013). In this framework, constructivist mentoring is characterized by shared reflection on practice, critical inquiry of prevailing teaching standards, and mutual problem-solving, thus enabling a partnership in learning in which both mentor and mentee grow professionally and personally. Following a constructivist approach, mentors acknowledge that their mentee is actively co-constructing knowledge with them, is an agent of their own change, and brings into the program a valuable, fresh perspective on the current practices and cultural aspects of teaching. In turn, mentoring based on a behaviorist concept of learning utilizes the mentor as

an expert teacher that transmits expert knowledge to a rather passive learner, the mentee. In this transmissive approach, mentors shape learning processes in a directive, unidirectional, and potentially more hierarchical and structured way, setting the action agenda and socializing the beginning teacher into the existing school culture and practice (cf. Wang & Odell, 2002).

The conceptualization provided by Richter et al. (2013) reflects a development of mentoring practices, which according to Heikkinen et al. (2008) "seem to change towards the same direction as the conceptions of knowledge and learning" (p. 112). Yet, while constructivist-oriented practices may be on the rise, traditional and directive approaches to mentoring are still common in current teacher education (Crasborn et al., 2011; Hoffman et al., 2015; Mena et al., 2017). At the same time, only few studies in the field have focused on these approaches to school-based mentoring and their respective influence on beginners' professional development and well-being. The next section provides a brief review on findings in this regard.

2.3 Mentoring Approaches and Their Consequences – a Brief Review

Mentoring Approaches and Mentees' Professional Learning

In the current scientific discourse, the general benefits of mentoring for beginning teachers' professional learning are rarely doubted and have been backed by evidence early in the growing branch of research (e.g., Carter & Francis, 2001; Evertson & Smithey, 2000). However, study designs that consider varying qualities of mentor-mentee interactions have contributed to an improved insight into effective and ineffective ways of support. As such, Fives et al. (2007) found that mentoring support characterized by guidance and collaboration led to stronger efficacy beliefs[1] for instructional practices of prospective teachers at the end of

[1] Bandura (1986) defined self-efficacy beliefs as an individual's expectancy to successfully cope with future challenges despite possible obstacles or hindrances. The concept will be further outlined within the scope of study 2 in chapter 6.

their practical training phase. In turn, findings from a mixed-methods study by Klassen and Durksen (2014) indicated that critical, evaluative mentor feedback had a negative impact on the development of student teachers' professional self-efficacy. Stanulis and Floden (2009), applying a controlled two-group design, observed that beginning teachers who were intensively supported by mentors trained in constructivist practices made greater progress with regards to their abilities to motivate students, to establish a beneficial classroom atmosphere, and their instructional skills, when compared to a control group of beginners that received standard induction support by untrained mentors. Comparing distinct approaches in a quantitative design, Richter et al. (2013) further demonstrated the advantages of constructivist-oriented mentoring for beginners' teaching enthusiasm, teacher self-efficacy, and job satisfaction over transmission-oriented mentoring, which did not display any effects on the outcomes of the study except for a small increase of novices' transmissive beliefs. In the same vein, constructivist-oriented mentoring practices, unlike transmission-oriented practices, enhanced the degree of beginning teachers' reflection on practice in a study by Linninger (2016), which in turn increased beginning teachers' instructional skills and professional classroom vision.

Mentoring Approaches and Mentees' Well-Being

Beside its potential to enhance beginning teachers' professionalization, mentoring has long since been acknowledged as an effective means to shield young and inexperienced teachers from the strain that often arises during the challenging first years of their career (e.g., Gold, 1996; Ingersoll & Kralik, 2004). At the same time, Hobson and Malderez (2013) pointed out that judgmental and overly critical forms of mentoring may be widespread where mentor teachers are not trained for their role, and that these diminish mentees' development and well-being. Thus, in addition to its role in beginners' skill acquisition, the quality of mentoring interactions appears to be vital also for the preservation of well-being. In the study by Richter et al. (2013) mentioned above, constructivist but not transmissive mentoring lowered

participants' experience of emotional exhaustion. Moreover, evidence provided by Voss et al. (2017) indicates that constructivist-oriented mentoring practices buffer against an increase in emotional exhaustion in the first year of induction. In a later study, Voss and Kunter (2020) confirmed this protective role of constructivist mentoring in an analogous study design.

All in all, a growing number of findings highlight the advantages of mentoring following constructivist principles of learning for the mentees' professional and health-related development, while transmission-oriented and directive approaches have so far appeared ineffective in this regard. Nevertheless, only a small number of studies on the effectiveness of mentoring have actually compared distinct approaches, few have focused on beginning teachers involved in a post-university induction phase, and evidence derived from quantitative analyses and large-scale studies is still limited (Hobson & van Nieuwerburgh, 2022; Hoffman et al., 2015). Moreover, while researchers in the field have started to turn the spotlight on distinct mentoring qualities and their consequences, there is a scarcity of investigations that consider determinants beyond the mentor's characteristics, i.e., preconditions the mentees bring into the relationship, and contextual factors beyond the mentor-mentee dyad that may be influential for the outcomes of the relationship. The next section will delineate a selection of further influential factors for effective mentoring in teacher education.

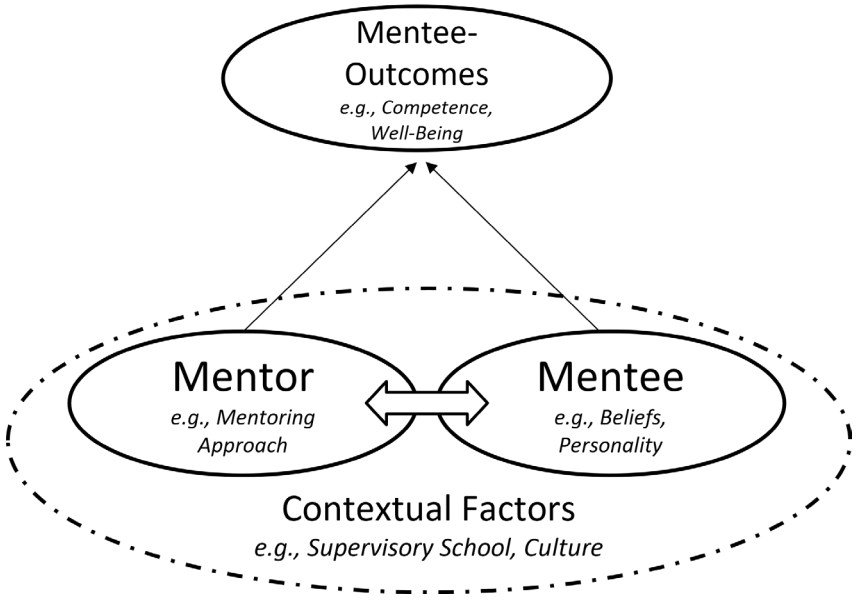
2.4 Further Influences on Mentoring Success – a Dyad in a Context

Besides the crucial role of the approach experienced teachers take to their mentoring practice, characteristics of the mentee as well as the educational and cultural context within which the professional relationship is formed are further important preconditions for effective mentoring (Hascher & Kittinger, 2014; cf. Wanberg et al., 2003). Thus, to develop an advanced understanding of the conditions for successful mentoring in teacher education, characteristics of the mentor teacher, the beginning teacher, and the supervisory school context should be

considered as influential and interacting with one another (cf. Kunter et al., 2013). Figure 1 depicts this basic interplay of influencing factors, which will be elaborated upon in the following.

Figure 1

Generic Model of Mentoring Determinants (based on Hascher & Kittinger, 2014)



Characteristics of the Mentee

Prospective teachers do not arrive before their mentor in an entirely malleable form, but already show cognitive and psychosocial characteristics that have been shaped by their educational biography and that are assumed to affect their collaboration and professional learning within the relationship. For instance, the beginners' cognitive abilities (e.g., Bullough et al., 2008), personality (Wildman et al., 1992), motivational and learning orientations (Oosterheert & Vermunt, 2001), and openness towards being mentored (Roehrig et al., 2008) have been discussed as influential in mentored learning to teach. In particular, the mentees'

initial professional beliefs, i.e., their "psychologically held understandings and assumptions about phenomena or objects of the world that are felt to be true, have both implicit and explicit aspects, and influence people's interactions with the world" (Voss et al., 2013, pp. 249–250), have received growing attention in the research on teacher mentoring, and are focused upon in this PhD project. Beginning teachers' beliefs and images about 'the right way' of teaching are considered as a gateway for new knowledge during induction, and therefore thought to have a critical influence on their professional development (Fives & Buehl, 2012). Beginning teachers enter their practical training already with strong beliefs about teaching and learning, consolidated over the years of their own school experience as a student (Richardson, 2003). These beliefs about teaching and learning can be reform-minded (i.e., constructivist-oriented) and traditional (i.e., transmission-oriented), and thus congruent with or diverging from the learning approach that underlies a mentor's teaching and mentoring practice (see section 2.2). However, while it is largely undisputed that the beginners' prior beliefs need to be considered as influential in formal teacher education and therefore should be taken into account by the educators in relation to their own professional beliefs (Fives & Buehl, 2012; He & Levin, 2008), there is a scarcity of empirical evidence in the teacher mentoring literature on the consequences of matching versus differing beliefs held by mentor and mentee (Hobson et al., 2009).

Contextual Factors Influencing School-based Mentoring

Various contextual factors influence the course of mentored learning to teach as part of a nationwide or regional teacher induction program. At a broader level, curricular requirements and regulations determine, to a considerable degree, the conceptions and functions of mentoring, the frequency and scope of meetings, the selection and pairing of mentors with mentees, and the compensation or incentives mentor teachers receive for their engagement, all of which may facilitate or hinder successful mentoring (Jones, 2000; see Wang & Fulton, 2012,

for a comprehensive review). Furthermore, whether school-based mentoring is coherently integrated into an induction program and coordinated with regards to other components and institutions that make part of it, affects its potential and outcomes (Hascher et al., 2004; Hobson et al., 2009). Beside these educational policy-related factors that exhibit their influence on a macro-level, the cultural and social characteristics of the local supervisory school where a mentoring relationship is arranged are assumed to play an important role in how mentored learning to teach progresses (Wang & Fulton, 2012). Accordingly, mentoring is influenced by the implicit teaching ideals and values, and the social structure and degree of collaboration that characterize a school's teaching staff. In particular, it has been suggested that mentoring is more effective if it takes place at a training school with a supportive, collegial culture (Lee & Feng, 2007), in line with the notion of teachers' learning as being inherently social and community-based (Putnam & Borko, 2000). In this regard, mentor and mentee may likewise profit from having the option to receive support from someone beyond the formal mentoring dyad, i.e., peer networks or experienced teachers at their school (Whisnant et al., 2005). Such informal support received during spontaneous interactions in the educational establishment has further been discussed as capable of complementing, or even compensating for a beginning teacher's formal mentoring experience (cf. Desimone et al., 2014). However, only few empirical studies have investigated how mentoring relates to the socio-cultural context at the supervisory school and shed light onto the potentially complex interplay of both (cf. Orland-Barak, 2014; Wang & Fulton, 2012).

As the evidence above states, the professional outcomes of mentoring beginning teachers can be considered as a function of the mentor's, the mentee's, and contextual characteristics. Still, only few studies have taken an appropriately holistic research approach and included influencing variables from more than one of these three domains in their investigation of mentored learning to teach. This may be, amongst other reasons, because many

studies do not explicitly introduce a sound theoretical model representation of beginning teachers' professional learning, which would allow for inferring the multiple determinants involved and how these may interact. In the next chapter, I will present a comprehensive process model of professional teacher competence developed by Kunter et al. (2013) and locate mentoring as a source of learning within the wider teacher education context. Thereby, the considerations above regarding conditions for effective mentoring will be juxtaposed with the implications of a well-established, overarching process model of teachers' learning.

3. On the Professional Learning of Teachers

3.1 What is to be Learned: The Notion of Teachers' Professional Competence

In the international literature on teacher preparation, a considerable heterogeneity and vagueness of conceptions and terms employed in the context of professionalization persist that impair the assessability of teachers' qualification and the comparability of researchers' findings (cf. Cochran-Smith & Zeichner, 2005). With regards to the notion of teachers' "competence" or "expertise", Baumert and Kunter (2013) point out that "overarching theoretical structures that would allow relevant research questions to be translated into empirically testable hypotheses are lacking" (p. 25). To address this lack of a consistent, global conceptual framework in the literature, the authors introduced a comprehensive model of teachers' professional competence that pinpoints what is required by teachers on both a cognitive and non-cognitive level to fulfill the demands of the profession (Baumert & Kunter, 2006, 2013). Building on and integrating earlier, seminal works on teachers' professional knowledge (e.g., Shulman, 1986) as well as competence (Weinert, 2001), the authors postulate a multidimensional competence model that comprises four broad aspects, namely professional knowledge, motivational orientations, self-regulation skills, and professional beliefs and values (Baumert & Kunter, 2006). While the knowledge domain has been presented as the core of professional competence, the model is non-hierarchical in general and the defined aspects are assumed to interact in a dynamic way, shaping teachers' professional practice. Each of the four aspects include several, more specific domains which, in turn, contain a range of more precise facets that can be operationalized for empirical research. For instance, within the aspect of professional knowledge, the core domains of content knowledge, pedagogical content knowledge, and generic, subject-unrelated pedagogical knowledge can be primarily distinguished (cf. Shulman, 1986). Moreover, generic pedagogical knowledge can be

differentiated into, inter alia, the facets classroom management and orchestration of learning processes, assessment of student performance, and general knowledge of student learning and instruction planning. With regard to motivational orientations, Baumert and Kunter (2006) subsume a range of related variables, such as teachers' enthusiasm for their subject and their intrinsic motivation, i.e., their orientation to carry out activities for genuine enjoyment and satisfaction, as opposed to external incentives or pressure (cf. Ryan & Deci, 2000). Self-regulatory skills are conceptualized mainly as capabilities of adequately coping with job demands, balancing out professional engagement in and dissociation from work-related tasks, as well as regulating the accompanying emotions. Lastly, professional beliefs entail, inter alia, teachers' subjective theories of teaching and learning that are held to be true, value commitments, and epistemological beliefs, i.e., beliefs relating to the nature and acquisition of knowledge (Baumert & Kunter, 2013; cf. Pajares, 1992).

Within Baumert and Kunter's (2013) framework, teachers' professional competence is viewed as malleable, thus learnable and teachable in general, raising the question as to how its aspects are successfully developed and which determinants need to be considered that may moderate this development in the context of initial teacher education.

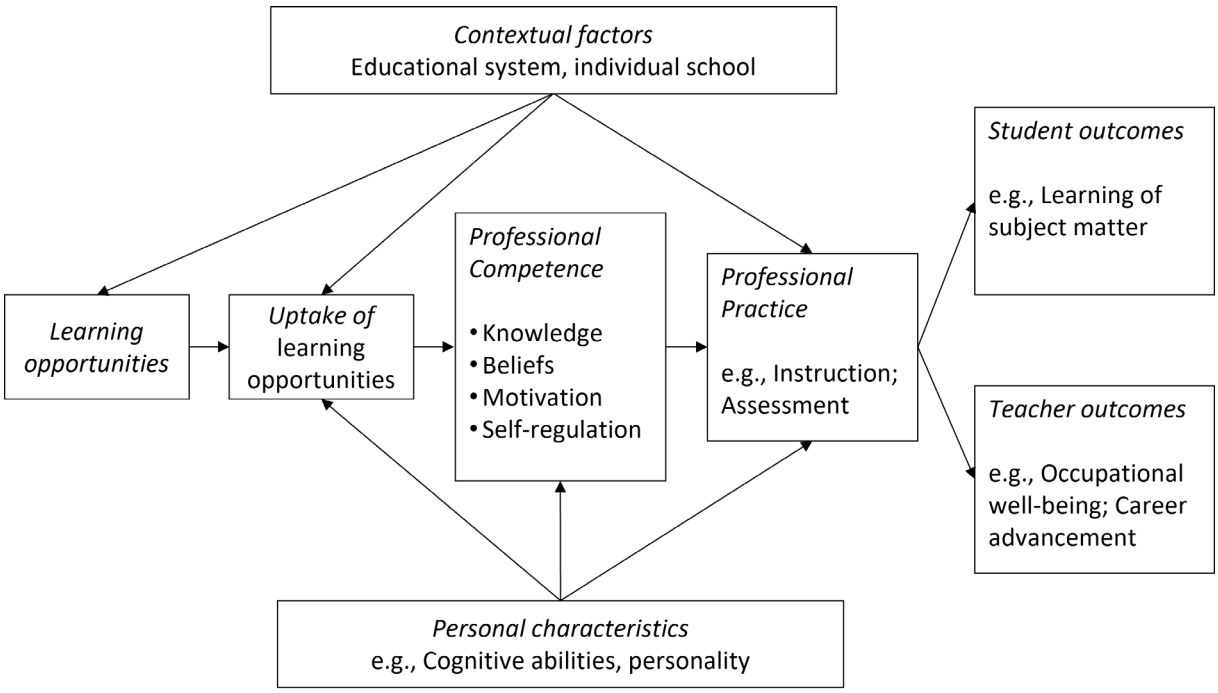
3.2 How it is Learned: A Process Model of Teachers' Professional Development

Building on their conceptualization of teachers' professional competence, Kunter et al. (2013) have developed a process model of teachers' professional development that includes both influential factors and consequences of teachers' professional competence (see Figure 2). Underlying this model is the basic assumption that teachers' competence can, on the one hand, be fostered by preparation programs and further training (cf. Darling-Hammond et al., 2005), and is, at the same time, affected by personal, non-profession-specific characteristics that candidates bring into these programs (Kunter et al., 2013). To promote professional

development, federally or regionally organized teacher preparation programs usually provide a range of opportunities to learn, such as theory courses, in-class training, work shadowing, or mentoring arrangements.

Figure 2

Model of the Determinants and Consequences of Teachers' Professional Competence (as developed by Kunter et al., 2013)



In addition to these formalized elements of preparation, learning also occurs via informal learning opportunities, such as spontaneous or naturally occurring interactions with peers (Richter, Kunter, Lüdtke, et al., 2011). The process model postulates that the nature, availability, and quality of these formal and informal learning opportunities is influenced by educational policy-related factors as well as institutional characteristics of a beginners' training school. In accordance with offer and use-conceptions of learning (cf. Helmke, 2003), these learning opportunities are actively utilized by beginning teachers to a varying degree,

depending on the learners' personal characteristics and, once more, contextual factors associated with the education system and the local school. This interplay of learning opportunities and their use is assumed to stimulate the development of professional competence, which, in turn, is thought to become visible in the beginning teachers' professional practice, i.e., their behavior intended to meet the demands in and around the classroom. Professional competence, manifested in teachers' professional practice, will entail various learning- and well-being-related outcomes for teachers and students likewise, i.e., variables that can be used to measure professional success (Kunter et al., 2013). For teachers, beside career-related advancement and innovative behavior, the securing of occupational well-being and mental health has been suggested as a major priority of teacher qualification in the light of teacher attrition and growing staff shortages (Hobson & van Nieuwerburgh, 2022). For students, learning-related results as well as their social-emotional development are considered within the model's framework.

3.3 Locating Mentoring in the Process of Professional Development

In the framework of the afore-mentioned process model of teachers' professional development, a mentor teacher adopts the role of a provider of learning opportunities. Within the mentoring relationship, he or she may offer to the beginning teacher support in the design of lessons, observations of his or her own teaching, feedback discussions, help with administrative tasks, and more. In turn, the mentee is viewed as an active learner, an agent of his or her own professional change, who makes use of these opportunities. In this regard, three assumptions of the process model provided by Kunter et al. (2013) are significant for the present study of mentoring effectiveness:

1. The *quality* of learning opportunities, such as mentoring, is crucial for successful professional development of beginning teachers.

2. The uptake of a given learning opportunity is *moderated* by individual cognitive and non-cognitive characteristics that beginners bring into the program.
3. *Contextual characteristics* of the beginning teachers' supervisory school affect the learning opportunity and its uptake.

These assumptions are well in alignment with the notion of school-based mentoring as a 'dyad in a context' that has been developed earlier (see section 2.4). Firstly, the mentor's approach to his or her mentoring practice has been shown to vary, and this variation has implications for the beginners' development (e.g., Wang & Odell, 2002). Secondly, the mentee's prior beliefs about teaching can affect how he or she approaches formal education and can correspond to the mentor's approach or not, which influences how both collaborate and learn in the relationship (cf. Hobson et al., 2009).[2] Thirdly, social and institutional characteristics of the training school and its staff shape the nature of mentoring and intertwine with the mentor-mentee collaboration (cf. Lee & Feng, 2007); mentoring is furthermore less effective if it is not well coordinated with other elements of an induction program (Hascher et al., 2004).

With regards to the development of professional competence and practice, mentoring appears as capable of contributing to all aspects of competence as well as the instructional practice of beginning teachers (cf. section 2.3), even though little is known with regards to the promotion of self-regulation skills. Moreover, the quality of beginners' mentoring experience has implications for 'teacher outcomes' as conceptualized in the process model, such as their occupational well-being. While it has also been shown that high-quality teacher mentoring is associated with higher achievement of the mentored teachers' students (Evertson & Smithey, 2000), 'student outcomes' as postulated within the model by Kunter et al. (2013) are beyond the scope of the present investigation.

[2] While some studies have investigated the change of beginning teachers' professional beliefs in the course of their induction and how mentoring relates to this change (e.g., Voss & Kunter, 2020), the present PhD project focuses on initial beliefs as a characteristic brought into the teacher preparation program and how these beliefs interact with mentoring as a learning opportunity.

4. Research Aims of the Present Studies

Three empirical studies were conducted as part of the present PhD project to further our understanding of successful mentoring support for beginning teachers and the conditions for this success. In general, each of the studies intends to make a distinct contribution with respect to the project's guiding research questions as follows.

Question 1: *How favorable are distinct approaches to mentoring beginning teachers with regard to the beginners' professional development and well-being?*

Regarding the consequences of mentoring approaches, study 1 will focus on mentees' well-being, investigating how constructivist- and transmission-oriented mentoring interactions relate to levels of emotional exhaustion, competence support, and autonomy support experienced by the beginners. Study 2 will concern itself with the effects of these two qualities of mentoring on aspects of their mentees' motivation and self-regulation as part of their professional competence. Study 3 complements these first two analyses by including various aspects of beginning teachers' generic pedagogical knowledge and determining how these are associated with the beginners' experience of support.

Question 2: *How do additional factors within and beyond the mentor-mentee dyad influence the effectiveness of mentoring support during induction?*

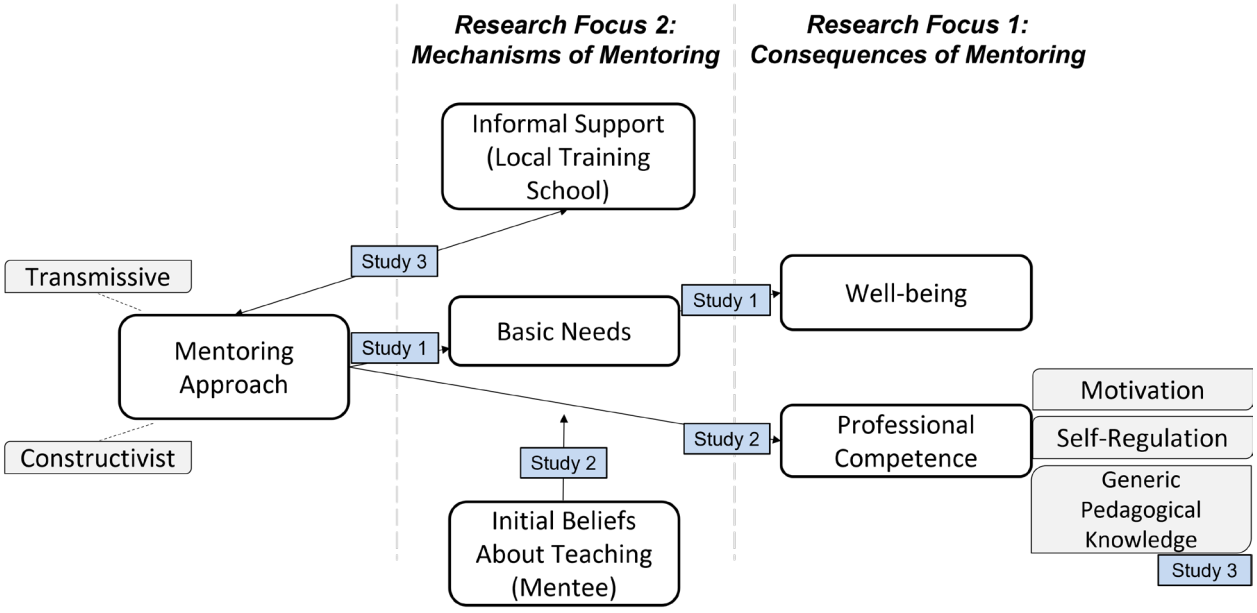
As a second aim, the present PhD project sets out to shed light upon the "mechanisms through which mentoring works (i.e. whether there are any mediators or moderators between mentoring and distal outcomes like job satisfaction)[, which] have not been well examined" (Wanberg et al., 2003, p. 51). To improve our insight into these mechanisms within the effectiveness of teacher mentoring, study 1 will disentangle the effects of mentoring approaches on emotional exhaustion in a mediation framework by drawing on Self-Determination Theory and the embedded concept of basic needs (Deci & Ryan, 2002). In addition, study 2 will consider the influence of beginners' prior beliefs about teaching and learning on the effects of constructivist-

and transmission-oriented mentoring within a moderation analysis. Finally, study 3 will explore the interplay of formal mentoring and informal sources of support beyond the mentor-mentee dyad, including novice peers and experienced colleagues as providers of support that surround the mentoring arrangement at the beginning teachers' supervisory school.

Figure 3 visualizes the respective scopes of the three present studies in relation to the project's overarching research foci. In the following, the research aims of each study will be outlined amid the background of the pre-existing evidence base and the implications of the model representations that have been presented in chapters 2 and 3.

Figure 3

Working Model of the Present PhD Project



4.1 Goals of Study 1: Determining Mediative Processes in Mentoring's Benefits for Beginning Teachers' Well-being

The first study contributes to the field of research on teacher mentoring by comparing the potential of constructivist- and transmission-oriented mentoring to buffer against beginning teachers' emotional exhaustion during induction, a reverse indicator of their psychological well-being. Therein, its focus lies on determining the processes potentially involved in mediating the respective effects of both mentoring approaches. Regarding the model representations presented above, the study is thus concerned with the quality of mentoring as a learning opportunity and, moreover, the pathways that lead to variation in an important, health-related teacher outcome and aspect of burnout (Maslach et al., 1986).

The few investigations that have discriminated between distinct qualities of school-based mentoring have indicated the benefits of constructivist-oriented practices for beginners' professional development and well-being, and find that transmission-oriented, directive approaches remain largely ineffective in this regard (Linninger, 2016; Richter et al., 2013; Voss et al., 2017; cf. Wang & Fulton, 2012). At the same time, little is yet known with regards to intrapsychic mechanisms that would explain the difference between both approaches' effects on novices' well-being. Therefore, study 1 draws on Self-Determination Theory (Deci & Ryan, 2002) and proposes the inherent needs for competence and autonomy of the beginning teachers as explanatory variables implicit in the effects of both mentoring approaches (cf. Hofmann & Springer, 2014). In the framework of an integrated, mediational working model, the assumed associations are put to the test applying structural equation modeling. The study's analyses are based on self-report data of beginning teachers undergoing their post-university practical training for teaching on primary or secondary level as foreseen by state regulations in a region of Germany. The selected data stem from an online survey conducted within a larger research project that was dedicated to evaluating this practical training phase organized by the state

(Imhof et al., 2020).[3] Via this methodology, the first study addresses the following, specific research questions:

(1) Are the distinct mentoring approaches introduced earlier capable of eliciting feelings of competence and/or autonomy in beginning teachers?

(2) Can the specific capability to support intrinsic needs explain differences between their respective influence on well-being that have been observed (Richter et al., 2013)?

4.2 Goals of Study 2: On the Effectiveness of Mentoring Regarding Beginners' Motivation and Self-Regulation, and the Role of Mentees' Prior Beliefs

The second study firstly seeks to deepen our knowledge of mentoring practices that may foster the mentees' professional self-efficacy as part of their motivation, and promote adequate emotional management as part of their self-regulation. While a range of studies have yielded evidence that support by a mentor increases beginning teachers' self-efficacy, many investigations focus solely on the university-related teaching practicum (e.g., Fives et al., 2007; Klassen & Durksen, 2014), do not discriminate clearly between different approaches to mentoring (e.g., Kutsyuruba et al., 2019), or investigate mentoring and its correlates via essentially cross-sectional designs (cf. Richter et al., 2013). With regards to emotional management, the somewhat traditional neglect of emotions within formal teacher education is still flanked by a scarcity of findings on how mentors may aid their mentees in dealing with unpleasant emotions in everyday work (cf. Hawkey, 2006; Meyer, 2009). The present study addresses these issues in the literature, determining the influence of constructivist- and transmission-oriented mentoring on beginning teachers' self-efficacy and emotional surface

[3] The evaluation of the post-reform practical teacher training phase was commissioned by the state ministry of science, continuing education, and culture in Rhineland-Palatinate, Germany, and implemented by a project team from Mainz University under the leadership of Prof. Margarete Imhof in 2017, with a survey period from 2017 to 2019.

acting in a longitudinal investigation.[4] Referring back to the model framework provided by Kunter et al. (2013), study 2 is once more concerned with mentoring as a learning opportunity of varying quality and complements study 1 by examining its consequences for beginners' motivation and self-regulation as two aspects of their professional competence. In addition, study 2 considers the role of beginning teachers' prior beliefs about teaching and learning in their experience of constructivist and transmissive mentoring, thus investigating how a personal characteristic of the learner may moderate the uptake of a learning opportunity (cf. Kunter et al., 2013; also see Figure 2). As these prior beliefs can be differentiated by the learning theory they adhere to, i.e., constructivist- and transmission-oriented (cf. Baumert & Kunter, 2006), they may or may not match with the approach a mentor takes to shaping the learning interactions with their mentee. While some researchers have argued that a match between the educator's and the educated's beliefs may be helpful for their collaboration (cf. He & Levin, 2008), research in this regard is still largely absent (Hobson et al., 2009). Therefore, study 2 will include the mentees' beliefs about teaching and learning in an exploratory part of its investigation. The study's moderated regression analyses will be based on a second subset of data on beginning teachers in their post-university induction phase that participated in the afore-mentioned, larger evaluation survey, covering two assessment periods and allowing for a longitudinal investigation of the presumed effects. In applying this design, study 2 is guided by the following research questions:

(1) To what extent can constructivist and transmissive mentoring promote professional self-efficacy and reduce the amount of emotional surface acting among beginning teachers?

[4] Surface acting denotes an emotion regulation strategy that aims at modifying facial expressions to either hide or feign emotions in order to meet professional demands (Hochschild, 2012). Not only in the teaching context, it is considered as maladaptive and associated with stress and exhaustion. The concept will be further outlined within the scope of study 2 in chapter 6.

(2) What are the consequences of a match versus a mismatch between a mentor's and a mentee's beliefs about teaching and learning for the professional development of the mentee during teacher induction?

4.3 Goals of Study 3: Exploring the Interplay of Formal Mentoring Support and Informal Support and its Consequences for Beginners' Professional Development

Study 3 focuses on constructivist- and transmission-oriented mentoring and their relation to further sources of support that surround the mentor-mentee dyad at the beginning teachers' training school. The study investigates the interplay of experiences of formalized support by assigned mentors and spontaneous, non-formalized support by experienced colleagues and novice peers, and examines the consequences for beginning teachers' professional development and well-being. Informal teacher collaboration therein is considered as a socio-contextual characteristic of the supervisory school, as postulated within the process model of professional development outlined earlier, and its interaction with school-based mentoring as a learning opportunity is explored (cf. Kunter et al., 2013). Moreover, study 3 complements the present investigation of mentoring consequences, as it determines how formal and informal support relate to specific domains of beginning teachers' generic pedagogical knowledge, i.e., their instructional, classroom management, and assessment knowledge.

Following the approach described above, the present study aims at contributing to the scientific discourse on mentoring in multiple ways. Firstly, past studies on the effectiveness of teacher mentoring have commonly concentrated on well-being-related and motivational consequences for beginning teachers, while only few have included professional knowledge or teaching skills as an outcome (cf. Hobson et al., 2009). Secondly, although studies have indicated that peers and colleagues are significant providers of support for beginning teachers as well (e.g., Herman et al., 2019; Richter, Kunter, Lüdtke, et al., 2011), little is yet known

regarding the interrelation between formal mentoring and informal support as a contextual factor during teacher preparation. In this regard, it has been argued that informal interaction partners may compensate for a beginners' negative formal mentoring experience, and furthermore complement the support provided by assigned mentors (Desimone et al., 2014). Consequently, researchers have asserted that formal and informal forms of support should be combined to best support beginning teachers' development (e.g., Shirrell et al., 2019). Following these considerations, study 3 takes a person-centered approach to identify typical patterns of formal mentoring and informal support in an exploratory framework and examines between-pattern differences regarding beginning teachers' pedagogical knowledge, self-efficacy, and emotional exhaustion. The associated latent class analysis is, as in studies 1 and 2, based on self-report data of beginning teachers undergoing post-university induction in a state of Germany. The following set of research questions is addressed by study 3:

(1) How do beginning teachers perceive the quality of their mentoring support, their peer support, and the support provided by their colleagues at the training school? Can distinct patterns of formal and informal support be identified that characterize different subgroups of beginning teachers undergoing induction?

(2) Do the identified subgroups differ with regards to their generic pedagogical knowledge, their teacher self-efficacy, and their emotional exhaustion?

(3) Do formal mentoring support and informal support complement each other? Can they compensate for each other?

5. Mentoring Styles and Novice Teachers' Well-being: The Role of Basic Need Satisfaction (Original Study 1)

Burger, J., Bellhäuser, H., & Imhof, M. (2021). Mentoring styles and novice teachers' well-being: The role of basic need satisfaction. *Teaching and Teacher Education, 103,* 103345. https://doi.org/10.1016/j.tate.2021.103345

Abstract

School-based mentoring is a key component of support during the challenging teacher induction phase, but different counseling approaches vary in their effectiveness in fostering novices' well-being. This study investigates effects of two distinct mentoring approaches on emotional exhaustion by considering their potential to address mentees' basic needs. Data stem from 579 beginning teachers enrolled in the German practical training period. Structural equation modeling indicates that constructivist-oriented mentoring lowers levels of exhaustion by supporting mentees' autonomy need satisfaction. Results do not indicate an effect of transmission-oriented mentoring on mentees' well-being. Implications for mentoring practice and future directions are discussed.

Keywords

mentoring, teacher well-being, beginning teacher induction, emotional exhaustion, self-determination theory, psychological needs

5.1 Introduction

Beginning teachers' entry into teaching practice is frequently characterized as a challenging and psychologically demanding phase (Chang, 2009a; Clandinin et al., 2015; Gold, 1996; Taylor et al., 2019). High stress and exhaustion levels experienced by novice teachers ("reality shock"; Dicke, Parker, et al., 2015; Friedman, 2000; Voss et al., 2017) result from a plethora of demands, such as classroom disturbances (Dicke et al., 2018), communication with parents (Veenman, 1984), and time pressure (Skaalvik & Skaalvik, 2017). These may lead to the perception of one's own competences as insufficient (Tynjälä & Heikkinen, 2011), negative emotions and, ultimately, leaving the profession (Harmsen et al., 2018; Scheopner, 2010). In the face of increasing attrition rates among early career teachers (Ingersoll & Smith, 2003; OECD, 2005), researchers have urged policy makers in the context of teacher education to implement support structures that foster early career teachers' health and, ultimately, retention (Callahan, 2016; Howe, 2006; Ingersoll & Kralik, 2004; Prilleltensky et al., 2016).

School-based mentoring has become a prominent form of support during practical teacher training worldwide (Howe, 2006). Prospective teachers consider this relationship among the most essential resources during the induction phase (Marable & Raimondi, 2007). Regarding the benefits of mentoring programs for novice teachers, studies have found positive effects on, e.g., motivation (Klassen & Durksen, 2014), job satisfaction (Ingersoll & Strong, 2012), classroom practice (Evertson & Smithey, 2000; Stanulis & Floden, 2009), and well-being (Richter, Kunter, Lüdtke, et al., 2011; Voss et al., 2017). As a consequence, mentoring has repeatedly been emphasized as an essential component of high-quality teacher induction and a key factor to retention in the early teaching career (Callahan, 2016; Hobson et al., 2009; Ingersoll & Strong, 2011; Pirkle, 2011; Smith & Ingersoll, 2004).

However, not every kind of mentoring interaction is per se beneficial for beginning teachers (Wang & Fulton, 2012). Overly judgmental forms can even harm mentees' self-esteem

and mental health (Hobson & Malderez, 2013; Maguire, 2001). Thus, when conducting research on the effects of mentoring on novice teachers, it is essential to consider qualitative differences in a mentor's counseling style that manifests itself during interactions with the mentee (Hobson et al., 2009; Ingersoll & Strong, 2011). Still, few empirical studies in this field have distinguished between distinct mentoring approaches and established their respective effect upon the prospective teacher's health and competence. Furthermore, while there is initial evidence of the positive influence on prospective teachers' well-being engendered by certain mentoring styles, little is yet known about the intrapsychic mediation processes that could explain why some mentor-mentee interactions appear more beneficial than others (Richter et al., 2013).

In this study, we aim to contribute to the understanding of qualitatively distinct mentoring styles by investigating their effects on beginning teachers' health and exploring the inner processes involved in a mediational framework. The following section will first outline central mentoring concepts that apply to the context of teacher induction, before recent findings on their implications for and effects on mentees' well-being are briefly reviewed. To explore the mechanisms underlying these effects, we will then adopt a mediation model framework by drawing on Self-Determination Theory (Deci & Ryan, 2008b) and acknowledge recent findings on the role of basic needs in teacher training.

5.2 Theoretical Background

5.2.1 Concepts of Mentoring

In the context of practical teacher training, a mentor is typically an experienced teacher assigned to a novice (the mentee) entrusted with the task to "support the mentee's learning, development and well-being" (Hobson, 2017, p. 335), as well as "to observe and provide the new teacher with instructional support and feedback" (Pirkle, 2011, p. 43). Instructional support aims at enhancing a broad set of skills prospective teachers rely on to successfully manage lesson planning, classroom interactions, diagnostic assessment, and other job-related tasks (Gold, 1996). Distinguished from psychological support (i.e., confidence building and buffering mentees' self-esteem against ego threats, negative experiences, and isolation; Gold, 1996) and role modeling (i.e., the shaping and development of a professional identity; Richter et al., 2013), instructional support represents one of three central goals of novice teacher mentoring. To foster professional competence and buffer against emotional strain, the quality of instructional support and feedback is crucial (e.g., Hobson, 2017), and may even be of higher importance than its frequency (Richter et al., 2013).

To conceptualize instructional support as a central component of educative mentoring, this article builds upon a theoretical framework provided by Richter et al. (2013). Drawing on learning theory paradigms and integrating two analogous models of mentoring introduced by Feiman-Nemser (2001) as well as Cochran-Smith and Paris (1995), the authors distinguish between transmission-oriented (synonymous: transmissive) mentoring and constructivist-oriented (synonymous: constructivist) mentoring as two qualitatively distinct approaches that shape learning processes in mentor-mentee interactions. A transmission-oriented mentoring style is based on a behaviorist concept of learning, in the sense that knowledge is provided by and transferred from an expert to a rather passive novice in a directive, unidirectional way. Meanwhile, constructivist-oriented mentoring implies collaborative reflection and inquiry with

an understanding of learning as a bidirectional and mutual process (Cochran-Smith & Paris, 1995; Feiman-Nemser, 2001; Richter et al., 2013; Wang & Odell, 2002). Therefore, the latter is reflective of a constructivist learning theory, viewing the mentee as an actively organizing individual that adds, rearranges, and interconnects new experience to existing declarative and procedural knowledge in a dynamic way. In alignment with this qualitative distinction, Hofmann and Springer (2014) differentiate between informatory and controlling aspects of mentor communication. Controlling aspects establish a rather asymmetric relationship between mentor and mentee via, e.g., externally setting developmental goals and the use of reinforcement and sanctions during the learning process. In contrast, informatory aspects allow for cooperation on equal terms by providing constructive feedback, free choice and mutual problem-solving (Hofmann & Springer, 2014). Thus, in the constructivist approach (Richter et al., 2013) and during informatory-colored interactions (Hofmann & Springer, 2014) respectively, a mentor teacher acts as a ‘co-thinker’ to the novice (Feiman-Nemser, 2001; Wang et al., 2008).

According to various authors, the approach a mentor teacher takes to shape counseling and instructional processes with his or her mentee can have specific effects on the novice’s success and preservation of well-being during the often challenging process of professionalization (Feiman-Nemser, 2001; Hobson, 2017; Hofmann & Springer, 2014; Howe, 2006; Lindgren, 2005). However, while a large body of evidence underlines the potential benefits of mentoring within induction for early career teachers’ mental health and retention, few studies distinguish between different qualities of mentoring support within their analyses. The following section provides a brief overview on recent findings regarding early career teacher mentoring and emotional exhaustion, a prominent reverse indicator of teacher well-being in the international literature and a central component of burnout (Gold et al., 1992; Maslach et al., 1986; Uitto et al., 2015).

5.2.2 Effects of Mentoring on Emotional Exhaustion

Mentoring support during the demanding transition from university life to a full teaching position has been shown to buffer against emotional exhaustion (Kessels, 2010; Richter, Kunter, Lüdtke, et al., 2011). In line with this, mentoring has been found to reduce attrition rates among beginning teachers (Ingersoll & Strong, 2011), as leaving the profession has been viewed as a consequence of high exhaustion (Jalongo & Heider, 2006) and lack of mentoring support (Darling-Hammond, 2003; Ingersoll & Smith, 2003). In contrast, mentors can also affect early career teachers' well-being negatively, by provoking rather maladaptive face-saving reactions by their mentees via critical feedback (Bjørndal, 2020), by being generally unavailable for their mentees (Oberski et al., 1999; Smith & McLay, 2007), or engaging in judgmental and overly critical forms of feedback ('Judgementoring'; Hobson & Malderez, 2013). Adding to these ambiguous findings, results of a mixed-method study by Klassen and Durksen (2014) were twofold: incidents of miscommunication, expression of high expectations and negative feedback were linked to increased stress levels among prospective teachers in a teaching practicum, whereas positive assistance and informational help was valued (Klassen & Durksen, 2014).

Considering distinct types of instructional mentor support in the induction phase, Richter et al. (2013) were able to demonstrate beneficial effects of mentoring that follows constructivist principles on emotional exhaustion and motivational outcomes in a longitudinal study; in contrast, transmission-oriented mentoring did not exhibit an impact on participants' well-being or motivation. Consistent with this, Voss et al. (2017) found a buffering effect of constructivist-oriented mentoring on the increase of emotional exhaustion in early career teachers over the course of one year. Collaborative reflection, as stimulated in the constructivist-oriented approach, has yielded direct positive associations with prospective teachers' mental health as well (Linninger, 2016; Soini et al., 2016).

To conclude, there is sound evidence for a positive influence of school-based mentoring on beginning teachers' well-being in the demanding transition phase from university training to full teaching load. However, a large body of research on mentoring and mentees' health relies on qualitative data and case studies (Hoffman et al., 2015; Orland-Barak, 2014), while quantitative, correlational investigations are rather scarce. Moreover, there is only preliminary evidence with respect to the specific communicational skills and strategies mentors require to effectively promote learning and personal growth in their mentee (Wang et al., 2008; Wang & Fulton, 2012). Also, as has been stated earlier, little is known about the actual intrapsychic mechanisms that mediate the effects of some mentoring support forms (e.g., constructivist-oriented mentoring) on well-being, and hence could explain the difference in how beneficial specific forms of instructional support are for mentees' emotional stability (Richter et al., 2013). To explore these mechanisms in the framework of a mediation model, we draw on Self-Determination Theory (Deci & Ryan, 2002) and its conceptualization of universal intrinsic needs. After an introduction of the theoretical assumptions and their implications regarding the two mentoring approaches outlined earlier, findings on the importance of basic need satisfaction in novice teacher training are briefly reviewed.

5.2.3 Mentoring and Basic Need Satisfaction

Self-Determination Theory (SDT; Deci & Ryan, 2002) states that individuals have a genuine, inherent tendency towards personal growth and productive self-actualization, constantly forging interconnections with surrounding elements of their social, educational or work-related environments in the process. Embedded in this macrotheory of human motivation, development, and health, Cognitive Evaluation Theory (CET; Ryan & Deci, 2000) posits three universal basic needs for competence, autonomy, and social relatedness. SDT states that the fulfillment of these needs is crucial for "integrated and vital human functioning" (Deci & Ryan, 2002, p. 6) in a given social or employee context. Hence, to preserve their well-being, to foster

intrinsic motivation, as well as to stimulate personal or professional development, people need to firstly perceive their self as effective in and capable of accomplishing their tasks in a given context. Secondly, they need to be able to organize their behavior and, possibly, problem-solving in an autonomous way, i.e., not feeling like a pawn that is instrumentalized by other individuals or institutions that uphold values that he or she cannot identify with, and instead perceiving themselves as the true initiator of their performance (Hofmann & Springer, 2014). Lastly, it is stated that individuals have a general need for social relatedness to their contextual group, team, co-workers or department, a feeling of belonging, acceptance, and human interconnectedness.

According to SDT, satisfaction of these needs should be an essential prerequisite for novices' professional development during practical teacher training and the preservation of well-being in this challenging process. The promotion of professional competence is a major objective of teacher induction, and higher competence, in turn, is associated with well-being (Klusmann et al., 2012). Yet, as novices to the profession, beginning teachers necessarily lack practical experience and may therefore face distress-evoking classroom-related situations (Chaplain, 2008). Hence, an initial perception of oneself as lacking the competence needed for the job is likely (Tynjälä & Heikkinen, 2011). Furthermore, novice teachers in practical training need to develop their own authentic and autonomous way of performing in classrooms, e.g., selecting methods and instructional techniques that they see fit, to improve their teaching quality (Blömeke & Klein, 2013) and preserve their mental health (Pearson & Moomaw, 2005). At the same time, they depend on external feedback and evaluation from their supervisors, they may be required to adapt their teaching according to this feedback, and they may face a mentor that guides them closely (Richter et al., 2013) or even engages in heavy criticism towards their in-class performances (Hobson & Malderez, 2013). Finally, fulfillment of their need for

relatedness requires them to adapt to a yet unfamiliar school context, a heterogeneous teaching staff and its implicit social rules.

In CET, environmental factors can be characterized by the degree to which they foster or thwart the satisfaction of essential, intrapsychic needs (Deci & Ryan, 2002). While need fulfillment will most likely result in engagement, initiative, joy, and productive self-development, hindered need satisfaction will contrarily entail demotivation, negative affect, lack of growth, and self-alienation.

From a CET perspective, the qualitatively distinct forms of instructional mentoring support introduced earlier in this section can thus be characterized as social-contextual factors in a prospective teacher's environment of professional and personal development. Drawing on the theoretical implications of the aforementioned mentoring concepts (Cochran-Smith & Paris, 1995; Feiman-Nemser, 2001; Hofmann & Springer, 2014; Richter et al., 2013), it can be hypothesized that the two approaches should promote fulfillment of the mentee's intrinsic needs to a varying degree, ultimately exhibiting a stronger or lesser effect on his or her well-being. Regarding transmission-oriented mentoring, the direct provision of knowledge and expertise associated with this approach (Richter et al., 2013) may successfully address the mentee's need for competence. However, the unidirectional and behaviorist nature of this provision, the orientation towards best-practice examples, and the close and directive guidance of a rather passively acting novice is unlikely to encourage autonomous problem-solving and performance (Beck & Kosnik, 2000; Yuan, 2016). In contrast, constructivist-oriented mentoring should be effective in allowing mentees an appropriate degree of autonomy as it encourages collaborative reflection and inquiry, recognizes the diversity of solutions to a given problem or situation, and withstands judgmental feedback (Feiman-Nemser, 2001). In line with this argument, Ryan and Deci (2000) state that "choice, […], and opportunities for self-direction […] allow people a greater feeling of autonomy" (p. 70). Furthermore, mentees'

expressed ideas, current strategies, and attitudes are valued and integrated into constructivist coaching interactions, and thereby, expectations of competence on the mentee's side may be heightened as well. With respect to the need for social relatedness, we do not assume a substantial impact of mentor-mentee interactions, as the mentoring relationship assessed in this study is formally arranged and, therefore, professional by nature. Satisfaction of this particular need should result from rather informal relationships and interactions, such as positive experiences with colleagues (Struyve et al., 2016).

5.2.4 Findings on Basic Need Satisfaction in Teacher Education

The critical role of basic need satisfaction regarding well-being and professionalization in teacher training has been emphasized repeatedly (Aelterman et al., 2016; Holzberger et al., 2014; Korthagen & Evelein, 2016; Uzman, 2014). In a diary study, Aldrup et al. (2017) demonstrated how daily in- and outside class stressors thwarted beginning teachers' satisfaction of the needs for competence and relatedness, which in turn resulted in heightened exhaustion levels and reduced work enthusiasm. This stands in line with previous findings by Bartholomew et al. (2014), who found hindered basic need satisfaction to mediate the link between job pressure and ill-health, the need for autonomy emerging as the strongest predictor of emotional exhaustion within the analysis. Consequently, when the school environment is in turn perceived as autonomy-supportive, this leads to greater adaptability and lower emotional exhaustion of experienced teachers (Collie et al., 2018). However, fulfillment of the three basic needs seems to be more difficult for student teachers compared to more experienced colleagues (Evelein et al., 2008), and thwarted vs. satisfied needs have an impact on positive and negative affect in student teachers likewise (Hagenauer et al., 2018).

While the relevance of intrinsic need fulfillment for early career teachers' mental health is undoubted, much less is known regarding environmental conditions that may promote (or diminish) it during induction. In a recent meta-synthesis by Dunst et al. (2019), school-based

mentoring was associated with higher quality teaching and improved beginning teachers' sense of preparedness to teach. A lack of a sense of competence, in turn, has been associated with emotional exhaustion (Kaplan & Madjar, 2017). Moreover, autonomy support by a university supervisor has been shown to lower exhaustion and depersonalization of student teachers during teaching practicum (Fives et al., 2007). Underlining faculty instructors' general potential to address the need for autonomy, Gonzalez et al. (2018) found autonomy-supportive teaching styles to enhance self-perceived competences and teacher self-efficacy in prospective teachers. Moreover, in a non-educative context, supervisory mentoring enhanced basic need satisfaction in a sample of work newcomers from different organizations (Wang et al., 2018).

5.2.5 Research Questions and Hypotheses

The empirical findings outlined above highlight the importance of successful need satisfaction for early career teachers' well-being during the practical training period. Meanwhile, little is yet known regarding the potential of certain supportive structures within the induction phase to satisfy these needs. Are the distinct mentoring approaches introduced earlier capable of eliciting feelings of competence and/or autonomy in beginning teachers? And can the specific capability to support intrinsic needs explain differences between their respective influence on well-being that have been observed (Richter et al., 2013)?

To address these research questions, the present study investigates the association between two qualitatively different forms of instructional mentoring support, satisfaction of the needs for autonomy and competence, and emotional exhaustion in a mediational framework. Building upon the theoretical assumptions and previous empirical findings as outlined above, we hypothesize the following with regards to our sample of beginning teachers undergoing induction:

H.1 Constructivist-oriented mentoring lowers emotional exhaustion in novice teachers.

H.2 Transmission-oriented mentoring lowers emotional exhaustion in novice teachers (to a lesser degree than constructivist-oriented mentoring).

H.3 The effect of constructivist-oriented mentoring on emotional exhaustion is mediated by autonomy need support.

H.4 The effect of constructivist-oriented mentoring on emotional exhaustion is mediated by competence need support.

H.5 The effect of transmission-oriented mentoring on emotional exhaustion is mediated by competence need support.

H.6 Transmission-oriented mentoring is not associated with support of the need for autonomy.

5.3 Methods

5.3.1 Participants and Procedures

The database used for this study's analysis stem from an online survey commissioned by the ministry of science, continuing education, and culture in a federal state ('Bundesland') in Germany, with the intent to evaluate the post-reform practical training phase of beginning teachers (Imhof et al., 2020). After graduation from their educational masters studies at university, prospective teachers complete a federal state-specific, 18 month-long in-service training before obtaining their final teaching license. This so-called 'Vorbereitungsdienst' offers a broad range of practical, classroom-related learning opportunities at an assigned supervising school, as well as continuous specialization in subject-related and general pedagogical theory courses at specific teacher training institutions. Moreover, it involves the formal assignment to a regular mentor teacher at the supervising school, who usually shares one (or both) subjects with his or her mentee, supports during in-class practical training, and participates in evaluative feedback meetings formally arranged by representatives of the training institution in accordance with the curriculum of the training phase.[5]

The data used for this study reflect beginning teachers' appraisals on entering their second trimester of practical training (i.e., in the 6th to 8th month of 18 months in total) for teaching at primary level (26%) or secondary level (74%). Data were obtained anonymously at every teacher training institution in the federal state (30 in total) via an online self-report questionnaire presented during course attendance. Participation was voluntary and without monetary compensation. Due to the repeated-measurement design of the research project, the sample used in the present analyses consists of four cohorts, each participating in the second

[5] As defined in Rhineland-Palatinate's state regulation 'Landesverordnung über die Ausbildung und Zweite Staatsprüfung für das Lehramt an Grundschulen, an Realschulen plus, an Gymnasien, an berufsbildenden Schulen und an Förderschulen' [State Regulation on Teacher Training and Certification for Teachers in Primary Education, Lower Secondary Education, Upper Secondary Education, Vocational Education, and Special Education], which became effective on January 3, 2012.

trimester of their practical teacher training during one out of four measurement periods[6] within the overall project duration from autumn 2017 to spring 2019. The overall sample comprises 579 individuals with an average age of 27.6 years (*SD* = 3.4 years) and of whom 68.7% were female.

5.3.2 Measures

Independent Variables: Mentoring Styles

To assess the quality of mentoring interactions as perceived by the beginning teachers, we adapted two scales measuring constructivist- and transmission-oriented mentoring as developed by Richter et al. (2013). The scale tapping constructivist-oriented mentoring consists of four items (e.g., *"My mentor helps me to improve independently."*), whereas three items measure transmissive-oriented mentoring (e.g., *"My mentor tells me what I need to improve."*). Prospective teachers were asked to rate their interactions on a Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). Cross-validating the constructs of interest, Richter et al. (2013) demonstrate a reasonable model fit of a two-factor solution within exploratory and confirmatory factor analyses. In their study, they also correlate the mentee's ratings to self-report ratings of their corresponding mentor teachers and find a substantial overlap between estimates of both sides (Richter et al., 2013). In our study, both scales showed adequate internal consistency (constructivist-oriented mentoring: ω_T = .88; transmission-oriented mentoring: ω_T = .85; McNeish, 2018).

Mediating Variables: Basic Need Satisfaction

A German adaptation of the Basic Need Satisfaction at Work Scale (Kauper et al., 2012) was used to capture the support felt by novice teachers in satisfying their basic intrinsic needs.

[6] Cohort 1 (N = 231, *M* (age) = 27.1, *SD* (age) = 3.3, 73.2% female) participated in autumn 2017; Cohort 2 (N = 128, *M* (age) = 28.1, *SD* (age) = 4.0, 64.1% female) participated in spring 2018; Cohort 3 (N = 95, *M* (age) = 27.5, *SD* (age) = 3.2, 69.5% female) participated in autumn 2018; Cohort 4 (N = 125, *M* (age) = 28.2, *SD* (age) = 3.0, 64.8% female) participated in spring 2019.

It comprises nine items in total, a set of three each intended to capture one of the basic needs for competence, autonomy, and social relatedness. For the present analyses, only the three items constituting the subscales of competence (e.g., *"I receive precise and detailed feedback on my performance."*) and autonomy need satisfaction (e.g., *"I can manage my working tasks my own way."*) were included (six items in total). Items were rated on a four-point Likert scale from 1 (strongly disagree) to 4 (strongly agree). Reliability was acceptable for both the competence need (ω_T = .80) and the autonomy need subscale (ω_T = .77).

Dependent Variable: Emotional Exhaustion

To measure the degree of prospective teachers' exhaustion, we applied an adaptation (Kunter et al., 2017) of the German version of the Maslach Burnout Inventory (Enzmann & Kleiber, 1989). Participants rated their own degree of fatigue and lack of energy at work on a four item-scale (e.g., *"I often feel exhausted at work."*), items ranging from 1 (strongly disagree) to 4 (strongly agree). The scale showed good reliability (ω_T = .82).

5.3.3 Statistical Analysis

To investigate the relationships between the variables of interest at the latent rather than the observed level, and hence to decompose measurement variances into factor and error variances, structural equation modeling was applied (Bollen, 1989; Hox & Bechger, 1998; MacCallum & Austin, 2000). We used the Lavaan package (Rosseel, 2012) for R software (R Core Team, 2014) to specify the measurement and path models corresponding to our hypotheses, and to examine parameters and model fit. Missing data was estimated using the full information maximum likelihood approach (Abraham & Russel, 2004; Enders & Bandalos, 2001). As preliminary analyses challenged the assumption of multivariate normality, a robust estimator compatible to the applied treatment of missing values (Steinmetz, 2015) in this study was adopted to determine the model parameters (Yuan et al., 2000). A level of significance at $p < .05$ was defined for all hypothesis testing.

5.4 Results

5.4.1 Descriptives and Measurement Invariance

Means, standard deviations, and latent correlations of all variables are depicted in Table 1. Before testing the hypothetical structures and associations between latent variables, a combined measurement model including all five variables of interest was specified and demonstrated acceptable overall fit (CFI = .96, RMSEA = .05 (90% CI [.041, .055]), SRMR = .05; for cut-off value recommendations, see Hu & Bentler, 1999; Schermelleh-Engel et al., 2003). To assess the degree of measurement invariance across the four cohorts included in the analyses, we applied a stepwise method, gradually comparing nested models with added restrictions to the reference model with lesser constraints by usage of a Likelihood Ratio Test (Van de Schoot et al., 2012) While the latter indicated metric invariance ($\Delta\chi^2 = 61.3$, $p = .43$) but no scalar invariance ($\Delta\chi^2 = 55.7$, $p < .05$), the gradual change in alternative fit indices

Table 1

Descriptives, Latent Correlations, and Welch Analyses of Variance

Variable	*M* *(SD)*	Constructivist Mentoring	Transmissive Mentoring	Competence Need Support	Autonomy Need Support	Emotional Exhaustion	F_{Welch} *(df),* *p* (4 Cohorts)
Constructivist Mentoring	3.23 (.75)	1.00	.27**	.72**	.44**	-.35**	$F_{3, 259.9} = 1.73$ $p = .16$
Transmissive Mentoring	2.74 (.83)		1.00	.35**	.11	-.01	$F_{3, 253.9} = 2.06$ $p = .11$
Competence Need Support	3.23 (.67)			1.00	.55**	-.38**	$F_{3, 263.6} = 0.42$ $p = .74$
Autonomy Need Support	2.86 (.75)				1.00	-.60**	$F_{3, 263.3} = 1.51$ $p = .21$
Emotional Exhaustion	2.23 (.79)					1.00	$F_{3, 267.2} = 1.62$ $p = .19$

Note. ** Latent correlations significant at $p < .001$. *F*- and *p*-values in the last column correspond to Welch analyses of variance across the four cohorts included in our sample.

provoked by the growing restrictions across all models was small (e.g., ΔCFI <.005; see Cheung & Rensvold, 2002; Meade et al., 2006). Thus, the results support the claim that factor loadings of the included indicators across groups are comparable and therefore, investigations of overall latent correlations across subgroups are enabled. Moreover, the small change in absolute fit indices (CFI and RMSEA) may even reflect scalar and strict invariance, respectively, as the Likelihood Ratio Test is strongly affected by sample size (Meade et al., 2008; Schermelleh-Engel et al., 2003). In addition, we thus conducted Welch analyses of variance (Delacre et al., 2019) for all variables to further investigate mean structures across the cohorts, and results warranted no attention (also see Table 1). Consequently, data from all cohorts were integrated and the mediation model was applied to the overall data set.

5.4.2 Mediation Analyses

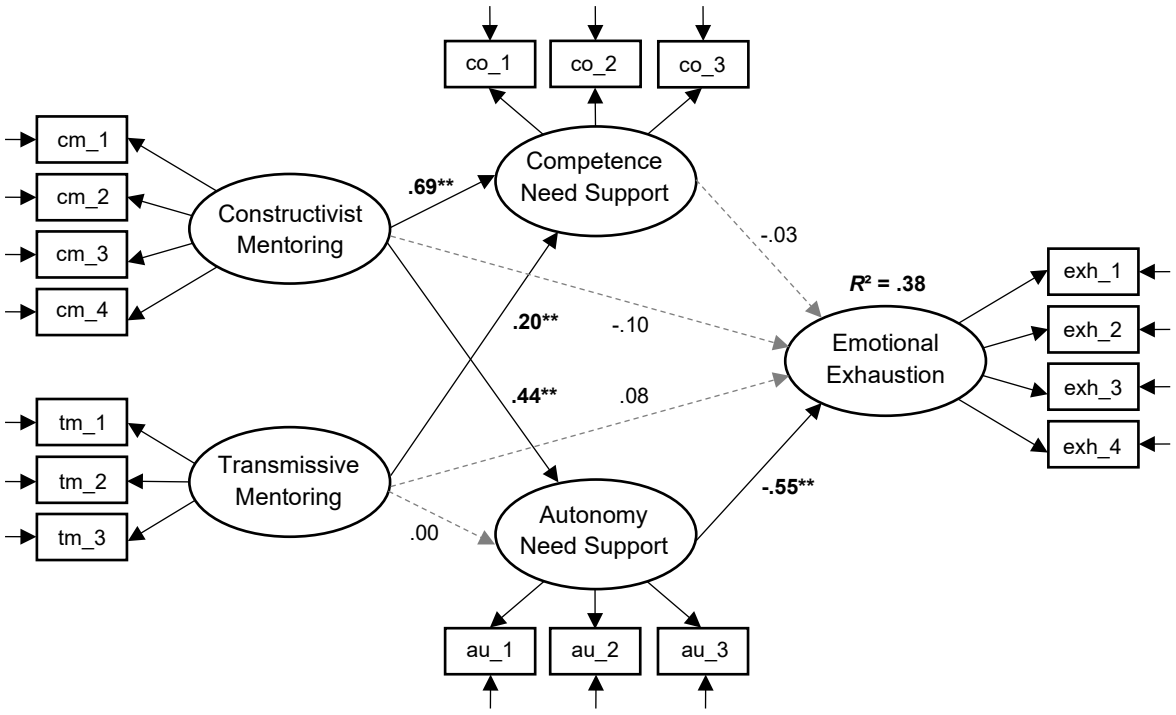
We tested our hypotheses in a saturated mediational path model that comprises two independent variables, two mediators, and one dependent variable (see Figure 4). Within this model, we treated constructivist- and transmission-oriented mentoring as independent factors (also see Richter et al., 2013), fixing their covariance to zero to facilitate direct, indirect, and total effect estimations with regards to the mediation analyses. The latent (error) covariance of our mediating variables, competence and autonomy need support, was specified to vary freely, taking into account further variables that may explain additional shared variance beyond the independent variables in our model, but that could not be included in the current analyses.

The estimated model displayed a reasonable fit (CFI = .96, RMSEA = .05 (90% CI [.045, .059]), SRMR = .08) and explained 38% of the variance in emotional exhaustion (Figure 4). Along the specified indirect pathways, constructivist-oriented mentoring exhibited a meaningful indirect effect on emotional exhaustion via autonomy need support, in accordance with hypotheses 1 and 3 (β = -.24, p < .001). Beyond this, the independent variable was not directly associated with exhaustion anymore (β = -.10, p = .15). While transmission-oriented

mentoring showed no effect on autonomy need support (in alignment with hypothesis 6; β = .00, p = .98), both predictors were positively associated with competence need support. However, in contrast to the significant latent correlation that was obtained initially (r = -.38, p < .001), competence need support was no longer associated with emotional exhaustion (β = -.03, p = .74) in the combined mediation model that included autonomy need support simultaneously. Thus, contrary to hypotheses 2 and 5, neither an indirect nor a direct effect of transmission-oriented mentoring on emotional exhaustion could be obtained in this model. Furthermore, competence need support failed to mediate the significant effect of constructivist mentoring on exhaustion (in contrast to hypothesis 4). In accordance with the

Figure 4

Combined Measurement and Path Model



Note. For reasons of parsimony, factor loadings, error variances and latent (co-)variances are not displayed. Regression weights are completely standardized and, if presented in bold, significant at p < .001.

obtained latent correlations, constructivist mentoring displayed a negative total effect (specified as the sum of the direct effect, and both specified indirect effects; $\beta = -.36$, $p < .001$), whereas transmission-oriented mentoring showed no meaningful total effect ($\beta = .07$, $p = .15$). Table 2 provides the direct, indirect, and total effect estimates obtained within the mediation analysis.

Table 2

Indirect, Direct, and Total Effects of Mentoring Styles on Emotional Exhaustion

IV	MV	DV	*ab*	ab_{ps}	ab_{cs}	*c*'	*c*
cm	bn-co	emo-exh	-.02	-.02	-.02	-.10	-.36**
cm	bn-au	emo-exh	-.25**	-.24**	-.24**	-.10	-.36**
tm	bn-co	emo-exh	-.00	-.01	-.01	.08	.07
tm	bn-au	emo-exh	-.00	-.00	-.00	.08	.07

Note. IV = independent variable, MV = mediator variable, DV = dependent variable, *ab* = unstandardized indirect effect, ab_{ps} = partially standardized indirect effect, ab_{cs} = completely standardized indirect effect, *c*' = direct effect, *c* = total effect; cm = constructivist mentoring, tm = transmissive mentoring, bn-co = competence need support, bn-au = autonomy need support, emo-exh = emotional exhaustion. **$p < .001$.

To further assess the strength of the obtained indirect effect with regards to our proposed mediators, we conducted a likelihood ratio test and compared the original model to a restricted version in which the direct effect of constructivist-oriented mentoring on emotional exhaustion was fixed to zero. With $\Delta\chi^2 = 1.98$ ($p = .16$), the restricted model did not demonstrate a worse fit than the unrestricted model, indicating (in accordance with the observation of a non-significant direct effect in the unrestricted model) a full mediation of autonomy need support in the current analysis.

5.5 Discussion

5.5.1 The Present Study

The present study investigated relationships between two qualitatively distinct mentoring approaches, the experience of basic need fulfillment and emotional exhaustion during early career teachers' practical training period in Germany. In line with our assumptions as well as previous findings, constructivist-oriented mentoring had a considerable beneficial effect on mentees' levels of emotional exhaustion (Hypothesis 1; Richter et al., 2013; Voss et al., 2017). Moreover, this effect was fully mediated by the substantial support of prospective teachers' need for autonomy (in accordance with Hypothesis 3), whereas competence need support did not emerge as a mediator (contrary to Hypothesis 4). As predicted further (Hypothesis 6), a transmission-oriented instructional support could not elicit feelings of autonomy in the process of being mentored. Meanwhile, the positive effect of transmission-oriented mentoring on competence need support could be confirmed, but, contrary to our expectations (Hypothesis 2 and 5), mentor-mentee interactions based on this approach did not affect beginning teachers' exhaustion overall. This aligns with a previous finding by Richter et al. (2013) but remains inconclusive with regards to the observed non-association between competence need satisfaction and exhaustion in the mediation model, given the postulate of self-determination theory (Deci & Ryan, 2002). Still, our correlational analysis indicated a meaningful association between competence need fulfillment and well-being, which is in line with other findings regarding its relation to beginning teachers' health (e.g., Aldrup et al., 2017; Ciyin & Erturan-Ilker, 2014). Thus, even though it did not emerge as a mediator in our following latent analysis, we still suggest that support in satisfying the early career teachers' need for competence should be considered as a relevant aspect of health promotion during teacher preparation programs and beyond, as is reflected in earlier studies (Bartholomew et al., 2014; Hobson & Maxwell, 2017; Kaplan & Madjar, 2017).

Autonomy need satisfaction displayed a strong negative correlation with exhaustion and, in contrast to the need for competence, also emerged as a mediator of the relationship examined in our model analysis. This finding indicates that the support of autonomy is vital for the preservation of well-being at this stage of professionalization, which is in line with the results from another quantitative study focusing on its role in teacher preparation (Kaplan & Madjar, 2017) and complements others that have focused on competence and on relationship needs, respectively (Aldrup et al., 2017; Aldrup et al., 2018). Besides acquiring certain competencies required by standards-based reforms, beginning teachers during induction need to develop their own instructional style and construct their roles and professional identity in and around the classroom (Chong, 2011; Schepens et al., 2009). These tasks require a certain degree of self-determination granted in an educative context that is otherwise characterized by a high degree of external performance pressure through continuous evaluation and predetermined learning objectives embedded in the curriculum. From a self-determination theory point of view, these characteristics can be viewed as external risk motivators undermining a sense of autonomy in the beginning teachers (Deci & Ryan, 2002). In line with the macro theory, our results suggest that a lack of support in this need for autonomy may be detrimental for novices' health. In turn, we found evidence for "autonomy support from significant others" (Deci & Ryan, 2008a, p. 21) within our examination of mentoring effectiveness.

Taken together, our findings from the mediational path analyses confirm the meaningful impact that has been attributed to school-based mentoring during induction (Callahan, 2016; Hobson et al., 2009; Ingersoll & Strong, 2012; Smith & Ingersoll, 2004) and underline the relevance of considering the 'how' in effectively supporting novice teachers to preserve their well-being during skill acquisition (Feiman-Nemser, 2001; Hobson, 2017; Howe, 2006; Lindgren, 2005; Richter et al., 2013; Wang & Odell, 2002). Furthermore, adding to the pre-

existing literature, our results reveal that mentoring interactions reflecting constructivist principles of learning are capable of fostering a sense of autonomy in the novice undergoing post-university induction. Unlike transmission-oriented approaches, these interactions thereby shield the beginning teacher against emotional exhaustion. In this regard, the current investigation extends previous studies that found beneficial effects of an autonomy-supportive learning environment on well-being and skill acquisition during the teacher-student practicum (Fives et al., 2007) and university-based teacher education (Gonzalez et al., 2018). Against this empirical background and in the light of self-determination theory, formally assigned mentor teachers may indeed form an integral part of an autonomy-supportive learning environment in teacher induction (Deci & Ryan, 2002). In the following, related challenges and potentials in current mentoring practice will be discussed.

5.5.2 Practical Implications

School-based mentoring is an established structure within a considerable amount of international teacher induction programs (Howe, 2006), yet mentor teachers are rarely well-prepared and often insufficiently compensated for their involvement in training early career teachers. Mentors have reported that they struggle at deciding how much guidance of their mentee is adequate (Valencic & Vogrinc, 2007), at integrating their double role as mentor and teacher (Jaspers et al., 2014), and at applying reflection-based counseling techniques (Lejonberg et al., 2018). At the same time, directive and dominant mentoring approaches are still prominent during interactions (Mena et al., 2017). Consequently, mandatory mentor training concepts have been repeatedly demanded to harness the full potential of mentoring beginning teachers (Aspfors & Fransson, 2015; Bradbury & Koballa, 2008; Hobson et al., 2009; Hoffman et al., 2015; Jaspers et al., 2018), and indeed some studies have yielded promising results regarding the effectiveness of mentor preparation programs on role clarity

and reflective practice (Langdon & Ward, 2015), mentoring beliefs (Ambrosetti, 2014), and the professional development of the protégés (Evertson & Smithey, 2000).

The present study is in alignment with these previous empirical arguments, emphasizing the potential of preparation programs that train mentor teachers to apply effective counseling strategies and gain role clarity during interactions with their novices. In the light of our core findings, strengthening a constructivist approach in school-based mentors' practices could serve as an effective measure to promote a sense of autonomy and health during mentees' transition into the teaching profession. Therefore, we propose to integrate a structured in-service training that focuses on counseling techniques reflecting constructivist learning approaches into the preparation process of school-based mentors. To be capable of fostering their mentees' autonomy within future pre- and post-lesson meetings, prospective mentor teachers should be trained in communicative skills that foster critical reflection on practice (Crasborn et al., 2008; Harrison et al., 2005), that grant freedom of choice during learning processes (Kaplan & Madjar, 2017), and that introduce new perspectives and approaches to problems encountered by the novices instead of imposing the 'expert's solution' on them (Feiman-Nemser, 2001). In addition, the practice of non-controlling language, listening, and feedback within the course work may address further relevant deficits reported by mentor teachers (Langdon & Ward, 2015; Reeve & Halusic, 2009). To ensure the effectiveness of these measures, mentors could also explicitly address the mentees' current subjective need fulfillment in the dialogue (Evelein et al., 2008). Finally, their professional development in this regard should be the focus of regular performance feedback provided by an external supervisor, to promote consolidation of the respective skills (Gardiner, 2009).

Moreover, to successfully adopt a constructivist-oriented approach within their practice, mentors need to actively construct their new roles as co-thinkers and counselors to their mentees (Feiman-Nemser, 2001; Orland, 2001). However, the integration of the new roles

associated with mentoring, the roles as a regular teacher, and the respective responsibilities and expectancies related to both, is a major challenge for mentors (Holloway et al., 2018; Jaspers et al., 2014). Hence, we suggest that this preparatory course is flanked by regular intervision or focus group meetings (Langdon & Ward, 2015) for prospective and in-service school-based mentors. In the course of these group sessions, shared reflection on personal and systemic challenges related to the mentoring activity (Gardiner, 2009; Orland-Barak, 2005) may be encouraged by moderation of an experienced mentor (Orland, 2001) in a non-judgmental, collaborative framework.

5.5.3 Limitations & Future Directions

Several limitations of the present study require attention. First, our mediation analyses are solely based on self-report measures, which are unavoidably at risk of being distorted by memory biases, sequence effects, or question wording (Podsakoff et al., 2003; Schwarz, 1999). Also, due to the design of our investigation, we were not able to obtain mentors' self-reports on their mentoring practices and compare them to the quality of mentoring interactions as rated by the novices. Meanwhile, Richter et al. (2013) found a substantial overlap between mentors' and mentees' ratings, indicating that beginning teachers' perceptions of mentoring approaches are a valid source of information in this context. Another restriction is due to the cross-sectional nature of our analyses, implying that the causal directions specified in our path model rely on the theory formation established and previous findings. Hence, the results with regards to these relations should be interpreted cautiously (MacCallum & Austin, 2000) and future studies could investigate the mediational patterns obtained in the framework of longitudinal designs and intervention studies (MacKinnon & Fairchild, 2009). Moreover, regarding the measures applied in this study, the instrument that captured mentoring qualities only assesses instructional support (Gold, 1996; Richter et al., 2013), thus we were not able to determine how other components of school-based mentoring support, e.g., psychological support, would

have affected prospective teachers' levels of emotional exhaustion in comparison. Finally, future studies should address influential factors beyond the scope of this study that are likely to influence the success or not of school-based mentor-mentee relationships as well. Among those, the consequences of a 'match' versus 'mismatch' between mentors' and mentees' professional beliefs (Hawkey, 1998; Orland-Barak, 2014), mentees' willingness to be mentored (Hobson, 2017), mentors' motives to mentor (Van Ginkel et al., 2016), higher workload compensation for mentors (Fletcher & Strong, 2009), and complementary versus compensatory effects of informal mentor arrangements (Hochberg et al., 2015) have been discussed. Future research should address the question how these interplaying factors can be further considered to optimize selection, pairing, and cooperation within the mentoring process.

5.5.4 Conclusion

This study contributes to understanding the differential effects of distinct mentoring qualities on early career teachers' well-being. In a structural equation model framework, we were able to simultaneously test mediation effects of basic need support within the association of two types of mentor-mentee interactions and emotional exhaustion. The main finding of these latent mediation analyses indicated that mentoring support following constructivist rather than behaviorist principles of learning lowered emotional exhaustion by successfully addressing the need for autonomy in beginning teachers. This is in alignment with a range of theoretical arguments and empirical findings that have emphasized the crucial role of mentors' counseling approach applied during interactions for novice teachers' development and health (overviews in Hobson et al., 2009; Wang & Fulton, 2012). Adding to the existing literature, this study particularly highlights the importance of effective autonomy need support (Deci & Ryan, 2002) within mentor-mentee relationships to promote novices' well-being during the challenging practical teacher training period.

6. Constructivist and Transmissive Mentoring: Effects on Teacher Self-Efficacy, Emotional Management, and the Role of Novices' Initial Beliefs (Original Study 2)

Burger, J. (in press). Constructivist and transmissive mentoring: Effects on teacher self-efficacy, emotional management, and the role of novices' initial beliefs. *Journal of Teacher Education*.

Abstract

Mentoring is acknowledged as an essential prerequisite for successful teacher induction, but its effectiveness may vary depending on the mentor's quality of support and the mentee's initial professional beliefs (Hobson et al., 2009). Focusing on novice teachers' self-efficacy and emotional management, this longitudinal study investigates how constructivist- and transmission-oriented mentoring approaches support beginning teachers' professional development, and how these approaches interact with the novices' initial beliefs about teaching and learning. The data stems from a sample of 138 beginning teachers who participated in an online survey during their second and third trimesters of practical training in Germany. Moderated regression analyses indicate positive effects of constructivist mentoring on teacher self-efficacy six months later, and an enhancing moderation effect of mentees' mismatching, transmissive beliefs. Results neither support distinct effects of constructivist mentoring on novices' emotional management, nor associations between transmissive mentoring and the outcomes. Implications for mentoring research and practice are discussed.

Keywords

International Teacher Education, Mentoring, Professional Development, Teacher Beliefs, Teacher Induction

6.1 Introduction

School-based mentoring is an integral part of teacher induction programs worldwide, intended to support beginning teachers' skill acquisition and well-being (Howe, 2006; Ingersoll & Strong, 2011). The effectiveness of mentored learning to teach depends upon the learning approach a mentor bases his mentoring practice on (Feiman-Nemser, 2001; Richter et al., 2013; Wang & Odell, 2002). While transmission-oriented mentoring practices, rooted in a behaviorist learning theory, seem largely ineffective in supporting beginning teachers, first studies highlight the benefits associated with a mentoring practice oriented towards constructivist principles of learning (Burger et al., 2021; Linninger, 2016; Richter et al., 2013). However, little is yet known about the capability of these mentoring approaches to promote self-regulatory and motivational competences, which are important prerequisites for a successful and healthy teaching career (Brouwers & Tomic, 2000; Richardson et al., 2013; Tynjälä & Heikkinen, 2011). To address this gap in the literature, the present, longitudinal study focuses on constructivist- and transmission-oriented mentoring and their influence on beginning teachers' self-efficacy and surface acting as part of their emotional management. Teacher self-efficacy is viewed as essential for the conservation of resources during teaching-related tasks (Baumert & Kunter, 2006; Zee & Koomen, 2016). Surface acting, in contrast, is assumed to exploit teachers' resources and undermine their well-being in the long term (e.g., Himbert & Imhof, 2022; Keller et al., 2014). Thus, both aspects of professional teacher competence are closely associated with the regulation of one's personal resources at work.

Beside the learning approach underlying an experienced teacher's mentoring practice, the prior beliefs about teaching and learning a novice brings into the induction program as an individual characteristic play an important role in mentored professional learning (cf. Kunter et al., 2013; Levin, 2015). Novice teachers' initial constructivist and transmissive beliefs about teaching may be congruent with their mentors' approach or not, which is assumed to influence

how mentoring as a learning opportunity unfolds (Hobson et al., 2009). However, the nature of this interplay between professional beliefs held on both sides and its consequences for the mentees' development remain largely undetermined. To contribute to our understanding of such mechanisms of mentoring, the present study includes the mentees' prior beliefs about teaching and learning as moderators in an exploratory framework, determining how these beliefs interact with the distinct mentoring approaches under investigation.

6.2 Theoretical Background

6.2.1 Concepts of Mentoring

A mentor teacher is typically described as an experienced teacher assigned to a novice teacher (the mentee) with the aim "to observe and provide the new teacher with instructional support and feedback" (Pirkle, 2011, p. 43). In line with this, Gold (1996) described two general forms of support a mentor teacher can provide. Psychological support, i.e., help in building confidence and preserving mentees' self-esteem during negative learning experiences, is distinguished from instructional support, which entails direct assistance in the acquisition of various professional skills needed for the day-to-day tasks, such as classroom interactions and lesson planning. While the provision of instructional support is among the core functions of formally assigned mentors, the quality of the supportive interactions between mentor and novice is crucial with regards to the mentee's professional development (e.g., Howe, 2006; Wang & Odell, 2002). To consider distinct mentoring approaches, the present study draws on a conceptualization provided by Richter et al. (2013). The authors integrated two previous distinctions of mentoring approaches by Feiman-Nemser (2001) and Cochran-Smith and Paris (1995) into their modeling of constructivist and transmissive mentoring (Richter et al., 2013). Both approaches are rooted in a specific learning theory: Constructivist-oriented mentoring interactions are premised on a constructivist learning theory, which manifests itself in

collaborative reflection, critical inquiry of practice, and mutual problem-solving. In contrast, during transmissive mentoring interactions, the expert teacher transmits knowledge to a rather passive novice via best practice, demonstrations, and direct provision, hence follows a behaviorist and unidirectional concept of teaching and learning. These approaches have differential consequences for the mentees' development. The following sections outline the concepts of self-efficacy and emotional management and briefly review recent findings on their relation to mentoring.

6.2.2 Teacher Self-Efficacy and Mentoring Support

Self-efficacy is understood as an individual's general expectancy to successfully cope with challenging situations in reliance on his or her own skills, and to succeed despite obstacles (Bandura, 1986). In accordance with the global concept rooted in Bandura's (1986) social-cognitive theory, Tschannen-Moran et al. (1998) contributed an integrative teacher self-efficacy model, applying the global concept to different school-related contexts. Teacher self-efficacy implies, e.g., expectancies to effectively manage classrooms and student engagement, as well as expectancies regarding relationship building and instructional practice (Schmitz & Schwarzer, 2000). The efficacy expectancies of teachers are associated with, inter alia, their teaching practices, well-being, and their students' academic achievement (for an overview, see Zee & Koomen, 2016).

Teachers with less job experience reported lower levels of self-efficacy when compared to more experienced colleagues (Wolters & Daugherty, 2007). Moreover, efficacy expectancies have been found to show only small increases during early teacher preparation (Dicke, Parker, et al., 2015; Fives et al., 2007). In face of high attrition rates in the early career (Ingersoll & Smith, 2003), it seems desirable to explore how novice teachers' self-efficacy can effectively be enhanced during preparatory service. Bandura (1986) postulates four sources that can fuel these efficacy or competence expectancies: mastery experience, vicarious experience, verbal

persuasion, and physiological arousal. While mastery experiences are considered the most powerful booster of self-efficacy, beginning teachers lack personal experiences of job-related success upon entering their practical training. Hence, vicarious experiences from observations of a model teacher, and verbal persuasion via performance feedback from teacher educators may also emerge as strong sources of efficacy beliefs (George et al., 2018). Physiological arousal may further play a role in the initial teacher education context, e.g., when inadequate interpretations of physiological states accompanying the novices' first teaching experiences negatively affect their self-efficacy.

School-based mentoring can have an impact on efficacy expectations in multiple ways: Effective mentors can facilitate novices' first mastery experiences via instructional support, they provide vicarious experience as a teacher model, and may verbally persuade their mentee within counseling and feedback sessions (Watson & Marschall, 2019). However, as not every type of interaction is beneficial for the mentee's development, it is important to consider how different approaches to mentor beginning teachers promote self-efficacy. With respect to the distinction outlined earlier, transmissive mentoring holds only a limited potential in this regard. While it seems likely that this mentoring approach offers vicarious experiences, the close guidance and direct transmission of knowledge undermines mentees' internalization of mastery experiences in the classroom. Transmissive mentoring does not support the mentee's need for autonomy (Burger et al., 2021), but the novices must be allowed to perceive themselves as the true initiators of their performance to be able to experience personal success in the classroom. In contrast, constructivist mentoring promotes autonomy and should facilitate professional mastery experiences for the novices. Furthermore, through shared reflection on practice and mutual inquiry (e.g., Feiman-Nemser, 2001), constructivist mentors serve as models and can effectively persuade beginning teachers. Previous findings are in accordance with these considerations. As such, Fives et al. (2007) found that student teachers' self-efficacy for

instructional practices increased when they were actively guided by their mentor teacher. Mentor teachers' verbal persuasions have been found to play an important role in the development of self-efficacy during these university-based practicum experiences (Klassen & Durksen, 2014). With regards to the early teaching career, Kutsyuruba et al. (2019) reported evidence for the impact of mentoring that is based on a collaborative partnership in learning on beginning teachers' well-being, self-efficacy, and classroom-related confidence. Meanwhile, a study by Devos et al. (2012) yielded mixed results regarding the effects of collaborative interactions with colleagues: These only enhanced the novices' self-efficacy when their difficulties in teaching were low. Nevertheless, the perceived mentoring quality was found to foster their self-efficacy (Devos et al., 2012). In the same vein, Richter et al. (2013) demonstrated that a constructivist approach to mentoring enhances beginning teachers' self-efficacy expectations, while transmissive mentoring yielded no effectiveness in this regard.

6.2.3 Emotional Management and Mentoring Support

The term 'emotional labor' was coined by Hochschild (2012) and refers to the effort that is related to managing and expressing emotions considered adequate in a specific work-related context. Within the concept, the author distinguished the two strategies 'surface acting' and 'deep acting'. Surface acting refers to a display of emotions that are not genuinely felt as well as a masking of emotions that are considered inappropriate in a certain situation. In contrast, deep acting implies that current emotions are actively changed towards the desired valence, e.g., by cognitive reappraisal. In the teaching context, emotional labor has been discussed as a highly relevant phenomenon (Schutz & Zembylas, 2009). In day-to-day classroom interactions, teachers are required to manage their emotions constantly to maximize their students' learning (Sutton & Harper, 2009). During these interactions, teachers frequently suppress inner, emotional states that are deemed unfitting in the respective classroom situation (Keller et al., 2014). Analogously, teachers feel obliged to act out fake positive emotions on

the surface to comply with their inner representation of informal display rules (Sutton, 2004). This surface acting has been found to be associated with negative affect and emotional exhaustion (Lee et al., 2016). In turn, emotionally authentic teachers foster positive affect in students (Keller & Becker, 2021). Still, emotions in the classroom and the skills required to manage them are not sufficiently covered by most formal teacher education curricula (Hargreaves, 2001; Meyer, 2009; Porsch, 2018). Hence, novices must acquire effective regulation strategies 'en passant' their pre- and in-service training but may lack adequate role models on the part of their teacher educators.

Previous studies on teacher mentoring have tended towards avoiding the complex issue of emotions and emotional support (Hawkey, 2006). Nevertheless, school-based mentoring has the potential to foster adaptive emotional management despite the neglect of emotions within formal teacher education. To do so, the school-based teacher educators need to allow their personal feelings into the mentoring dialogue (Bullough & Draper, 2004). Acting as a model that introduces emotions into the interaction, mentors may then be able to identify the beginning teachers' challenging situations and promote reflection on the strategies used to manage the corresponding emotions. In addition, mentors may aid beginning teachers to deconstruct emotional display rule beliefs (Chang, 2020). These considerations align with the core of constructivist mentoring, i.e., reflection on practice, collaborative inquiry, and freedom of choice (Feiman-Nemser, 2001). Promoting reflection on emotional management and enabling autonomous learning, mentors encourage their mentees to express themselves and their emotions more freely around the classroom. In the directive and more hierarchical mentor-mentee relationships established in the transmissive approach, novices may feel a stronger need to comply to the ideal of teaching reflected in expert knowledge and best-practice examples. Mentors may introduce 'ideal' pedagogical display rules that are in tension with authentic emotional communication of the mentees (Chang, 2020). Beginning teachers may feel obliged

to conform to these rules and exclude seemingly unfitting emotions in their teaching practice. As their need for autonomy tends to be ignored within this type of interactions (Burger et al., 2021), mentees may be less inclined towards authentic expression of their progressing professional identity and, even more, manage their emotions superficially.

To conclude, the two mentoring approaches should have a distinct potential to reduce beginning teachers' urge to surface act emotions. While transmissive support may not allow for sufficient degrees of freedom in beginning teachers' emotional teaching practice, constructivist interactions buffer against overusing superficial acting by encouraging autonomous learning and shared reflection on the emotional aspects of teaching. Though little is known regarding the influence of these specific approaches, some evidence indicates a considerable impact of school-based mentoring in general on novices' emotional management. As such, Meyer (2009) explored how mentors influence the autonomous instructional practice and emotional management of their student teachers. In her qualitative case studies, reflection on their emotional management helped prospective teachers to optimize their lessons' instructional quality. This reflection could be promoted or hindered depending on whether cooperating teachers responded to the emotional aspects of the teaching experiences shared by the student (Meyer, 2009). In line with this, Shapira-Lishchinsky and Levy-Gazenfrantz (2016) reported positive associations between authentic leadership qualities of school-based mentors and emotion regulation skills of the mentees in a qualitative study in Israel. Moreover, a supportive workplace environment was found to buffer against the negative effects of emotional labor on secondary school teachers' well-being in the U.K. (Kinman et al., 2011). Meanwhile, a qualitative study by Yuan and Lee (2016) found mentors to elicit negative emotions that affected the identity development of prospective teachers when the relationship was more hierarchical.

Taken together, the empirical reviews underline the theoretical arguments for an impact of mentoring on beginning teacher self-efficacy and emotional management. However, while qualitative studies dominate (Hoffman et al., 2015), only few findings stem from quantitative and longitudinal designs. Even fewer focus on the post-university induction phase. Moreover, little is known concerning personal prerequisites of the beginning teachers and how they influence the mentoring relationship. The following section outlines the function of beliefs in mentored professional learning.

6.2.4 Beginning Teachers' Beliefs About Teaching and Learning

To broaden our understanding of school-based mentoring and its influence on beginning teachers' skill acquisition, it is important to consider the beliefs mentees bring into the program (Hobson et al., 2009). In this study, the term 'beliefs' is used according to the definition provided by the COACTIV project team, i.e., "psychologically held understandings and assumptions about phenomena or objects of the world that are felt to be true, have both implicit and explicit aspects, and influence people's interactions with the world" (Voss et al., 2013, pp. 249-250). Teachers' professional beliefs can be classified with respect to the topic they relate to, e.g., students, the school environment, or the teaching approach. This study's focus lies on beginning teachers' beliefs about the ideal holistic approach to teaching that promotes students' learning effectively. Professional beliefs situated within this domain have been distinguished in alignment with the two central learning theorems constructivism and transmission (e.g., Barkatsas & Malone, 2005; Hermans et al., 2008). Beginning teachers who hold constructivist beliefs view teaching as supporting the students in constructing knowledge by themselves. In their teaching, they encourage students to actively explore new learning content based on autonomous decision-making. In contrast, teachers with transmissive beliefs see teaching as the unidirectional transfer of knowledge to a rather passive student.

Beliefs about teaching and learning are assumed to develop and consolidate early, based on the teaching observed as a student in school. Consequently, prospective teachers already hold strong beliefs and theories about the right way of teaching and learning upon entering their programs (Richardson, 2003). Novice teachers' professional beliefs function as filters within the perception and interpretation of new information received during professional learning experiences (Fives & Buehl, 2012; Yadav & Koehler, 2007). In this light, the beliefs about teaching and learning are individual characteristics of beginning teachers brought into the teacher education program and assumed to interact with learning opportunities offered by mentor teachers, potentially moderating to what extent these opportunities are utilized by the learners (cf. Kunter et al., 2013). As their prior beliefs affect the way the novices approach their formal education, it has been argued that mentors and other teacher educators need to take these beliefs into account and contrast them with their own (cf. He & Levin, 2008; Hollingsworth, 1989).

Regarding the pairing of mentors and mentees, it is yet to be determined whether congruent or diverging beliefs held on both sides generate more benefits for the beginners' professional development (Hobson et al., 2009). As He and Levin (2008) argued, teacher educators who know about their students' initial beliefs may "better facilitate teacher candidates' development, especially if our [the educators'] beliefs were congruent and consistent with theirs" (pp. 39-40). In accordance, two of the rare studies that investigated this aspect suggest that similar beliefs between mentor and mentee lead to a more satisfying relationship in the mentees' view, whereas divergent beliefs about teaching lead to tension (Bradbury & Koballa, 2008; Kitchel & Torres, 2007). However, while a match of beliefs about teaching may contribute to a more harmonious relationship, the implications of such a match versus mismatch for the development of mentees' professional competence, specifically their adequate emotional management and self-efficacy (cf. Baumert & Kunter, 2006), remain to be

determined. Therefore, at this early stage of research, the present study investigates how novice teachers' beliefs interact with the beliefs held by their mentors in the framework of an exploratory analysis.

6.2.5 The Present Study

The present study's research aims are two-fold: First, to determine whether constructivist- and transmission-oriented mentoring approaches have distinct, longitudinal effects on beginning teachers' self-efficacy and emotional surface acting during teacher induction. Second, to explore how the novices' prior constructivist- and transmission-oriented beliefs about teaching and learning interact with each of the two mentoring approaches, i.e., whether an initial match or mismatch between a mentor's approach and a mentee's belief has an influence on the benefits arising from the mentoring relationship.

Against the background of the theoretical arguments and empirical evidence outlined above, the first research aim entails the following hypotheses:

H1. Constructivist-oriented mentoring enhances beginning teachers' professional self-efficacy six months later.

H2. Constructivist-oriented mentoring lowers the frequency of surface acting as reported by beginning teachers six months later.

H3. Transmissive mentoring enhances beginning teachers' professional self-efficacy six months later, to a lower extent than constructivist mentoring.

H4. Transmissive mentoring increases the frequency of surface acting as reported by beginning teachers six months later.

With respect to the second research aim, I abstain from including fixed a priori-hypotheses in line with the exploratory character of this part of the present investigation. The theoretical conceptualizations outlined above (Fives & Buehl, 2012; Kunter et al., 2013)

provide a rationale for assuming that beginning teachers' constructivist- and transmission-oriented beliefs moderate the effectiveness of mentoring. Thus, I will examine the interplay of beliefs held on both sides of the mentoring relationship in the framework of moderation analysis in the present study. Thereby, the following research question guiding this part of the investigation can be addressed: What are the consequences of a match versus a mismatch between a mentor's and a mentee's beliefs about teaching and learning for the professional development of the mentee during teacher induction?

6.3 Methods

6.3.1 Participants and Procedures

Data acquisition took place within a region-wide research project commissioned by the ministry of science, continuing education, and culture in a federal state of Germany ('Bundesland'). By means of an online questionnaire addressed to beginning teachers undergoing induction, the survey aimed at evaluating the post-reform practical training phase of German teacher education (Imhof et al., 2020). After graduation from their educational masters studies at university, prospective teachers complete a federal state-specific, 18 month-long in-service training before obtaining their final teaching license. Within this practical training phase, subject-related and general pedagogical content courses continue and are complemented by a wide range of classroom-related learning opportunities at an assigned supervising school. At this training school, a mentor teacher that usually shares one (or both) subjects is formally assigned to the beginning teacher.

In this study, a subset of the original research project's larger database is used, focusing on novice teachers that were assessed on entering their second trimester of practical training (i.e., in the 6th to 8th month of 18 months in total; 'time 1') as well as approximately six months later, at the entrance of their third trimester (in the 12th to 14th month; 'time 2'). Participation

was voluntary and without compensation, and data was pseudonymized to enable later matching of longitudinal data. Due to the repeated-measurement, multi-cohort design of the original project, the sample used in this study includes three cohorts that successively filled in the questionnaire in their respective second and third trimester of practical training. The initial sample at time 1 consisted of 454 novices (N = 231 from Cohort 1, N = 128 from Cohort 2, and N = 95 from Cohort 3), from which 30.4% also participated at time 2 (N = 138). To consider systematic differences between dropouts and later participants at time 2, we compared both groups with respect to sociodemographic and psychological variables under investigation and obtained no substantial differences (see Table 8 in section 6.5.5). With regards to the longitudinal samples, Cohort 1 (N = 76, 76% female, M_{age} = 26.82, SD_{age} = 2.49) participated in autumn 2017 (time 1) and spring 2018 (time 2), Cohort 2 (N = 42, 62% female, M_{age} = 28.02, SD_{age} = 3.49) followed in spring 2018 (time 1) and autumn 2018 (time 2), and Cohort 3 (N = 20, 50% female, M_{age} = 28.50, SD_{age} = 3.33) was assessed in autumn 2018 (time 1) and spring 2019 (time 2). None of these cohorts differed significantly from another with respect to socio-demographic background variables (gender, a-level and university masters grade, type of teaching license aspired, amount of teaching experience before induction), except for a small-sized difference in age. Hence, all data was integrated into one final sample consisting of 138 individuals with an average age of 27.4 years (SD = 3.0 years) and of whom 68% were female. 22% were preparing to teach at primary level, and 78% at secondary level.

6.3.2 Measures

Independent Variables: Mentoring Approaches

An adaptation of two scales for constructivist- and transmission-oriented mentoring developed by Richter et al. (2013) was used to measure the quality of mentoring interactions as perceived by the beginning teachers. The scale assessing constructivist-oriented mentoring comprises four items (e.g., *"My mentor helps me to improve independently."*), while the level of transmissive-oriented mentoring is captured by three items (e.g., *"My mentor tells me what I need to improve."*). Every item was rated on a Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). Exploratory and confirmatory factor analysis conducted by the author group indicated a two-factor solution as best fit, and the scales have demonstrated good overlap with self-ratings of corresponding mentor teachers (Richter et al., 2013). In the present study, fit indices obtained in a confirmatory factor analysis at time 1 indicated an acceptable fit as well (CFI = .96, RMSEA = .09 (90% CI [.067, .108]), SRMR = .06; see Schermelleh-Engel et al., 2003). Both scales showed good to very good internal consistency at time 1 (constructivist mentoring: $\omega_{T1} = .89$; transmissive mentoring: $\omega_{T1} = .80$) and time 2 (constructivist mentoring: $\omega_{T2} = .92$; transmissive mentoring: $\omega_{T2} = .86$).

Dependent Variable: Self-Efficacy

To quantify levels of profession-related self-efficacy, an adaptation of the German Teacher Self-Efficacy Scale (Schmitz & Schwarzer, 2000) was applied. The 10 item-scale was developed with the aim to create a content-valid and economical measure of teacher competence expectancies. Thus, it comprises statements referring to multiple competence domains, such as building relationships with students (e.g., *"I am sure that I will be able to establish good contact with even problematic students."*) and coping with stress (e.g., *"Even if I face classroom disturbances, I am sure that I will be able to maintain my composure."*), that are rated on a 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree). As

expected with regards to construct validity, the authors were able to obtain high negative correlations with job strain and burnout (Schmitz & Schwarzer, 2000). It demonstrated good reliabilities in this study ($\omega_{T1} = .77$; $\omega_{T2} = .77$).

Dependent Variable: Surface Acting (Emotional Labor)

To assess the degree of surface acting that is carried out by the participants, the 'emotional dissonance' subscale as part of the emotional labor scales (Zapf et al., 1999) was adopted. The four items measure the frequency of emotional dissonance experiences (e.g., *"How often do you have to display feelings that do not correspond to what you actually feel towards others in school?"*; *"How often do you have to suppress feelings in order to appear neutral to others in school?"*) and are rated on a 5-point scale from 1 (very rarely/never) to 5 (very often). The emotional dissonance measure has been shown to highly correlate with emotional exhaustion, depersonalization, and job dissatisfaction in various professions (overview in Zapf et al., 2001). It displayed adequate internal consistency for both measurement points ($\omega_{T1} = .84$; $\omega_{T2} = .86$).

Moderating Variables: Beliefs About Teaching and Learning

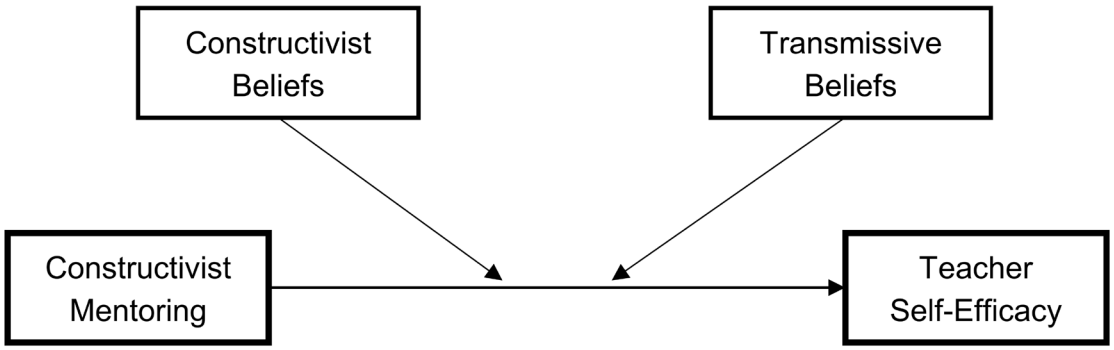
To capture the strength of two qualitatively distinct beliefs about teaching and learning, two scales developed by Kunter et al. (2017) were used. The scale tapping constructivist beliefs about learning and teaching consists of seven items (e.g., *"Students learn best by discovering their own ways to solve tasks in class"*) rated on a scale from 1 (strongly disagree) to 4 (strongly agree). Likewise, the second scale assessing transmissive beliefs about learning and teaching comprises seven items (e.g., *"Students learn best by watching their teacher do example exercises"*) with equal scale range. The original scales demonstrated a good two factor solution fit (Voss et al., 2013), and the adaptation by Kunter et al. (2017) showed adequate internal consistencies over multiple times of measurement, as it did in the present study (constructivist beliefs: $\omega_{T1} = .83$; $\omega_{T2} = .85$; transmissive beliefs: $\omega_{T1} = .74$; $\omega_{T2} = .79$).

6.3.3 Statistical Analysis

The SPSS software package version 23 (IBM, 2015) was used for all analyses. To test the proposed main effects and explore possible moderation effects, regression analyses were conducted, using the PROCESS macro for SPSS, version 3.5 (Hayes, 2017). The pre-defined 'model 2' within PROCESS allows for the inclusion of one independent variable, two moderator variables, and one dependent variable simultaneously. Therefore, a series of four longitudinal regression analyses in total were conducted to test all main and interaction effects of interest. Per model analysis, one mentoring approach was defined as the independent variable (measured at time 1), both belief variables were included as moderator variables (time 1), and one competence-related outcome (self-efficacy or emotional management) was introduced as a dependent variable (measured at time 2; see Figure 5 for an exemplary path model). Thus, each path model entailed two interaction terms, i.e., a 'match term'

Figure 5

Generic Moderation Model Displaying Main and Interaction Effects



and a ‘no-match term’ formed by the respective independent variable and the belief variables. All variables forming interaction terms were mean-centered prior to analysis (Irwin & McClelland, 2001). In each model, baseline values of the respective outcome at time 1 as well as the gender variable were added as covariates. Regression weight estimates in the longitudinal models were based on 5000 bootstrap samples. Hypotheses testing was based on a level of significance at $p < .05$.

6.4 Results

6.4.1 Descriptives & Preliminary Analyses

Descriptives and results for paired Welch tests between both measurement points for all variables are depicted in Table 3. With regards to descriptive values, constructivist mentoring interactions and constructivist beliefs displayed higher means than their

Table 3

Means, Standard Deviations, and t-Tests for Both Measurement Points

Variable	time 1		time 2		*t*	*p*
	M_{t1}	SD_{t1}	M_{t2}	SD_{t2}	(df)	
Constructivist Mentoring	3.20	.75	3.11	.86	1.64 (137)	.10
Transmissive Mentoring	2.80	.78	2.65	.87	2.09 (137)	.04
Constructivist Beliefs	3.31	.49	3.38	.49	-1.86 (137)	.07
Transmissive Beliefs	2.46	.49	2.45	.51	.20 (137)	.84
Teacher Self-Efficacy	3.04	.39	3.15	.38	-3.89 (137)	.00
Surface Acting	2.31	.84	2.50	.89	-2.75 (137)	.01

transmissive counterparts. At the same time, means of the latter indicated a considerable presence of traditional views on learning and transmissive mentoring experiences in the sample as well. Significant mean augmentation from the second to the third trimester of the induction phase was observed for both teacher self-efficacy ($t(137) = -3.89$, $p < .01$) and surface acting ($t(137) = -2.75$, $p < .01$), indicating meaningful change in both dependent variables included in the study.

Table 4 displays the bivariate correlations of all model variables, assessed in the second trimester (time 1) and third trimester (time 2) of practical teacher training. Constructivist mentoring experiences at time 1 and time 2 were significantly associated with teacher self-efficacy at time 2 ($r = .22$, $p < .05$, for constructivist mentoring at time 1) and correlated negatively with surface acting at time 1 and 2 ($r_{t1} = -.35$, $p_{t1} < .05$; $r_{t2} = -.24$, $p_{t2} < .05$, for constructivist mentoring at time 1). In contrast, transmissive mentoring interactions did not display meaningful correlations with any outcome variable. With regards to beliefs and mentoring approaches, consistent, moderate associations could only be found for transmission-oriented mentoring and transmissive beliefs (significant r values ranging from .19 to .32). In addition, both teacher self-efficacy and surface acting showed strong stability over the time span examined (teacher self-efficacy: $r = .59$, $p < .05$; surface acting: $r = .57$, $p < .05$). To conclude, while these preliminary correlational results were in accordance with the hypothesized, beneficial effect of constructivist mentoring on self-efficacy (H1) and surface acting (H2), they did not support the assumed effects of transmissive mentoring on both outcomes (H3 and H4).

Table 4

Bivariate Correlations of all Model Variables

	Variable	2	3	4	5	6	7	8	9	10	11	12
1.	Constructivist Mentoring, T1	**.63**	.15	.15	**.19**	.15	-.01	-.04	.09	**.22**	**-.35**	**-.24**
2.	Constructivist Mentoring, T2	1.00	.06	**.48**	.06	.07	.11	-.04	-.02	**.17**	**-.25**	**-.26**
3.	Transmissive Mentoring, T1		1.00	**.51**	.16	.09	**.19**	**.27**	.16	.10	-.08	-.08
4.	Transmissive Mentoring, T2			1.00	-.08	-.13	**.32**	**.29**	-.11	-.06	-.04	-.09
5.	Constructivist Beliefs, T1				1.00	**.56**	**-.27**	**-.22**	**.43**	**.36**	**-.23**	-.15
6.	Constructivist Beliefs, T2					1.00	**-.34**	**-.21**	**.35**	**.42**	-.15	**-.20**
7.	Transmissive Beliefs, T1						1.00	**.65**	-.10	-.03	.11	.11
8.	Transmissive Beliefs, T2							1.00	-.11	-.11	.10	.15
9.	Teacher Self-Efficacy, T1								1.00	**.59**	**-.28**	**-.29**
10.	Teacher Self-Efficacy, T2									1.00	**-.36**	**-.50**
11.	Surface Acting, T1										1.00	**.57**
12.	Surface Acting, T2											1.00

Note. Correlations in bold are significant at $p < .05$. T1 = first assessment, during 2nd trimester of practical teacher training; T2 = second assessment, during 3rd trimester of practical training.

6.4.2 Path Models and Moderation

As outlined earlier, four sequential regression analyses were conducted to test the presumed main effects and explore possible interaction effects between mentoring approaches and mentees' beliefs in a longitudinal framework.

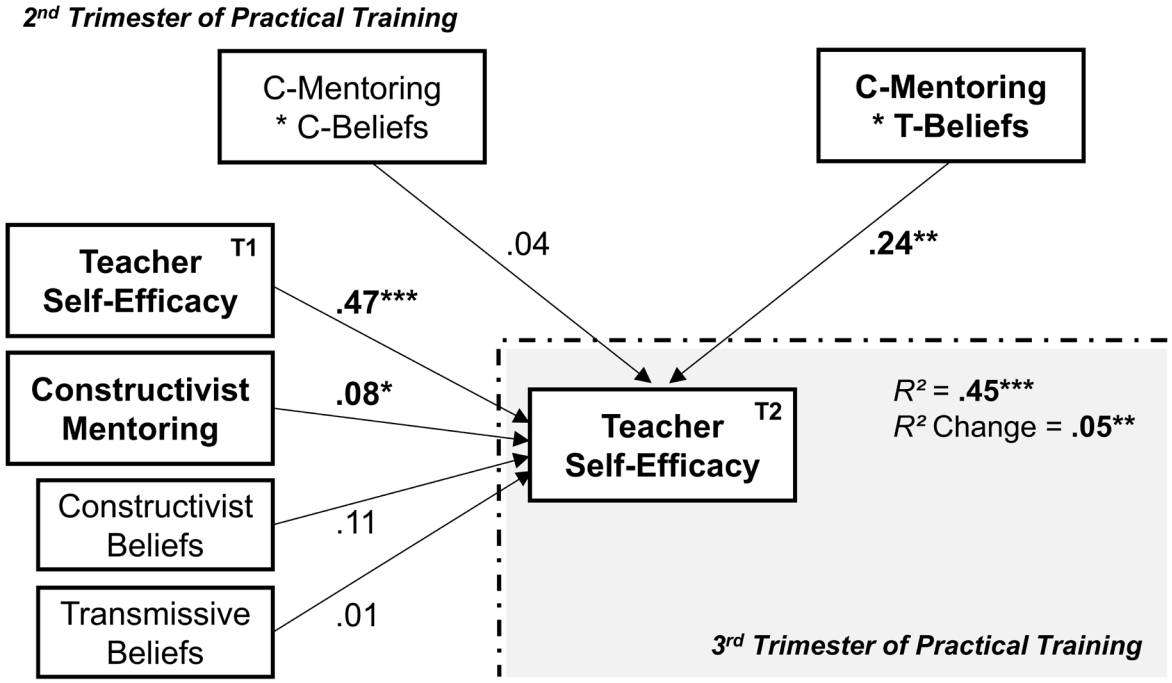
Figure 6 visualizes the first path model specified for the regression analyses, displaying the results for constructivist mentoring and teacher self-efficacy. This first model reached overall significance, F (7, 130) = 18.16, $p < .01$, $R^2 = .45$. In support of hypothesis 1, the mentoring quality exerted a meaningful first-order effect on the outcome at average moderator levels ($b = .08$, $p < .05$). In addition, a significant interaction with transmissive beliefs held by

the mentee was obtained (b = .24, p < .01). Applying simple slope analysis (Jaccard et al., 1990) to further explore the effect pattern of this interaction, results indicated that constructivist mentoring was most beneficial for teacher self-efficacy when transmissive beliefs were high (e.g., b = .20, p < .01 for high transmissive and average constructivist beliefs), suggesting benefits arising from an initial mismatch between the mentor's approach and the mentee's beliefs. This moderation effect contributed significantly to the total amount of variance explained by the model, even if to a small extent (ΔR^2 = .05, p < .01). Aside, the baseline level strongly predicted teacher self-efficacy at time 2 (b = .47, p < .01).

The second regression analysis covered transmissive mentoring interactions and novice teachers' self-efficacy and reached overall significance (F (7, 130) = 13.88, p < .01, R^2 = .40). Contrary to hypothesis H3, no first-order effect was found for transmission-oriented mentoring (see Figure 7). Moreover, no interaction between the mentoring style and either of the belief

Figure 6

Longitudinal Path Model for Constructivist Mentoring and Self-Efficacy



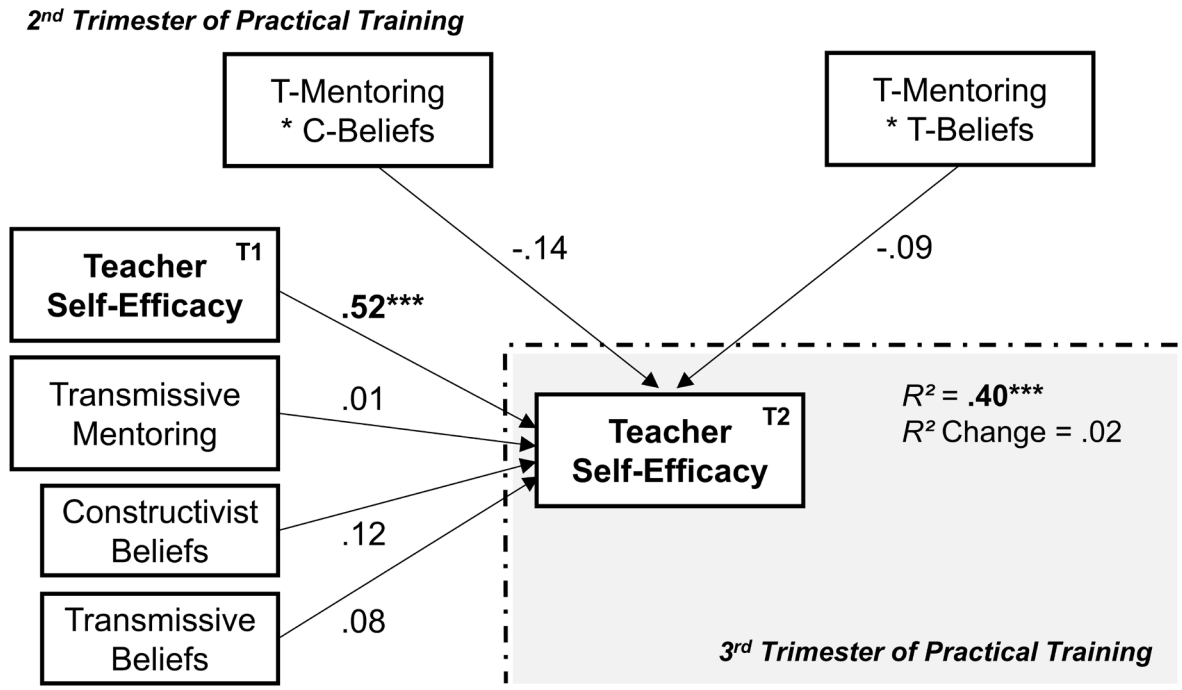
Note. Regression weights are unstandardized and, if displayed in bold, significant at * p < .05, ** p < .01, or *** p < .001. Effect estimates are based on 5000 bootstrap resamples. For reasons of parsimony, the model intercept is omitted.

variables was obtained. Solely the baseline measure of self-efficacy (b = .52, p < .01) emerged as a predictor of the outcome.

The third model addressed the relationship between constructivist mentoring interactions and emotional management and was significant ((F (7, 130) = 13.98, p < .01, R^2 = .37). While the baseline values at time 1 strongly predicted the amount of surface acting six months later (b = .57, p < .01), no first-order effect of constructivist mentoring at medium moderator levels was found, in contrast to the beneficial effect that had been hypothesized (b = -.07, p = .45). With regards to the exploratory part of the model, the interaction term formed by constructivist mentoring and transmissive beliefs significantly predicted the frequency of surface acting at time 2 (b = -.38, p < .05). While the change in explained variance was small, this interaction contributed to the overall predictive value of the model (ΔR^2 = .02, p < .05). Results of simple slope analyses indicated that the predictive value of constructivist

Figure 7

Longitudinal Path Model for Transmissive Mentoring and Self-Efficacy



Note. Regression weights are unstandardized and, if displayed in bold, significant at * p < .05, ** p < .01, or *** p < .001. Effect estimates are based on 5000 bootstrap resamples. For reasons of parsimony, the model intercept is omitted.

mentoring on surface acting was higher when mentees' transmissive beliefs were high, and when their constructivist beliefs were low and medium, respectively. While the global pattern of conditional effects aligned well with the interaction effect that had been obtained with regards to mentees' self-efficacy, the simple slope analyses did not reveal a distinct effect of constructivist mentoring when the traditional threshold of significance was applied (e.g., b = -.29, p = .051, for high transmissive and low constructivist beliefs; for all conditional effects, see Tables 6 and 7 in section 6.5.5).

The last regression analysis covered transmissive mentoring interactions and surface acting. The corresponding, overall model reached significance (F (7, 130) = 13.49, p < .01, R^2 = .37). Contrary to the assumption of an adverse effect of this mentoring approach on mentees' emotional management, transmissive mentoring did not increase the frequency of surface acting (b = -.10, p = .31). As to the exploratory moderation terms that were included again, no meaningful interactions with constructivist or transmissive beliefs were obtained. Parameters of the third and fourth regression models are displayed in Table 5.

Table 5

Model Summary for Mentoring Approaches, Beliefs, and Surface Acting

Constructivist Mentoring							
Baseline	CM	CB	TB	CM*CB	CM*TB	R^2	ΔR^2
.57**	-.07	.02	.16	.07	-.38*	.37**	.02*
Transmissive Mentoring							
Baseline	TM	CB	TB	TM*CB	TM*TB	R^2	ΔR^2
.64**	-.10	.03	.05	.35	.24	.37**	.02

Note. CM = constructivist mentoring, CB = constructivist belief, TB = transmissive belief, TM = transmissive mentoring. ΔR^2 refers to the change in explained variance due to the interaction term(s). *p < .05, **p < .01.

6.5 Discussion

6.5.1 Findings of the Present Study

This longitudinal study focused on constructivist- and transmission-oriented mentoring approaches and their respective potential to influence beginning teachers' self-efficacy and surface acting frequency six months later. Within this investigation of mentoring effectiveness, it was further explored whether a (mis-)match between the mentor's approach to mentoring and the mentee's prior beliefs about teaching and learning has consequences for the beginning teachers' professional development.

With regards to beginning teachers' self-efficacy, the present results stand in line with earlier findings that have indicated a beneficial effect of mentoring approaches oriented towards collaboration, reflection on practice, and constructivist principles of learning (Fives et al., 2007; Kutsyuruba et al., 2019; Richter et al., 2013). While the six month-stability of self-efficacy in this study was high, constructivist mentoring still revealed a meaningful effect on the outcome, thus providing support for the corresponding hypothesis. In contrast, novices' self-efficacy did not profit from mentoring interactions that followed traditional principles of learning within the time span considered. Thus, contrary to the assumption that a transmission-oriented mentoring approach may at least provide vicarious experiences for the mentees, transmissive mentoring apparently did not tackle any sources of self-efficacy. While this aligns to previous evidence (Richter et al., 2013), a benefit of this directive approach in earlier phases of teacher education remains plausible, e.g., at the entrance of practical training when novices may need closer guidance. To investigate whether an initial 'match' or 'no-match' (Hobson et al., 2009) between the quality of mentoring and the professional beliefs held by the mentee would be more beneficial for the development of novice teachers' self-efficacy, the conditional effects of constructivist mentoring at different values of mentees' constructivist versus transmissive beliefs were determined. This exploratory moderation analyses indicated that the

influence of constructivist mentoring was stronger when beginning teachers' beliefs contrasted the mentor's approach to mentoring. Put differently, as mentees' transmissive beliefs increase beyond the average in this study, the effect of constructivist mentoring on teacher self-efficacy becomes stronger.

With respect to the beginning teachers' surface acting, transmissive mentoring interactions did not lead to an increase in frequency six months later, contrary to prior assumptions. Instead, transmission-oriented mentors did not affect their mentees' surface acting in the classroom in this study, possibly because the emotional aspects of teaching are simply left out of the mentor-mentee dialogue in this approach. For constructivist mentoring, findings were ambiguous in this regard. While the preliminary correlational analysis first suggested a beneficial effect, results from the subsequent, longitudinal regression analysis did not indicate that this mentoring approach reliably shields against maladaptive emotional labor within the time frame covered in this study. The exploratory analysis with regards to beginning teachers' beliefs, in turn, revealed an interesting pattern of conditional effects that aligns well with the 'no-match' effect observed for constructivist-oriented mentoring and teacher self-efficacy. However, in the light of these results, it would be premature to infer a distinct impact of constructivist mentoring on novice teachers' surface acting. While this appears to be in contrast with earlier findings on mentoring and mentees' emotional management (e.g., Meyer, 2009; Shapira-Lishchinsky & Levy-Gazenfrantz, 2016), this study covered only a limited time frame within the induction phase, and focused on instructional support provided by mentors. It cannot be ruled out that mentoring fosters beginners' emotional management within longer time frames, or that, e.g., psychological support (Gold, 1996) may have an influence on beginning teachers' emotional labor. Mentoring and coaching support have already displayed beneficial effects on emotional labor in other workplace contexts (e.g., Chi & Wang, 2018), underlining their potential in this regard.

While the ‘no-match’ effect for the combination of constructivist mentoring and transmissive beliefs emerged only vaguely for surface acting in this study, it was observed quite consistently for teacher self-efficacy. In the light of this finding, it appears to be beneficial when a mentee experiences constructivist-oriented interactions with his or her mentor that, at the same time, clash with his or her prior, traditional views on teaching and learning. This may indicate that the initial irritation caused by the contradicting mentor’s approach and mentee’s belief can fuel the early learning processes stimulated by mentoring during induction. Noteworthy, an interaction with novices’ prior beliefs was only observed for constructivist mentoring in this study. Given its reflective, mutual, and inquiry-oriented nature, beliefs may be explicitly addressed, juxtaposed, and discussed within this approach (Wang & Odell, 2002), while a directive, educator-centered form of interaction may not leave enough room for such reflective discussion.

6.5.2 Practical Implications

As distinct qualities of mentoring have demonstrated distinct capability to support the professional development of beginning teachers, principals and school administrators should bear in mind the potential benefits of preparing future mentors for their challenging double role as teacher and mentor (Holloway et al., 2018). When untrained, cooperating teachers tend to rely on evaluative feedback, judgmental comments, criticism, and praise (Hoffman et al., 2015). They take up too much interaction time giving direct advice, and do not sufficiently practice, e.g., active listening (Crasborn et al., 2008). Accordingly, transmissive mentoring interactions were a frequent experience for the present study’s participants but remained ineffective for their development. In contrast, constructivist mentoring interactions were beneficial for the novices’ self-efficacy, which represents an essential condition for a successful career start in teaching (Kim & Cho, 2014). Therefore, a structured, research-informed in-service training that prepares soon-to-be mentors for their new function and promotes reflective

counseling techniques (e.g., Kaplan & Madjar, 2017) could harness the full potential of school-based mentoring. Benefits of such a mentor preparation program can further include the mentors' increased capability to support the needs for competence and autonomy of their mentees, thereby promoting autonomous motivation in the beginning teachers (Kaplan, 2021). Moreover, by covering the role of emotions in teaching and the inherent emotional aspect of the mentoring relationship (Hawkey, 2006), this preparatory coursework may further encourage mentor teachers to reflect on the emotions encountered by the mentees, their management, and the respective consequences. Even if neither mentoring approach reliably buffered against a reaction-focused, maladaptive emotion regulation strategy in this study, an orientation towards mutual reflection and inquiry within the mentoring approach should still be considered as an essential prerequisite in this regard.

The present findings further underline the importance that has been attributed to beginning teachers' prior professional beliefs in the context of teacher education (Fives & Buehl, 2012; He & Levin, 2008; Hollingsworth, 1989). At first glance, the observation that a mismatch of beliefs is beneficial for the mentees' development contrasts some earlier findings. However, it is plausible that a match of beliefs leads to a more satisfying or harmonious relationship between mentor and mentee (Bradbury & Koballa, 2008; Kitchel & Torres, 2007), while a no-match may yield benefits for the beginners' self-efficacy. In alignment, a certain degree of dissonance between a mentor and a beginning teacher has been discussed as a 'mainspring' for learning (Hawkey, 1998). Professional beliefs are, in part, implicit and thus subconsciously affect the processing of professional learning experiences (Fives & Buehl, 2012). Mentors need to explicitly address these beliefs, deconstruct how they influence the beginner's practice, and integrate them into the mentoring dialogue, which should be enabled during constructivist-oriented interactions. With regards to the pairing of mentors and mentees, a recommendation arising from the current findings is that principals and administrators

consider the prior beliefs novices bring into their program. If these beliefs initially deviate from reform-minded teaching orientations, the beginning teachers should be paired with mentors whose approach to mentoring represents a counterpart to these beliefs. During a constructivist-oriented dialogue, strongly held traditional beliefs and the expectations espoused by the curriculum can be juxtaposed, verbally enacted by the mentee, and appreciated by the mentor (Levin, 2015). By enhancing meta-cognitive awareness of their beliefs, these may less result in resistance towards reform-minded practice (e.g., Bray, 2011). Moreover, in the light of the current findings, this mismatched pairing fosters the beginners' self-efficacy.

6.5.3 Limitations and Future Directions

Several limitations of the present study require attention. First, the data used is based solely on self-report questionnaires, which may suffer from, e.g., memory bias or consistency motives (e.g., Podsakoff et al., 2003). Moreover, for design reasons, the quality of mentoring was indirectly assessed via the mentees' ratings and cannot be compared to the self-perception of their respective mentors. However, the novices' assessment has been found to be a valid measure that satisfyingly overlaps with the mentors' self-ratings (Richter et al., 2013). To capture the mentoring approach experienced by the novices, a broad measure was applied, which distinguishes between two approaches but cannot provide detailed information on the content of mentor-mentee gatherings. Thus, it cannot be inferred to what extent both parties exchanged views on teaching and learning during their meetings, and the present findings should be rather interpreted as a first clue of benefits associated with a 'no-match'. Future qualitative or mixed-method studies could determine which communicative micro-interactions are effective in juxtaposing different views on teaching and learning. With respect to teacher beliefs, this study's focus is limited to beginning teachers' beliefs about teaching and learning, which is only one of multiple belief domains relevant for professional teacher competence (Fives & Buehl, 2012). Furthermore, within the moderation analyses, it was implicitly assumed

that the mentors' approach to mentoring reflects their actual beliefs about teaching and their teaching practice, so that a real 'belief (no-)match' can be assessed. However, scenarios have been conceptualized in which this consistency is not necessarily the case (Wang & Odell, 2007). In this regard, the present findings need to be treated cautiously and future studies could address this challenge by applying more differentiating measures of beliefs around the mentor-novice relationship. Finally, the effect sizes obtained in this study are small and suggest that other learning opportunities will need to be considered in future research on the wide-ranged outcomes examined in the context of teacher education. Nevertheless, despite generally poor recognition of and compensation for their additional duties (Jones, 2000), mentors following constructivist principles were able to substantially contribute to their novices' development of self-efficacy in this study.

6.5.4 Conclusion

This longitudinal study complements the research on school-based mentoring by investigating two qualities of mentor-mentee interactions and their consequences for novice teachers' self-efficacy and surface acting during induction. The present core findings underline the potential that has been attributed to constructivist mentoring (Richter et al., 2013), do not indicate advantages of transmission-oriented mentoring approaches, and contribute to the search for effective means to foster self-efficacy in teacher education (Klassen et al., 2011). In a moderation analyses framework, the study further provides first evidence for the benefits resulting from an initial mismatch between novices' professional beliefs and mentors' approaches to mentoring. Meanwhile, the results do not indicate a distinct buffering effect of either mentoring approach on novices' surface acting. Mentor preparation programs and the consideration of mentees' prior beliefs in the mentored learning process are worthy goals for mentoring practice.

6.5.5 Supplementary Tables

Table 6

Conditional Effects of Constructivist Mentoring on Self-Efficacy at Values of Beliefs

CB	TB	Effect	*SE*	*t*	*p*	LLCI	ULCI
-.49	-.49	-.06	.08	-.73	.47	-.211	.098
-.49	.00	.06	.06	.98	.33	-.062	.183
-.49	**.49**	**.18**	**.07**	**2.63**	**.01**	**.044**	**.313**
.00	-.49	-.04	.05	-.70	.49	-.139	.067
.00	**.00**	**.08**	**.04**	**2.08**	**.04**	**.004**	**.159**
.00	**.49**	**.20**	**.06**	**3.43**	**.00**	**.084**	**.314**
.49	-.49	-.02	.05	-.31	.76	-.116	.085
.49	**.00**	**.10**	**.05**	**2.06**	**.04**	**.004**	**.200**
.49	**.49**	**.22**	**.07**	**3.00**	**.00**	**.075**	**.365**

Note. CB = constructivist beliefs, TB = transmissive beliefs, LLCI = lower level confidence interval, ULCI = upper level confidence interval. Values of moderators range from -1 to +1 standard deviation. Level of confidence for all intervals at .95.

(Continued: Supplementary Tables)

Table 7

Conditional Effects of Constructivist Mentoring on Surface Acting at Values of Beliefs

CB	TB	Effect	*SE*	*t*	*p*	LLCI	ULCI
-.49	-.49	.09	.15	.58	.57	-.215	.392
-.49	.00	-.10	.13	-.80	.43	-.350	.150
-.49	**.49**	**-.29**	**.15**	**-1.97**	**.05**	**-.580**	**.001**
.00	-.49	.12	.10	1.23	.22	-.073	.315
.00	.00	-.07	.09	-.76	.45	-.246	.110
.00	**.49**	**-.26**	**.14**	**-1.83**	**.07**	**-.535**	**.021**
.49	-.49	.15	.12	1.24	.22	-.092	.400
.49	.00	-.04	.14	-.25	.80	-.315	.244
.49	.49	-.22	.19	-1.16	.25	-.609	.160

Note. CB = constructivist beliefs, TB = transmissive beliefs, LLCI = lower level confidence interval, ULCI = upper level confidence interval. Values of moderators range from -1 to +1 standard deviation. Level of confidence for all intervals at .95.

(Continued: Supplementary Tables)

Table 8

Comparison of Socio-Demographic and Model Variables at Time 1 Between Follow-Up Participants and Dropouts

Variable	Participation at time 2 (N = 138)	No participation at time 2 (N = 316)	Group comparison		
	%	%	χ^2	*df*	*p*
Gender: female	68.1	70.4	2.25	2	.32
Cohort 1	55.1	49.1	1.39	1	.24
Cohort 2	30.4	26.3	.62	1	.43
Cohort 3	14.5	23.4	5.32	1	.02
	M (SD)	*M (SD)*	*t*	*df*	*p*
Age	27.4 (3.0)	27.6 (3.7)	.44	447	.66
Exam Grade[a]	1.84 (.45)	1.91 (.43)	1.62	435	.11
Prior Teaching Experience (hours)	11.7 (4.3)	11.9 (5.3)	.39	452	.70
Constructivist Mentoring	3.20 (.75)	3.25 (.75)	.62	451	.54
Transmissive Mentoring	2.80 (.78)	2.68 (.84)	1.46	451	.14
Constructivist Beliefs	3.31 (.49)	3.39 (.50)	1.55	452	.12
Transmissive Beliefs	2.46 (.49)	2.52 (.53)	1.24	452	.22
Teacher Self-Efficacy	3.04 (.39)	3.12 (.41)	1.91	451	.06
Emotion Work	2.31 (.84)	2.42 (.92)	1.21	451	.23

Note. [a] Average grade of first teaching state examination (Educational Masters).

7. Patterns of Formal and Informal Support within Teacher Induction – Latent Classes and Their Implications for Novices' Competence and Well-Being (Original Study 3)

Burger, J., Schulz, P., & Imhof, M. (2022). Patterns of formal and informal support within teacher induction: Latent classes and their implications for novices' competence and well-being [Manuscript under review]. *Mentoring & Tutoring: Partnership in Learning*.

Abstract

Studies on mentored learning to teach commonly focus on the quality of formally arranged mentoring relationships, leaving aside the informal sources of support that surround the mentor-mentee dyad. In this exploratory study, we broaden the scope and investigate how two distinct formal mentoring approaches interact with the informal support provided at teacher training schools in shaping the professional development of beginning teachers. Self-reports from 583 German beginning teachers on mentoring support, peer support, and collegial support are used to identify typical patterns of support during teacher induction. By means of latent class analysis, five support classes with qualitative differences are identified and subsequently compared with regards to their professional skills, self-efficacy, and emotional exhaustion using the BCH 3-step approach. Findings indicate significant differences across groups and a complementary relation between formal and informal support. Implications for effective teacher support within future teacher education are discussed.

Keywords

Teacher; Induction; Mentor; Informal; Support; Competence

7.1 Introduction

School-based mentoring has become an integral part of teacher induction policies worldwide with the aim to support novices' competence development and well-being (Howe, 2006). Upon entrance into practice, beginning teachers often feel challenged by a wide range of demands (Dicke et al., 2018), whilst often judging their teaching abilities as deficient (Tynjälä & Heikkinen, 2011). Mentoring programs have shown to foster beginning teachers' professional skills (Dunst et al., 2019) and welfare (e.g., Voss et al., 2017), and therefore have been emphasized as an effective measure to buffer against the novices' professional 'reality shock' and, ultimately, attrition (Ingersoll & Strong, 2011). However, research has shown that different qualities of mentoring interactions need to be considered in more detail (e.g., Feiman-Nemser, 2001), as some can even be "detrimental to the professional learning and […] well-being of student and newly qualified teachers" (e.g., Hobson & Malderez, 2013, p. 93). So far, only few studies have contributed to insights towards which distinct approaches to mentoring are beneficial for the beginners' development. Moreover, little is yet known regarding the interrelation of formal mentoring approaches and informal sources of support, such as peers and experienced colleagues located at the training school (Hobson et al., 2009). Can informal supportive interactions, for instance, compensate for a novice's low-quality formal mentoring experience (Desimone et al., 2014)? Or do both forms of support rather complement each other?

In this exploratory study, we investigate how beginning teachers perceive the quality of formal interactions on the one hand, and informal interactions on the other hand within their professional learning during their induction program. Applying a person-centered approach, we aim at identifying novice subgroups that are characterized by distinct patterns of mentoring, peer, and collegial support experience. These potential subgroups will then be compared with

regards to their professional skill acquisition and well-being, which may shed light on the interplay of formal mentoring support and informal support at a novices' training school.

In the following section, we will outline the conceptualizations that shape the theoretical foundation for the included forms of teacher support, each accompanied by a brief review of recent findings on their role in teacher induction. We subsequently focus on the interplay of formal and informal support.

7.2 Theoretical Background

7.2.1 Concepts of Mentoring Support

In teacher education, the term 'mentor' usually labels an experienced teacher who is formally assigned to supervise a new teacher, the mentee. The mentor is intended to "provide […] instructional support and feedback" (Pirkle, 2011, p. 43) and preserve the mentee's well-being. During practical training, instructional support is among the core functions of mentors and entails promoting a large set of skills needed for, e.g., lesson planning, classroom management, and assessment tasks (Gold, 1996). In addition, mentor teachers may also provide psychological support (e.g., protecting their mentees' self-esteem against failures) and act as a role model that influences their mentees' professional identity.

Richter et al. (2013) demonstrated the necessity to consider different qualities of instructional mentor support. The authors distinguish between a constructivist and a transmissive approach to mentoring beginning teachers, each implying different qualities of mentor-mentee interactions (Richter et al., 2013). Within this distinction, a transmission-oriented approach is grounded in a behaviourist learning theory. Accordingly, mentoring is understood as a unidirectional transmission of knowledge by an active expert, the mentor, to the mentee as a mostly passive recipient. In contrast, constructivist-oriented mentoring interactions are characterized by mutual reflection, collaborative problem-solving, and critical

inquiry, which is in line with a constructivist theory of learning (Wang & Odell, 2002). Here, both mentor and mentee are regarded as active learners who co-construct and rearrange knowledge dynamically in a reflection-oriented, bidirectional discourse.

While there is broad consensus that the quality of mentoring interactions experienced by the novices is strongly associated with their professional success (Feiman-Nemser, 2001; Hobson et al., 2009; Howe, 2006), only few studies in the field have compared distinct approaches to mentoring beginning teachers. The following section provides a brief overview on recent findings in this line of research.

7.2.2 Effects of Mentoring Quality on Beginning Teachers' Skill Acquisition and Well-being

Multiple studies have demonstrated that school-based mentoring varies in its effectiveness depending on the quality of mentor-mentee interactions. A mixed-method study by Klassen and Durksen (2014) revealed that informational and positive assistance provided by the mentor teacher was beneficial, whereas high expectations and negative feedback expressed by the mentor led to increased stress for novices in the teaching practicum. Moreover, mentor teachers' critical or judgmental feedback has been found to provoke potentially maladaptive face-saving reactions of the mentee (Bjørndal, 2020), and can yield detrimental effects on the mentees' self-esteem (Hobson & Malderez, 2013). In contrast, a constructivist-oriented mentoring approach had beneficial effects on beginning teachers' self-efficacy, job satisfaction, and emotional exhaustion, and appeared thus superior to transmissive mentoring in a longitudinal study by Richter et al. (2013). Accordingly, Voss et al. (2017) found that a constructivist mentoring experience could protect novice teachers against an increase of exhaustion during the first year of the induction phase.

However, with regards to the mentees' professional skills and knowledge, findings are rather ambiguous. In the study by Voss et al. (2017), constructivist mentoring did not affect the

increase of classroom management knowledge that was observed for the beginning teachers. Contrasting results were found by Malderez et al. (2007), as mentoring considerably supported the development of beginning teachers' classroom and time management skills in their study. As to instructional skills, a recent meta-analysis by Mok and Staub (2021) revealed a small to medium overall effect of mentoring for pre-service teachers, which could be enhanced by making cognitive processes explicit that underlie current teaching practices.

Most of the studies presented above focus on mentor-mentee relationships during the teaching practicum as part of university-based teacher education. Evidence that stems from post-university, practical training programs appears limited. As to mentoring effectiveness, only few studies have addressed the impact of mentoring on the novice teachers' professional competences (Hobson et al., 2009), in contrast to a large amount of works that underline its influence on 'psychological outcomes' (e.g., self-esteem). Moreover, the role of informal relationships that surround and possibly complement the formally established mentoring dyad is rarely acknowledged in investigations of mentored learning to teach. It is open to further research to address these shortcomings and add to the existing literature by exploring the interrelation of formal mentoring and informal sources of novice teacher support.

7.2.3 Informal Support During Teacher Education

Formal mentoring relationships are arranged against a background of spontaneous interactions occurring between the novice teachers and the social environment at their training school. The informal exchange with experienced colleagues and novice peers has been found to support the new teachers' professional development and health. Novice peers may be especially capable of supporting each other's well-being by sharing information and collectively coping with problems, as they often face similar professional challenges (Kutsyuruba et al., 2019; Richter, Kunter, Lüdtke, et al., 2011). Relationships among peers

have been found to help novices maintain their motivation, commitment, and passion for teaching (Anderson & Olsen, 2006).

Complementing this, experienced colleagues form a large part of the training school's social context and play an important role in the novice teachers' socialization into the school culture (Pogodzinski, 2012). Supportive and appreciative relationships with their surroundings are a vital precondition for the beginning teachers' growth of self-esteem and -efficacy. Moreover, informal collaborative networks among teachers promote reflection and reform-minded teaching practices (Herman et al., 2019). Accordingly, the amount of knowledge exchange among colleagues is also associated with early career teachers' job satisfaction and perseverance (Colognesi et al., 2020).

In other professional areas, informal mentor-mentee relationships have been discussed as more beneficial compared to formalized mentoring (James et al., 2015; Ragins & Cotton, 1999). In this regard, it has been argued that a novice can autonomously choose the person they perceive as the best interpersonal fit and that they are not limited to cooperating with a single, formally assigned person. However, novice teachers have reported a tendency to solely seek information during informal interactions with experienced colleagues without engaging in deeper collaborative discourses and reflection (Du & Wang, 2017), which is considered as a vital precondition for a persistent change in professional skills. Consequently, some authors plead for a combination of both formal and informal learning opportunities that may best promote the professional development of teaching practices (e.g., Parise & Spillane, 2010; Shirrell et al., 2019).

7.2.4 On the Interplay of Formal and Informal Support

Mentor teachers are often assigned by the administration without considering any objective criteria, hence a fruitful cooperation within the mentoring relationship is anything but guaranteed for the mentees. Informal sources of professional support may compensate for a lack of mentoring support and offer the kind of guidance, skill repertoire, or expertise that a novice teacher cannot find within the formal mentoring relationship (Desimone et al., 2014). With regards to the conceptualization outlined above, past evidence suggests that low-quality mentoring support is provided when transmission-oriented interactions dominate the exchange (e.g., Richter et al., 2013). This may motivate beginning teachers to look for informal contacts that allow for the mutual reflection and critical inquiry otherwise associated with constructivist-oriented mentoring. Besides, formalized mentoring is more closely oriented towards the curricula standards of teacher education and tends to offer predominantly instructional support in line with these standards, while potentially missing out on the emotional and social needs of the mentees. Hence, novice teachers may choose peers or experienced colleagues to informally speak about their emotional problems (Hochberg et al., 2015).

Informal support may not be limited to the provision of social-emotional help but can also complement formal mentoring with regards to the novices' professional knowledge and skills (Du & Wang, 2017). In alignment with this, Desimone et al. (2014) found no differences in the amount of time spent on exchanging about various areas of professional competence (e.g., classroom management) during formal versus informal interactions. While formal mentors were more likely to make lesson-observations and give feedback within the framework of their systematic programs, beginning teachers also appreciated the spontaneous, 'in the moment' exchange facilitated through informal networks, and highly valued both interaction partners in general (Desimone et al., 2014). Hence, both forms of support can complement each other and contribute to the same learning goals grounded in the respective teacher education

curriculum. Nevertheless, few studies have investigated the interplay of formal and informal sources of support in the induction phase in relation to beginning teachers' professional learning outcomes. Additionally, to our knowledge, no previous study has considered distinct formal mentoring approaches within such an investigation.

7.2.5 Research Aims of the Present Study

In the present study, we take an exploratory, person-centered approach to determine characteristic patterns of formal and informal forms of support at novice teachers' training schools. Therein, we simultaneously consider formal mentoring relationships of varying quality and the concurrent informal interactions surrounding the mentor-mentee dyad, acknowledging that both interact in shaping the framework of beginning teachers' professional development. We specifically focus on how the novices typically perceive the quality of interactions with their mentors, peers, and experienced colleagues during induction. We also examine whether the patterns we obtain indicate a compensatory or complementary interrelation between formal and informal support. We address the following set of exploratory research questions:

(1) How do beginning teachers perceive the quality of their mentoring support, their peer support, and the support provided by their colleagues at the training school? Can we identify distinct patterns of formal and informal support that characterize different subgroups of novice teachers undergoing induction? If so, will these subgroups vary in their socio-demographic and biographic features, i.e., gender, state examination grade, and prior teaching experience?

In a second step, we intend to compare the subgroups of teacher candidates along a range of outcomes related to their professional competence and well-being. Professional teacher

competence has been conceptualized as entailing four broad areas, namely professional knowledge, motivation, self-regulation, and beliefs (Baumert & Kunter, 2006). Within our analyses, we focus on the novices' general pedagogical knowledge and motivation as part of their competence, and further include an indicator of their well-being. Hence, we ask:

(2) Do the identified subgroups differ with regards to their general pedagogical knowledge, i.e., their instructional skills, classroom management skills, and assessment skills?

(3) Do the identified subgroups differ with regards to their teacher self-efficacy, an indicator of their motivation, and their emotional exhaustion, a reverse indicator of their well-being?

Due to the explorative character of our study, we abstain from including a-priori hypotheses. At the same time, qualitative differences across the identified support profiles would allow for specific assumptions regarding research questions (2) and (3). In accordance with past evidence on mentoring quality, a novice subgroup characterized by high constructivist-oriented interactions should indicate comparably higher levels of professional competence and well-being. In the same line, a profile with predominantly transmissive mentoring experience might display lower professional competence than other groups. With regards to informal support, a profile defined by strong peer and collegial support should show lower exhaustion and higher self-efficacy. On a global level, a subgroup that highly benefits from both formal and informal support should exhibit overall high competence and well-being, corresponding to a complementation effect. Moreover, a subgroup with low-quality formal mentoring experiences may simultaneously report more benefits from informal relationships, and vice versa. If a group of this kind does not display poorer professional knowledge or well-being, this may indicate a compensatory relation. Hence, differences in professional competence and well-being across

the identified subgroups may reflect complementary or compensatory relations between formal and informal support. This corresponds to our last question:

(4) Do formal mentoring support and informal peer / collegial support complement each other? Can they compensate for each other?

7.3 Methods

7.3.1 Participants and Procedures

The beginning teachers assessed in this study were part of a larger database obtained in a research project that evaluated the post-reform practical training period in a federal state of Germany (‘Vorbereitungsdienst’), as commissioned by the state authority. This state-specific teacher induction program follows after prospective teachers’ graduation from their educational masters studies at university and leads to the novices’ second and final teaching license. During this phase, candidates assume a reduced teaching load at an assigned supervising school that offers a variety of practical learning opportunities in and around the classroom. At the supervising school, the candidates are assigned to a regular mentor teacher who supports in lesson preparation, instruction, and provides feedback. Moreover, they can autonomously approach experienced colleagues from the school staff and other novices to support their every-day teaching.

In the present study, we included beginning teachers’ information given during the second trimester of their induction, i.e., in the 6th to 8th month of 18 months in total. In cooperation with all 30 teacher training institutions in the state, an online self-report questionnaire was presented during course attendance and filled in voluntarily, anonymously, and without monetary or other compensation. Candidates in this study were part of four

different cohorts that successively participated during the second trimester of training[7], by reason of the repeated-measurement design implemented in the broader evaluation project. The overall sample consisted of 583 persons, aged 27.6 years (*SD* = 3.4) on average. The majority of the participants were female (68.6%), and approximately 25.7% acquired a license for teaching at primary level and 74.3% for teaching at secondary level.

7.3.2 Measures

Formal Support: Mentoring Interactions

Two scales developed by Richter et al. (2013) were adapted in this study to assess the quality of mentor-mentee interactions. The scale measuring transmission-oriented mentoring comprised three items (e.g., 'My mentor tells me what I need to improve.'), while the second scale that captured constructivist-oriented interactions consisted of four items (e.g., 'My mentor helps me to improve independently.'). Novice teachers in our study were asked to indicate their mentoring experience on a Likert scale from 1 (strongly disagree) to 4 (strongly agree). Richter et al. (2013) demonstrated a satisfying overlap between mentees' ratings on these scales in comparison to their respective mentors' self-ratings. Moreover, their findings indicated that a two-factor solution for these mentoring approaches is appropriate in the framework of exploratory and confirmatory factor analyses. Both scales appeared adequately consistent in our study (constructivist-oriented mentoring: ω_T = .87; transmission-oriented mentoring: ω_T = .84).

[7] Each cohort was surveyed during one out of four measurement periods within the overall project duration from autumn 2017 to spring 2019. Cohort 1 (*N* = 232, *M* (age) = 27.2, *SD* (age) = 3.3, 73% female) participated in autumn 2017; Cohort 2 (*N* = 128, *M* (age) = 28.1, *SD* (age) = 4.0, 64% female) participated in spring 2018; Cohort 3 (*N* = 98, *M* (age) = 27.5, *SD* (age) = 3.2, 68% female) participated in autumn 2018; Cohort 4 (*N* = 125, *M* (age) = 28.1, *SD* (age) = 3.0, 65% female) participated in spring 2019.

Informal Support: Interactions with Colleagues and Peers

To tap the degree of informal interactions at the novice teachers' supervisory schools, we assessed interactions with experienced colleagues and novice peers. The scale 'Colleagues as Interactional Partners' has been applied in a broad evaluation project conducted by Kunter et al. (2017) and demonstrated good reliability over multiple assessment periods. Three items were designed to assess the degree of reflectivity and inquiry within the spontaneous interactions with experienced colleagues at the training school (e.g., 'The discussions with my colleagues encourage me to reconsider my own opinion.'). The presented statements were rated on a 4-point Likert scale ('strongly disagree' to 'strongly agree') and demonstrated a satisfying internal consistency in our study ($\omega_T = .78$).

To measure the level of social support provided by our participants' fellow novice teachers, we adapted a scale developed by Richter, Kunter, Lüdtke, et al. (2011). In our study, this questionnaire section was rated on a 4-point Likert scale as well ('strongly disagree' to 'strongly agree') and contained three assertions regarding the degree to which peers provide our participants with support during challenging times (e.g., 'When I face problems with students, the other teacher candidates are important persons to contact.'). The scale showed adequate reliability in this study ($\omega_T = .80$).

Professional Knowledge

We included three facets of beginning teachers' general pedagogical knowledge as part of their teacher competence, covering the areas of classroom management, assessment, and instructions (Baumert & Kunter, 2006). To capture novice teachers' classroom management skills, we applied an adapted version of the German 'Classroom Disturbances and Time Loss' scale (Baumert et al., 2008). Four statements regarding the extent of impaired study time in class were presented (e.g., 'It is difficult to begin lessons on time in my classes.') and rated on a Likert scale from 1 ('strongly disagree') to 4 ('strongly agree'). As to assessment and

instructional skills, we adapted two scales designed by Gröschner (2009). The assessment skills scale comprised seven items (e.g., 'I am able to assess the learning process of my students with different instruments (e.g., Questionnaires, Learning Diaries).'), while the instructional skills scale entailed nine statements (e.g., 'I am able to clearly structure learning situations for my students.'). Both item groups were rated on a scale ranging from 1 ('does not apply at all') to 6 ('strongly applies'). In our study, all three measures displayed satisfying to strong internal consistency (Classroom Disturbances: ω_T = .77; Assessment Skills: ω_T = .86; Instructional Skills: ω_T = .91).

Teacher Self-Efficacy

To measure participants' professional self-efficacy, we applied an adaptation of the German Teacher Self-Efficacy Scale (Schmitz & Schwarzer, 2000). This instrument comprised 10 items designed to assess teachers' competence expectancies in both a content-valid and economical way. The statements presented within the scale referred to different areas of competence (e.g., 'I am confident that I will be able to establish good contact with even problematic students.'). All items were rated on a Likert scale that ranges from 1 (strongly disagree) to 4 (strongly agree). In our study, the scale demonstrated good internal consistency (ω_T = .88).

Emotional Exhaustion

Level of emotional exhaustion was captured with an adapted version of the well-established Maslach Burnout Inventory (German version; Enzmann & Kleiber, 1989) that consisted of four items (e.g., 'I often feel exhausted at work.'). The statements were rated on a scale from 1 (strongly disagree) to 4 (strongly agree) and reached satisfying reliability (ω_T = .80).

7.3.3 Statistical Analysis

To address our hypotheses, we first conducted Latent Class Analyses (LCA) using the Mplus 7.3 package (Muthén & Muthén, 2017). We identified latent classes based on our participants' experienced interactions with mentors, interactions with colleagues, and interactions with peers. Taking a mixture modeling approach, the LCA identifies latent classes in the sample based on patterns of the pre-defined indicator variables by estimating class membership probabilities for each respondent (Spurk et al., 2020). To determine the optimal number of classes, we ran multiple model calculations with an increasing number of latent classes, sequentially comparing a range of model fit indices including the Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC), and the Lo-Mendell-Rubin adjusted likelihood ratio (LMR) test. To allow for the inclusion of non-normally distributed variables in the model, the MLR estimator was used to calculate parameters. To avoid local solutions or maxima, we selected 7,000 random sets of start values, 300 iterations for each random start, and retained the 200 best solutions for final-stage optimization (Hipp & Bauer, 2006). After determining the number of latent classes that displayed the best model fit, survey participants were assigned to a class according to their most likely class membership. To compare the identified subgroups' values on the continuous, distal outcomes included in our study, we then applied the manual BCH approach, which performs Wald tests applicable to non-normal distributed variables (Bakk & Vermunt, 2016).

7.4 Results

7.4.1 Latent Classes of Formal and Informal Support

In a first step, we conducted a confirmatory factor analysis for all indicator variables intended for use in the subsequent latent class analysis (LCA). The combined measurement model demonstrated adequate fit (CFI = .98, RMSEA = .07, SRMR = .05; for recommendations, see Schermelleh-Engel et al., 2003), indicating that all four variables captured distinct interactional qualities as experienced by the beginning teachers in our sample. We then proceeded to the latent class analysis, and sequentially compared a range of fit indices in model solutions entailing one to seven classes (see Table 9).

Table 9

Fit Indices of Model Solutions with 1 to 7 Latent Classes

Number of Classes	Free Parameters	Log-Likelihood	BIC	AIC	LMR	Entropy
1	39	-8616.1	17480.5	17310.1	-	-
2	79	-7947.6	16398.2	16053.1	1331.8**	.90
3	119	-7747.7	16253.3	15733.5	398.1*	.87
4	159	-7564.6	16141.7	15447.2	364.7*	.89
5	**199**	**-7405.4**	**16078.1**	**15208.8**	**317.1**	**.91**
6	239	-7302.3	16126.6	15082.6	205.4	.91
7	279	-7213.0	16202.7	14985.0	177.9	.92

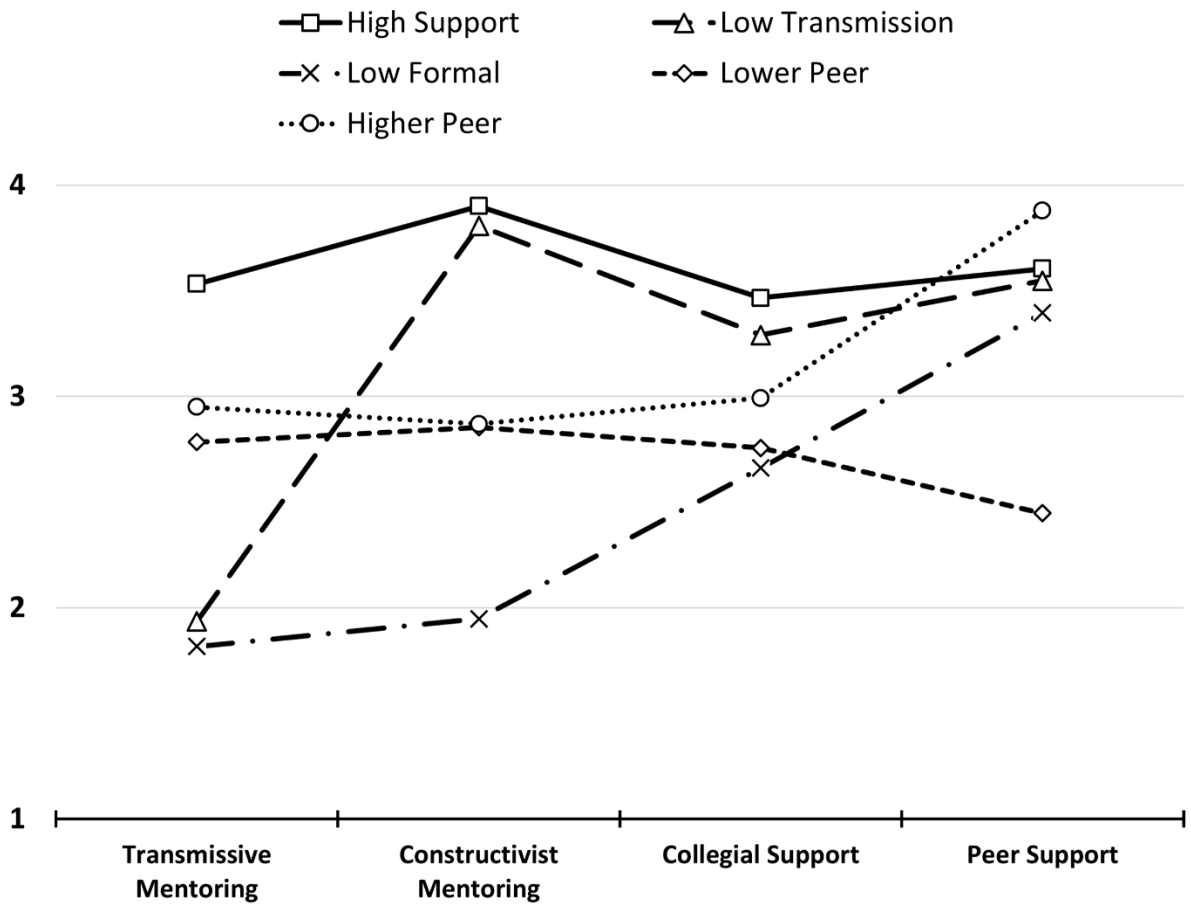
Note. BIC = Bayesian Information Criterion; AIC = Akaike Information Criterion; LMR = Lo-Mendell-Rubin Adjusted Likelihood Ratio Test; ** $p < .01$, * $p < .05$.

We compared the seven LCA runs with regards to fit indices, theoretical interpretability, and parsimony. While the AIC constantly indicated better fit when a class was added to the previous solution, the LMR Likelihood Ratio Test reached non-significance from the five-class solution on, indicating that further added classes would not contribute to a better model fit. The BIC, in turn, reached its lowest, i.e., most favorable value for the five-class solution. As the AIC can overestimate the correct number of underlying classes and thus has been discussed as an inferior fit index (e.g., Nylund et al., 2007), we prioritised the combination of BIC, LMR, and entropy values. In particular, the BIC is considered as an accurate fit index in the framework of Latent Class Analyses (Spurk et al., 2020). As a high entropy value further indicated a high posterior classification accuracy for the five-class solution, we further examined the models with four, five, and six classes with regards to distinctiveness and interpretability. In this in-depth examination, the five-class solution again yielded the most promising results, dividing the overall sample into five subgroups of rather equal size that were qualitatively distinct and appeared both theoretically and statistically plausible. The five identified classes are depicted in Figure 8.

About 25% of the overall sample ($N = 145$) could be assigned to a ‘high support’ class. This subgroup displayed strong constructivist- as well as transmission-oriented mentoring experiences, and simultaneously reported beneficial informal interactions (~0.5-1 *SD* above the grand mean). A ‘low transmission’-class, which comprised about 20% of all participants ($N = 120$), was primarily characterized by high informal and constructivist mentoring support, while showing below-mean transmission-oriented mentoring experiences (~1 *SD* below the grand mean). A ‘low-formal’ support class (~11%, $N = 65$) indicated low constructivist and transmissive mentoring interactions likewise (~1-1.5 *SD* below the grand mean), flanked by a combination of rather low collegial, but strong peer support. A fourth class (~16%, $N = 92$), named ‘lower peer’, was prominent due to comparably low support

Figure 8

Latent Classes of Formal and Informal Support Experiences by Beginning Teachers



from fellow beginning teachers (~1.5 *SD* below the grand mean). The fifth and largest class of the sample (~28%, *N* = 161) was defined by indicator values mostly close to the mean, except for elevated peer support, and was hence labeled ‘higher peer’.

7.4.2 Between-Class Comparison of Professional Competence and Well-being

There were no substantial differences between the identified subgroups with regards to gender, first state graduation GPA, or the amount of prior teaching experience (see Table 10).

Table 10

Sociodemographic Features of Classes

Variable	High Support	Low Transmission	Higher Peer	Lower Peer	Low Formal
N (%)	145 (24.9)	120 (20.6)	161 (27.6)	92 (15.8)	65 (11.1)
% Female	69.7	77.5	66.5	58.7	69.2
Exam[a]	2.0	1.9	1.9	1.9	1.8
Prior Experience[b]	11.9	11.6	12.2	11.3	11.9

Note. [a] Average grade in university state examination; [b] average number of weeks of practical teaching experience prior to entering the induction phase.

Prior to the comparisons of competence- and well-being-related variables between the five derived classes, we investigated the fit of a combined measurement model including all distal outcomes in the framework of confirmatory factor analysis as well. The combined measurement model of Instructional Skills, Assessment Skills, Classroom Management, Teacher Self-Efficacy, and Emotional Exhaustion indicated adequate fit (CFI = .95, RMSEA = .05, SRMR = .06). Next, we applied the three-step BCH approach to test for significant mean differences between all classes that had been identified in the previous step. Class-specific means and between-class differences for all outcome variables are displayed in Table 11.

As to instructional skills, significant differences were obtained between all classes except for the comparison of the ‘Lower Peer’ and the ‘Low Formal’ subgroups which displayed equally low scores. The ‘High Support’ group had significantly higher values than all other groups, including the ‘Lower Transmission’ class characterized by rare transmission-oriented mentoring interactions. A similar pattern emerged for assessment skills, although no

significant differences were observed between the 'High Support', 'Low Transmission', and 'Higher Peer' group for this variable. For classroom management, only the comparison between the 'High Support' group and the 'Higher Peer' group yielded a significant difference. With regards to teacher self-efficacy, again the 'High Support' and 'Low Transmission' groups displayed the highest scores, whereas the 'Lower Peer' and 'Low Formal' classes had significantly lower means. Here, the 'Higher Peer' group showed significantly lower values than the 'high support' subgroup, but meaningfully higher values than both low groups. Lastly, the 'Low Formal', 'Lower Peer', and 'Higher Peer' groups all exhibited significantly higher levels of emotional exhaustion than the two classes characterized by a combination of high formal and informal support.

Table 11

Means and BCH Comparisons of Professional Competence and Well-being Scores across Classes of Formal and Informal Support

Variable	Overall Mean	High Support (1)	Low Trans. (2)	Higher Peer (3)	Lower Peer (4)	Low Formal (5)	Overall Significance (p)	Pairwise
Instructional Skills[a]	4.72	5.10	4.92	4.70	4.35	4.36	$p < .001$	1 > 2 > 3 > 4, 5
Assessment Skills[a]	4.01	4.28	4.15	4.08	3.67	3.59	$p < .001$	1, 2, 3 > 4, 5
Classroom Management[b]	2.77	2.84	2.82	2.68	2.82	2.66	$p < .05$	1 > 3
Teacher Self-Efficacy[b]	3.09	3.23	3.13	3.10	2.87	2.95	$p < .001$	1 > 3 > 4, 5; 2 > 4, 5
Emotional Exhaustion[b]	2.25	1.96	1.97	2.36	2.52	2.57	$p < .001$	1, 2 > 3, 4, 5

Note. [a] Scale range from 1 to 6; [b] scale range from 1 to 4; the last column shows rank order of the five classes corresponding to significant, pairwise BCH comparisons.

7.5 Discussion

7.5.1 The Present Study

In the present exploratory study, we took a person-centered approach to determine typical learning environments at practical training schools of beginning teachers undergoing induction in a state of Germany. After obtaining qualitatively distinct profiles of formal and informal support, we proceeded to compare the associated subgroups with regards to their instructional, assessment, and classroom management skills, as well as their teacher self-efficacy and emotional exhaustion.

In the analyses, five subgroups with specific characteristics emerged that were rather equally distributed within the overall sample. On a global level, this suggests that beginning teachers' perception of formal and informal support quality provided at their training school varies considerably within the induction phase. Moreover, a meaningful proportion of beginning teachers appears to miss out on adequate mentoring support and sufficient social support from peers, respectively. The variation in perceived formal and informal support between the groups, however, did not appear to be associated with the beginners' final university grades or the amount of their teaching experience prior to the post-university induction phase. Thus, the benefits from formal and informal supportive interactions that novice teachers perceive do not seem to be determined by the intellectual or experiential preconditions assessed in this study.

Among the identified subgroups, two groups were characterized by an overall pattern of beneficial support, i.e., high informal interactions and simultaneous high-quality mentoring support ('High Support' profile and 'Low Transmission' profile). One of these two groups experienced primarily constructivist-oriented mentoring interactions, while the other reported on 'hybrid' experiences of both constructivist- and transmission-oriented mentoring. As expected, beginning teachers of both subgroups showed the highest professional competence

and well-being values on average, which is in line with a range of studies that underline the benefits associated with reflection- and inquiry-oriented mentoring practices (Feiman-Nemser, 2001; Howe, 2006; Richter et al., 2013; Voss et al., 2017) and informal support for successful teacher induction (Anderson & Olsen, 2006; Colognesi et al., 2020; Richter, Kunter, Lüdtke, et al., 2011). Moreover, while these two groups did not differ substantially in most of their self-assessments regarding competence and well-being, the 'hybrid' mentoring subgroup reported stronger instructional capabilities within their teaching. Even if rather small, this difference may indicate a benefit gained from a mixture of non-directive and demonstration-oriented mentoring practices, which aligns to a recent meta-analysis of mentoring and coaching in the teaching practicum. In their study, Mok and Staub (2021) concluded that a mentor who demonstrates teaching and simultaneously deconstructs the underlying, cognitive processes, can have a more positive impact on his or her mentee's instructional practice. The present finding of benefits associated with a 'hybrid mentoring' approach corresponds well to this conclusion.

In contrast to the previously discussed, advantageous groups, two additional profiles were derived that showed relative deficits in either formal mentoring support or informal peer support ('Low Formal' profile and 'Lower Peer' profile). In line with our assumptions, these lower-support groups indicated lower self-efficacy, higher emotional exhaustion, and lower professional skills except for classroom management, for which no substantial differences between groups were observed. With regards to the extent of this decline in professional competence and well-being, the beginning teachers whose support experience was predominantly characterized by low mentoring support did not differ from those who primarily reported deficits in support from their peers. Therefore, both the experiences of formal and of informal support seemed to be an essential prerequisite for a successful professional development and health preservation of the beginning teachers in our study. This corresponds

to a complementary relation between both forms of support and aligns with earlier findings in the context of formal and informal mentorship (Desimone et al., 2014; Du & Wang, 2017). While our results do not allow for the claim that informal sources of support are superior in providing emotional support (James et al., 2015; Ragins & Cotton, 1999), they rather reflect a relationship in which formal mentoring is complemented by spontaneous, 'in the moment' support (McCurdy, 2016), and in which both can contribute to the acquisition of professional skills as well as the novices' well-being. Among the professional skills investigated in this study, however, the management of classroom disturbances did not seem to vary substantially between the different profiles of formal and informal support. Possibly, this specific skill is not primarily affected by the interactional qualities as they were covered in our study, but other job-related variables, e.g., student- or classroom-related characteristics (cf. Voss et al., 2017).

With regards to a potential compensatory relation between formal and informal support, none of the five obtained profiles was clearly indicative of such a mechanism. While the fifth subgroup ('Higher Peer') as well as one of the low-support subgroups ('Low Formal') displayed a combination of low(er) mentoring support and simultaneously high(er) peer support, their competence and well-being levels were substantially lower than those of the high-support groups, and thus do not allow for the conclusion that their peers may have compensated for a low-quality mentoring experience. This underlines the importance of high-quality mentoring support during teacher induction.

7.5.2 Practical Implications

Taken together, our findings underline the importance of having both formal and informal sources of support available to optimize the skill acquisition and preserve the well-being of beginning teachers in their in-service training (Parise & Spillane, 2010; Shirrell et al., 2019). With regards to informal support, teachers have shown a tendency to collaborate more at early stages of their career (Richter, Kunter, Klusmann, et al., 2011). Thus, spaces for these

informal learning opportunities need to be established already in the first years of practice to harness their full potential. Learning in communities of practice, together with experienced and novice colleagues, promotes instructional skills, mutual personal support, and reflection (Anderson & Olsen, 2006; Colognesi et al., 2020). However, teacher education still relies heavily on formalized elements of learning and tends to ignore the variety of informal sources of support that complement these elements, instead of placing "collaborative learning opportunities […] at the center of in-service learning for all teachers" (Charner-Laird et al., 2016, p. 13).

In the present study, a considerable amount of beginning teachers surveyed did not experience adequate support from their formally arranged mentoring relationship and was not able to compensate for it with informal support from their experienced colleagues or peers. Given the implications of a low-quality mentoring experience found in the present study, policy makers and supervisors are well advised to place more importance on an adequate preparation of mentor teachers. In practice, teachers are many times selected to be mentors because of their good teaching practice. A good teacher, however, does not automatically make a good mentor. Mentors may struggle at integrating this new professional role and its associated tasks (Holloway et al., 2018). To support pre- and in-service mentors in their practice, a preparatory training may be implemented that entails constructivist-oriented conversational skills, e.g., reflection-oriented questioning, critical inquiry towards teaching practices, and autonomy-supportive problem solving (Crasborn et al., 2008).

In the light of the present findings, both formal and informal learning interactions of high quality are required to optimize the support of beginning teachers' professional development and well-being at their training school. Moreover, both formal and informal sources of support have the potential to address the professional as well as the personal needs of beginning teachers (also see Du & Wang, 2017). Therefore, it appears desirable to establish

an infrastructure that allows for the coordination of both sources at school level and ensure, in consultation with the beginning teacher, that all necessary professional skills and social-emotional needs are sufficiently addressed in the exchange with formal teacher educators and informal contacts (following Desimone et al., 2014). Moreover, the coexistence of formal and informal supportive structures within the induction phase should also be addressed on a policy level, where program coordinators and decision-makers could work towards implementing a better coordination of both in the curriculum, to harness their full, synergetic potential.

7.5.3 Limitations & Future Directions

The present study entails several limitations that are outlined in the following. Firstly, we assessed all constructs via self-report measures. Beside the inherent, general shortcomings associated with this type of data (e.g., memory biases or social desirability-conform ratings), this specifically limits our inferences with regards to our participants' instructional, assessment, and classroom management skills, as these represent self-perceived competences and may thus be conceptually close to professional self-efficacy. To assess professional skills pertaining to these domains, less subjective measures, such as video-based methods (e.g., König, 2015), have received growing attention and could be applied in future studies. Secondly, the scales we applied capture formal and informal teacher support on a global level and do not allow 'zooming into' specific contents of interactions. Therefore, our results in the framework of latent class analysis need to be treated carefully with regards to possible compensatory or complementary mechanisms between both sources of support and can only be considered as a first step on the way to deconstructing their complex interrelation. Future qualitative or mixed-method studies could deepen our understanding of the complex relationship between formal mentoring support and informal collaboration, e.g., by in-depth analyses of transcripts of interactions or addressing support via interview or case studies. Third, we could not include the frequency of formal and informal interactions in our study, which may be an important

factor in the interplay of both forms. However, in the case of formal mentoring, it has been argued that the quality of interactions matters more than its quantity (Richter et al., 2013). This is yet to be determined for informal interactions and the interrelation of both forms. Lastly, a range of other potential sources of professional and personal support in teacher induction lay beyond this study's scope and could be addressed in the future to access more holistic profiles of beginning teacher support. As such, we could not assess the quality of novices' interactions with their respective principal, and we did not focus on the quality of interactions at other professional learning sites, such as external coursework or seminars in the German teacher education system.

7.5.4 Conclusion

The present study improves our insight into formal and informal sources of support and their interplay during the induction phase of teacher education. Taking a holistic approach by means of state-of-the-art latent clustering analysis, we add to a range of previous studies, which have commonly focused on isolated elements of formal teacher education, by including the informal, supportive context surrounding the school-based mentor-mentee dyad at the mentee's training school. In the light of the present findings, we recommend strengthening the skill repertoire of formal mentors, to establish spaces for daily, spontaneous teacher collaboration that can complement the mentored learning process, and to promote the coordination of both sources of support by teacher educators and principals.

8. General Discussion

In the following, central findings of the three empirical studies presented earlier will be integrated and discussed with regard to the broad research questions that guide the present PhD project. Then, their implications for current teacher mentoring practice and research will be derived and methodological strengths and limitations will be critically reflected. For a comprehensive, in-depth discussion of each study's results, please refer to the original studies presented in chapters 5, 6, and 7.

8.1 Key Findings of the Present PhD Project

The present PhD project's central research objectives were two-fold: First, to investigate and compare the potential of constructivist- and transmission-oriented mentoring to support beginning teachers' well-being (cf. study 1), professional self-efficacy and adaptive emotional management (cf. study 2), and acquisition of their generic pedagogical knowledge and skills (cf. study 3) during their induction to the profession. Second, to explore the mechanisms involved in the effectiveness of these mentoring approaches, i.e., potential mediators (cf. study 1), moderators (cf. study 2), and interplays with informal sources of support (cf. study 3).

The Potential of Constructivist and Transmissive Mentoring to Support Beginning Teachers' Development

Including varying indicators of beginning teachers' competence and well-being, all three studies improved our insight into the general effectiveness of each mentoring approach for the mentees' professional development. Focusing on the consequences of constructivist and transmissive mentoring, they complemented each other by addressing the following research questions:

- Are constructivist and transmissive mentoring practices capable of supporting beginning teachers' need for competence and autonomy? Can they reduce the beginning teachers' emotional exhaustion? (cf. Study 1)
- Can constructivist and transmissive mentoring practices foster the beginners' professional self-efficacy? Do they affect the frequency of emotional surface acting by the mentees? (cf. Study 2)
- Are experiences of highly constructivist-oriented or highly transmission-oriented mentoring practices associated with higher instructional, assessment, and classroom management skills of beginning teachers? (cf. person-centered approach in Study 3)

Within the analyses of study 1, it was found that constructivist mentoring shielded beginning teachers against emotional exhaustion and fostered their sense of autonomy and competence considerably during a challenging time of high strain and constant assessment of their performance. In the educational science context, the effect sizes obtained can be viewed as medium even if rather conservative approaches are taken (cf. Timperley et al., 2007). Meanwhile, transmission-oriented mentoring practices had a small impact on the mentees' sense of competence in study 1 but failed to elicit feelings of autonomy in the beginners and did not buffer against emotional exhaustion. In study 2, constructivist mentoring, but not transmissive mentoring, demonstrated a small, beneficial effect on the beginners' professional self-efficacy in a longitudinal framework. At the same time, neither approach to mentoring reliably lowered the frequency of beginners' surface acting. Still, given the negative associations with novices' surface acting in preliminary analyses and the high stability of surface acting during the interval assessed, it appears plausible that constructivist mentoring can have a beneficial impact on mentees' emotional management over longer time spans. Also, it has been suggested that mentors can support beginning teachers in applying other, adaptive emotion regulation strategies, such as cognitive reappraisal of current emotions, which have

not been assessed in study 2 (cf. Chang, 2009b). Finally, within the person-centered approach taken in study 3, subgroups characterized by experiences of highly constructivist-oriented mentoring reported substantially higher instructional and assessment skills than other subgroups (for a comprehensive presentation of the subgroups derived within latent class analyses, please refer to chapter 7). However, no substantial differences in classroom management skills were observed between groups that received highly constructivist-oriented mentoring and groups in which these mentor-mentee interactions were rare. This may be due to the relatively narrow assessment of classroom management in study 3, i.e., as learning time lost due to classroom disturbances, which may not be proximately affected by constructivist mentoring support. However, a study by Voss et al. (2017) assessed beginning teachers' classroom management knowledge in a more holistic way and still did not find an association between constructivist-oriented mentoring and the development of this knowledge during the induction phase. At the same time, given the otherwise scarce evidence on specific mentoring approaches and their respective influence on mentees' classroom management, further studying of how this otherwise promising mentoring approach relates to further aspects of classroom management is needed, and any conclusions would be premature at this point. Nevertheless, it is possible that additional learning opportunities need to be offered during induction that can effectively promote beginners' classroom management, such as structured training programs (e.g., Dicke, Elling, et al., 2015).

As the overall view provided above illustrates, constructivist-oriented mentoring practices were consistently found to be superior to transmission-oriented practices regarding the promotion of various aspects of beginning teachers' professional competence and well-being. Referring to the process model of teachers' competence development (Kunter et al., 2013) outlined earlier, the present results support the model-related claim that the quality of specific learning opportunities, such as mentoring, has substantial consequences for the

professional development of beginning teachers. The benefits associated with mentoring oriented towards mutual reflection and problem-solving, critical inquiry, and co-thinking are in accord with a range of previous and current findings (e.g., Howe, 2006; Linninger, 2016; Prabjandee, 2022; Richter et al., 2013; Voss et al., 2017). Meanwhile, mentoring interactions based on behaviorist conceptions of learning appeared to be largely ineffective in stimulating mentees' development of teacher self-efficacy, professional skills, and well-being, which is, again, in line with some earlier studies (Linninger, 2016, Richter et al., 2013). Having said this, however, study 3 revealed small advantages for the instructional skills of beginning teachers that experienced a 'hybrid approach' of both transmission- and constructivist-oriented mentoring when compared to beginning teachers who received predominantly constructivist mentoring. This exploratory finding may indicate that transmission-oriented practices, though ineffectual when solely relied upon, can have a positive impact when mentors are capable of flexibly switching between different approaches in shaping the interactions with their mentees (cf. Mok & Staub, 2021).

Further Influences on the Effectiveness of School-based Mentoring

Beside focusing on the professional consequences of mentoring beginning teachers, the three studies conducted within this PhD project each aimed at uncovering specific mediating and moderating processes embedded in the effectiveness of mentoring that is based on distinct learning theories. With regards to these mechanisms of mentoring, studies 1, 2, and 3 each addressed specific research questions:

- Can the specific capability to support beginning teachers' intrinsic needs explain differences between the respective influence of constructivist and transmissive mentoring on the beginners' well-being? (cf. Study 1)

- What are the consequences of a match versus a mismatch between a mentor's and a mentee's beliefs about teaching and learning for the professional development of the mentee during teacher induction? (Study 2)
- Do formal mentoring support and informal support complement each other? Can they compensate for each other? (Study 3)

Within the scope of study 1, analyses based on structural equation modeling revealed that autonomy need support fully mediated the beneficial impact of constructivist mentoring on mentees' emotional exhaustion. The findings indicate that autonomy is a vital precondition for the healthy development of beginning teachers during induction. Transmission-oriented mentoring did not support the beginners' autonomy, suggesting that mentoring based on directive advice and close guidance fails to establish a learning environment that promotes an optimal, productive development of learners (cf. Deci & Ryan, 2002). While other learning opportunities provided within initial teacher education were beyond the scope of this study, future investigations could determine if the need for autonomy also plays a mediating role in the positive effects of, e.g., discourses during teacher induction classes of varying quality (Decker et al., 2015) or peer support (e.g., Richter, Kunter, Lüdtke, et al., 2011) that have been observed.

In study 2, a small but significant moderating effect of beginners' transmissive beliefs about teaching and learning was obtained within the effectiveness of constructivist-oriented mentoring. When these traditional beliefs about teaching brought into the program were strong, constructivist mentoring had a greater influence on the beginning teachers' self-efficacy. This may indicate that a 'mismatch' between professional beliefs held by experienced versus novice teacher can stimulate specific aspects of the beginners' professional competence development (cf. Hawkey, 1998), if mentoring practices allow for a mutual reflection on and critical inquiry of prevailing and subjective teaching ideals. At the same time, it has been found that similarities

between mentors' and mentees' professional values and attitudes contribute to a more harmonious and satisfying relationship as perceived by the mentees (Kitchel & Torres, 2007). Therefore, the consequences of a belief match versus mismatch for different aspects of the learners' professional development are potentially manifold, calling for deeper investigations that can support efforts to develop pairing procedures within teacher mentoring (e.g., Lozinak, 2016).

Finally, study 3 sets out to cast light upon the interplay between school-based mentoring and informal support by experienced colleagues and novice peers at the beginning teachers' training schools. In the exploratory approach taken, the distinct patterns of support indicated a complementary relation between formal and informal support, as groups characterized by either low formal mentoring quality or low informal support quality showed comparable declines in professional competence and well-being (for a closer examination of the different subgroups found within study 3, please refer to chapter 7). At the same time, the subgroups identified via latent class analysis did not allow for the claim that informal support compensates for a beginning teacher's poor formal mentoring experience, in line with first findings (Desimone et al., 2014). Nevertheless, the present study should be considered as merely one of the first steps towards discovering how formal mentoring relates to informal sources of support during teacher training. While the person-centered approach taken in study 3 led to interesting results also with regards to the interplay of both mentoring approaches, the potentially complex relation of formal mentoring and informal interactions calls for future, longitudinal studies as well as mixed-method approaches that include, e.g., interview data, and allow for improved insight into the underlying mechanisms.

The findings summarized in this section advance our understanding of the effectiveness of mentoring in multiple ways. Firstly, they reveal important mechanisms embedded in the specific effects of transmission- versus constructivist-oriented mentoring on beginning

teachers' well-being, emphasizing at the same time the crucial role of autonomy need support during initial teacher education. Secondly, they suggest that the beginners' prior beliefs about teaching may interact with the mentoring support received during initial teacher education, and that constructivist-oriented practices allow mentors to integrate mentees' differing beliefs into the dialogue and utilize this dissonance within the mentored learning process. Thirdly, they identify typical patterns of formal mentoring and informal support which indicate that collegial and peer support may not compensate for, but complement a mentoring experience of varying quality at the beginners' training school. With regards to the process model of teachers' competence development (Kunter et al., 2013), these findings are in line with the postulates that learners' uptake of mentoring as a learning opportunity can be moderated by individual, cognitive characteristics and that the social context of the supervisory school is intertwined with the learning opportunity and its uptake.

8.2 Implications for Mentoring Practice and Research in Teacher Education

Implications for Mentoring Practice

In most current teacher induction programs, mentor teachers are rarely prepared for their role but commonly selected by the principal or other educational decision-makers based on, if anything, their perceived teaching capability. However, as Hobson et al. (2009) suggested, "not all good teachers make good mentors" (p. 212). In fact, mentor teachers that are not trained for mentoring are prone to rely on directive feedback, criticism, and evaluative comments (Hoffman et al., 2015), and talk the most during meetings with their mentee (Mena et al., 2017). In the present study, mentoring interactions based on a directive, unidirectional transmission of knowledge largely failed to promote mentees' professional development and well-being. Given the crucial role that has been attributed to mentoring in teacher induction for decades and growing evidence on its often unrealized potential, it appears increasingly ill-

considered to simply nominate supposedly good teachers for mentor positions. In light of previous as well as the present findings, policymakers concerned with initial teacher education would be well-advised to acknowledge mentoring as a "profession within a profession" (Smith, 2015, p. 283) that needs to entail a formal training informed by current research (cf. Aspfors & Fransson, 2015). Such mentor preparation courses should comprise practical training in non-directive and autonomy-promoting counseling skills (cf. Crasborn et al., 2008; Kaplan & Madjar, 2017), opportunities for critical reflection on the tasks and potential conflicts associated with the future mentor roles (Holloway et al., 2018), and ongoing supervision groups that offer space for mutual support, problem-solving, and discussions of current challenges in individual mentoring practices (cf. Gardiner, 2009). While studies evaluating structured trainings have demonstrated positive effects for mentors' capabilities (e.g., Beutel & Spooner-Lane, 2009; Langdon & Ward, 2015), a successful region- or nationwide implementation of such a training will depend on the personnel and financial resources available in a given context. To participate in such training would require future mentors to be granted additional release time for their efforts (cf. Beutel & Spooner-Lane, 2009), which is a form of compensation already provided much too sparsely in many current mentor arrangements (Jones, 2000). Nevertheless, it is of crucial importance that the professionalization of mentors does not come at the expense of their working capability or well-being (cf. Hobson & van Nieuwerburgh, 2022). If educational budgets do not allow for enhancing mentors' expertise, then, a comparably less costly alternative may be to at least use the empirical evidence on effective mentoring practice for selecting mentors that bring the most qualification to the job. In the same vein, the European Commission (2010) has recommended to policymakers to choose teachers as mentors "according to rigorous criteria" (p. 21), such as interpersonal and communication abilities and the willingness to promote beginning teachers' exploration of different teaching methods and styles, which essentially reflects a constructivist approach.

Beside its central concern with the proficiency that mentors bring into the dyadic mentoring relationship, the present PhD project aimed at exploring whether cognitive preconditions of the beginning teachers are also influential for the outcomes of mentored learning to teach (cf. Kunter et al., 2013). Given the scarcity of studies that have considered prior professional beliefs or other characteristics of the mentees, it would be premature to infer recommendations for a specific, belief-based mentor-mentee pairing procedure based on the present findings. Nevertheless, they do suggest that the prior beliefs of mentees interact with learning opportunities offered by mentors and thus must be addressed and juxtaposed within school-based mentoring dialogues (cf. Bradbury & Koballa, 2008; He & Levin, 2008). Moreover, pairing novice teachers that hold traditional beliefs about 'the right way of' teaching with expert teachers engaging in constructivist-oriented mentoring practices may lead to an initial, relational tension, but also result in short- to medium-term benefits for the novices' self-efficacy, and thus, may ease their transition to a full teaching position (Tynjälä & Heikkinen, 2011). This underlines the potential of fostering a constructivist-oriented skill set among mentor teachers, enabling them to not only support the need satisfaction of their mentees, but also to integrate potentially differing beliefs into the dialogue in a favorable way by promoting critical inquiry of prevailing doctrines of teaching and abstaining from judgmental criticism.

The present findings further suggest that the social background in which a mentoring arrangement is formed plays an important role in beginning teachers' skill acquisition and well-being. While the informal support provided by colleagues and novice peers may not compensate for a mentee's poor mentoring experience in general, it is an important component of a beneficial learning environment at a training school and can complement mentoring in supporting professional learning and occupational health likewise. Therefore, it may be worthwhile to improve the coordination of formal mentoring dyads with the informal sources of support surrounding them, to better meet the professional and personal needs of beginning

teachers (cf. Beutel & Spooner-Lane, 2009; Desimone et al., 2014). Some teacher induction programs have already implemented structures that connect mentoring to more informal forms of support. For instance, within teacher induction in Israel, formally arranged mentoring support is complemented by less formalized, yet regularly meeting professional learning communities of teachers (Kaplan, 2022). In these learning community sessions, beginning teachers can discuss current challenges and develop a professional identity in a safe space, which has been shown to enhance their perceived autonomy and competence beyond the effects of mentoring (ibid.). Another example is provided by New Zealand, where alongside an 'advice and guidance coordinator' with mainly mentor-related duties, a 'buddy teacher', who entered practice few years ago, supports the beginners emotionally (Blömeke & Paine, 2009). While such approaches towards more holistic structures of professional support in teacher induction necessitate, to a certain extent, a formalization of hitherto informal sources, they are nevertheless promising undertakings towards a stronger embedding of mentoring into a school's social environment and the expertise located within.

Perspectives for Research on School-based Mentoring

In the literature research conducted for the present studies, the author came across a considerable heterogeneity of notions and concepts used to refer to different approaches towards school-based mentoring support, which often made it difficult to develop an overall picture of the current state of research. In a similar vein, Orland-Barak (2014) observed that

> the field is still challenged given the basic fragmented character of the various studies […]. The 'isolated pieces' of mediated professional learning […] call for adopting conceptual lenses that recognize the multifaceted networks of interactions that define mentors mediating roles and behaviors. (p. 186)

Indeed, much work is still to be done with regard to integrating the variety of qualitative and quantitative findings in the field that stem from differing conceptions and theoretical groundings of mentoring and its determinants. Nevertheless, endeavoring to gain a complete view of this patchwork quilt made up of such a variety of evidence would advance our shared language as researchers, stimulate the scientific discourse on effective teacher mentoring, and lay the foundations for recommendations to practitioners (cf. Orland-Barak, 2014). If, in contrast, researchers continue to accept the fraying out of notions used in the different strands of mentoring research, they risk a fragmentation within the field up to a point where basic, generalizable evidence that has value for teacher educators and decision-makers can no longer be produced.

By consolidating the varying notions and conceptions of mentoring prominent in the field, researchers and practitioners could develop a more holistic understanding of the many influential variables involved in the effectiveness of mentoring support for beginning teachers. Building upon the current findings, it appears particularly important to determine whether the benefits of constructivist-oriented mentoring practices may be diluted if mentors are involved in formal, summative assessments of beginning teachers. Combining the roles of an assessor and a supporter of the beginning teachers can be demanding for mentors and the mentoring relationship (Holloway et al., 2018; Smith, 2015). With certain induction-related evaluation criteria in mind, mentor teachers may be prone to more directive advice and close guidance, and less inclined to promote their mentee's autonomy in trying out different teaching methods. Future, cross-national studies could compare programs in which mentors are not tasked with beginners' assessment against those that see mentors act in a double role, and determine how this may affect the effectiveness of constructivist mentoring practices.

Lastly, while the present PhD project focused on mentoring in a traditional sense, i.e., as a dyadic relationship of an experienced professional and a novice, contemporary research

highlights the benefits of alternative forms of mentoring in the teacher education context, such as peer-group mentoring (e.g., Pennanen et al., 2020). The concept, originating in Finland, places a heavy emphasis on group-based, eye-level collaboration, co-construction of meaning, exchanging views, and shared reflection on experiences. Not only novices, but teachers at different stages of their career join and, under the guidance of an experienced teacher, establish reciprocal relationships and support each other. This setting, it has been argued, facilitates the orientation towards constructivist and humanistic principles in the mentoring process (Heikkinen et al., 2008). Since to date, the majority of past studies have focused on dyadic mentoring, more empirical evidence is needed to determine the advantages and, possibly, disadvantages of group-based forms relative to the conventional, one-on-one relationship. Nevertheless, peer-group mentoring appears as a promising alternative and may soon be the logical next step towards more constructivist-oriented mentoring practices in teacher education.

8.3 Methodological Strengths and Limitations

A range of methodological strengths and limitations of the three present studies require attention and will be addressed in the following. These relate to the studies' respective design, sample, applied instruments for data assessment, and data analyses.

Design

Two of the three studies conducted within the present PhD project have a cross-sectional design. Therefore, the causal assumptions underlying the model-based analyses of both studies could not be probed statistically but are grounded in theoretical arguments and prior research. In contrast, the longitudinal design of study 2 contributed to the research branch by determining the predictive value of mentoring over a six-month time span while controlling for baseline values of the outcomes under investigation. Studies based on larger samples could

further determine the causal relations between mentoring and, e.g., self-efficacy by specifying cross-lagged panel models based on multiple times of measurement (cf. Boomsma & Hoogland, 2001; Selig & Little, 2012). Moreover, each study maintained a clear focus on specific determinants of mentoring effectiveness, which led to a limited selection of variables and associations included in each investigation. While parsimonious model specifications are often preferable for the analyses of latent variable structures (cf. Raykov & Marcoulides, 1999), each study could ultimately cover only a fraction of the many influential factors involved in teachers' professional learning that have been postulated (Kunter et al., 2013). Hence, it cannot be ruled out that further relevant variables on the individual level, such as mentees' reasoning capabilities (Bullough et al., 2008) or willingness (Roehrig et al., 2008), and further factors on a contextual level, such as local, induction-related school policy and culture (e.g., Grudnoff, 2012), could have exhibited an influence if included in the presently specified models. Finally, while studies 1 and 2 followed variable-centered, regression-based approaches, study 3 took a person-centered approach by means of latent class analysis. While it is challenging to directly compare the findings of these studies, the exploratory analysis of study 3 complemented the first two investigations by offering a unique perspective on a 'hybrid approach' of transmission- and constructivist-oriented mentoring practices. In strictly variable-centered approaches, an investigation of this kind would not have been permitted.

Sample

Improving our insight into the mentored learning processes of beginning teachers enrolled in a post-university induction program, the present findings provide added value to a field of research that commonly relies on student teachers and their mentoring experience during the teaching practicum (Hoffman et al., 2015). At the same time, the data provided by the participants stem from a specific teacher education context shaped by state regulations of Rhineland-Palatinate, a region of Germany. While local and national contexts inevitably limit

the generalizability of findings in the field of teacher education, the present studies focused on generic mentoring approaches based on fundamental theories of learning, which have shown validity in diverse contexts and have been used in analogous forms within mentoring studies conducted in, e.g., the United States (Feiman-Nemser, 2001), England (Manning & Hobson, 2017), Finland (Heikkinen et al., 2008), Thailand (Prabjandee, 2022), New Zealand (Langdon & Ward, 2015), Austria (Da Rocha, 2014), and other regions of Germany (Richter et al., 2013). Therefore, findings of the present PhD project can contribute to the international discourse on 'the right way of' mentoring and should, at the same time, be cautiously interpreted in consideration of the national context from which they emerged (for an overview, see Cortina & Thames, 2013). With regards to sample size, the studies' analyses are based on satisfyingly large data sets from roughly 580 participants and nearly 140 participants, respectively, which enabled the definition and testing of statistical models with increased complexity. At the same time, the average response rate of the online questionnaire applied for data acquisition is estimated at around 23 percent (Imhof et al., 2020), indicating a gap between the potential and the eventually realized sample and questioning the latter's representativity. However, this represents a return rate common for online surveys in the social sciences when no compensation for participation is granted (cf. Tuten et al., 2002) and is comparable to other scientific projects that intended an extensive evaluation of teacher induction programs (Kunter & Klusmann, 2010). Moreover, we cooperated with all 30 teacher training institutions of Rhineland-Palatinate during data acquisition, enhancing the representativity of our sample. Finally, the studies conducted within the present PhD project aimed at investigating the consequences of generic learning opportunities in teacher induction, as opposed to an in-depth characterization of the state's specific population. Therefore, the average return rate of our online survey is no cause for further concern.

Instruments

All analyses of the present PhD project are based on data gathered via self-report measures, which are unavoidably at risk of being biased by, inter alia, memory effects, rating tendencies, or social desirability (Podsakoff et al., 2003). At the same time, these self-report scales enabled an efficient data acquisition and ultimately allowed for the application of quantitative methods that require larger sample sizes (for sample size recommendations, see Boomsma & Hoogland, 2001; Spurk et al., 2020), which is desirable in a branch of research that still lacks large-scale studies (cf. Hobson & van Nieuwerburgh, 2022; Kunter & Klusmann, 2010) and where quantitative approaches are rare. Regarding the specific variables included in the present studies, it firstly appears adequate to assess the participants' emotional exhaustion, basic need satisfaction, professional beliefs, surface acting, and self-efficacy by means of self-reports, as subjective experience and views, respectively, are at the core of these constructs. Moreover, self-reported emotional exhaustion is commonly used as an indicator of teachers' occupational well-being and health, respectively (e.g., Mattern & Bauer, 2014; Uitto et al., 2015). Meanwhile, the operationalization of transmission- and constructivist-oriented mentoring interactions via mentees' self-reports needs to be examined critically. The measure provided by Richter et al. (2013) demonstrated a meaningful overlap with mentors' self-assessments in the authors' original study and the factor structure of the scales could be confirmed in the present analyses. Still, the measure only permits us to examine mentoring approaches on a global level and does not allow for 'zooming' into specific mentor-mentee interactions in a more qualitative way. This argument also applies to the instruments used to assess informal support, and consequently calls for future studies that can enrich such quantitative data with qualitative assessments conducted in the field, such as interviews or meeting observations (e.g., Manning & Hobson, 2017), to further determine the mechanisms involved in school-based mentoring. Finally, the validity of beginning teachers' self-

perceptions of their generic pedagogical knowledge and skills, as included in study 3, is possibly limited and may be closer to the concept of professional self-efficacy than to objective measures of teacher competence (cf. Kunter & Klusmann, 2010). Here, standardized knowledge tests (e.g., Voss et al., 2011) and external ratings, such as students' ratings of instructional quality (e.g., Fauth et al., 2014), would be valuable - if costly - alternatives with potentially increased validity.

Data Analysis

Regarding the analytical approaches taken, the latent analyses conducted within studies 1 and 3 can be considered as a methodological strength of the present PhD project. In study 1, calculations based on structural equation modeling allowed for a precise, integrated definition of relationships among constructs and for an assessment of associations at the latent rather than the observed level, using the state-of-the-art R package 'lavaan' for all model specifications (MacCallum & Austin, 2000; Rosseel, 2012). Moreover, in the person-centered approach in study 3, we applied a contemporary, latent clustering procedure based on a large number of iterations, solution replications, as well as multiple fit indices, as is recommended (Spurk et al., 2020). Meanwhile, in study 2, separate models were put to the test for the independent and dependent variables instead of an integrated model that contains all variables simultaneously, due to the smaller sample size. Thus, future studies should test these associations within an integrated model for hypothesis testing supported by larger samples.

8.4 Conclusion

By means of three empirical investigations, the present PhD project advanced our understanding of effective mentoring support for beginning teachers during the induction into their profession. Overall, mentoring based on a constructivist theory of learning was found to effectively promote multiple aspects of the beginners' professional competence, their autonomy, and well-being during their post-university practical training. Meanwhile, findings indicate that transmission-oriented mentoring practices are mostly ineffectual for the professionalization of the novices. With regards to the constructivist-oriented approach, first exploratory results of the present studies further suggest benefits associated with an initial mismatch between professional beliefs held on both sides and highlight the importance of informal sources of support that can complement the mentoring relationship. To harness the full potential of school-based mentoring, it would seem imperative to implement mandatory, comprehensive, and evidence-based training programs that strengthen future mentors' constructivist-oriented communicative skills and their readiness towards critical inquiry about teaching ideals. Moreover, coordinating formal mentors and informal supporters could optimize the learning environment at the supervisory school of beginning teachers. In light of the plethora of studies which highlight mentoring as a key resource during teacher induction, greater investment in the professionalization of mentors and their orientations towards humanistic and constructivist principles will not only contribute to the induction of competent, mentally healthy teachers; it could also promote critical-constructivist transformation processes of prevailing practices and the drive for innovation in teaching as a whole.

References

Abraham, W. T., & Russell, D. W. (2004). Missing data: A review of current methods and applications in epidemiological research. *Current Opinion in Psychiatry*, *17*(4), 315–321. https://doi.org/10.1097/01.yco.0000133836.34543.7e

Aelterman, N., Vansteenkiste, M., van Keer, H., & Haerens, L. (2016). Changing teachers' beliefs regarding autonomy support and structure: The role of experienced psychological need satisfaction in teacher training. *Psychology of Sport and Exercise*, *23*, 64–72. https://doi.org/10.1016/j.psychsport.2015.10.007

Aldrup, K., Klusmann, U., & Lüdtke, O. (2017). Does basic need satisfaction mediate the link between stress exposure and well-being? A diary study among beginning teachers. *Learning and Instruction*, *50*, 21–30. https://doi.org/10.1016/j.learninstruc.2016.11.005

Aldrup, K., Klusmann, U., Lüdtke, O., Göllner, R., & Trautwein, U. (2018). Student misbehavior and teacher well-being: Testing the mediating role of the teacher-student relationship. *Learning and Instruction*, *58*, 126–136. https://doi.org/10.1016/j.learninstruc.2018.05.006

Ambrosetti, A. (2014). Are you ready to be a mentor? Preparing teachers for mentoring pre-service teachers. *Australian Journal of Teacher Education*, *39*(6), 30–42. https://doi.org/10.14221/ajte.2014v39n6.2

Anderson, L., & Olsen, B. (2006). Investigating early career urban teachers' perspectives on and experiences in professional development. *Journal of Teacher Education*, *57*(4), 359–377. https://doi.org/10.1177/0022487106291565

Aspfors, J., & Fransson, G. (2015). Research on mentor education for mentors of newly qualified teachers: A qualitative meta-synthesis. *Teaching and Teacher Education*, *48*, 75–86. https://doi.org/10.1016/j.tate.2015.02.004

Bakk, Z., & Vermunt, J. K. (2016). Robustness of stepwise latent class modeling with continuous distal outcomes. *Structural Equation Modeling: A Multidisciplinary Journal*, *23*(1), 20–31. https://doi.org/10.1080/10705511.2014.955104

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice Hall.

Barkatsas, A., & Malone, J. (2005). A typology of mathematics teachers' beliefs about teaching and learning mathematics and instructional practices. *Mathematics Education Research Journal*, *17*(2), 69–90. https://doi.org/10.1007/BF03217416

Bartholomew, K. J., Ntoumanis, N., Cuevas, R., & Lonsdale, C. (2014). Job pressure and ill-health in physical education teachers: The mediating role of psychological need thwarting. *Teaching and Teacher Education*, *37*, 101–107. https://doi.org/10.1016/j.tate.2013.10.006

Baumert, J., Blum, W., Brunner, M., Dubberke, T., Jordan, A., Klusmann, U., . . . Tsai, Y.-M. (2008). *Professionswissen von Lehrkräften, kognitiv aktivierender Mathematikunterricht und die Entwicklung von mathematischer Kompetenz (COACTIV): Dokumentation der Erhebungsinstrumente* [Professional competence of teachers, cognitively activating instruction, and development of students' mathematical literacy (COACTIV): Scale documentation]. Materialien aus der Bildungsforschung Nr. 83 [Educational Research Material No. 83]. Max-Planck-Institut für Bildungsforschung.

Baumert, J., & Kunter, M. (2006). Stichwort: Professionelle Kompetenz von Lehrkräften [On the professional competence of teachers]. *Zeitschrift für Erziehungswissenschaft*, *9*(4), 469–520. https://doi.org/10.1007/s11618-006-0165-2

Baumert, J., & Kunter, M. (2013). The COACTIV model of teachers' professional competence. In M. Kunter, J. Baumert, W. Blum, U. Klusmann, S. Krauss, & M. Neubrand (Eds.), *Cognitive activation in the mathematics classroom and professional competence of teachers* (pp. 25–48). Springer. https://doi.org/10.1007/978-1-4614-5149-5_2

Beck, C., & Kosnik, C. (2000). Associate teachers in pre-service education: Clarifying and enhancing their role. *Journal of Education for Teaching*, *26*(3), 207–224. https://doi.org/10.1080/713676888

Berry, B., & Shields, P. M. (2017). Solving the teacher shortage: Revisiting the lessons we've learned. *Phi Delta Kappan*, *98*(8), 8–18. https://doi.org/10.1177/0031721717708289

Beutel, D., & Spooner-Lane, R. (2009). Building mentoring capacities in experienced teachers. *The International Journal of Learning: Annual Review*, *16*(4), 351–360. https://doi.org/10.18848/1447-9494/CGP/v16i04/46209

Bjørndal, C. R. (2020). Student teachers' responses to critical mentor feedback: A study of face-saving strategies in teaching placements. *Teaching and Teacher Education*, *91*, 103047. https://doi.org/10.1016/j.tate.2020.103047

Blömeke, S., & Klein, P. (2013). When is a school environment perceived as supportive by beginning mathematics teachers? Effects of leadership, trust, autonomy, and appraisal on teaching quality. *International Journal of Science and Mathematics Education*, *11*(4), 1029–1048. https://doi.org/10.1007/s10763-013-9424-x

Blömeke, S., & Paine, L. (2009). Berufseinstiegs-Programme für Lehrkräfte im internationalen Vergleich [An international comparison of induction programs for teachers]. *Journal für Lehrerinnen- und Lehrerbildung*, *9*(3), 18–25.

Bollen, K. A. (1989). *Structural equation modeling with latent variables*. John Wiley & Sons.

Boomsma, A., & Hoogland, J. J. (2001). The robustness of LISREL modeling revisited. In R. Cudeck, S. du Toit, & D. Sörbom (Eds.), *Structural equation modeling: Present and future: A festschrift in honor of Karl Jöreskog* (pp. 139–168). Scientific Software International.

Bradbury, L. U., & Koballa, T. R. (2008). Borders to cross: Identifying sources of tension in mentor-intern relationships. *Teaching and Teacher Education*, *24*(8), 2132–2145. https://doi.org/10.1016/j.tate.2008.03.002

Bray, W. S. (2011). A collective case study of the influence of teachers' beliefs and knowledge on error-handling practices during class discussion of mathematics. *Journal for Research in Mathematics Education*, *42*(1), 2–38. https://doi.org/10.5951/jresematheduc.42.1.0002

Brouwers, A., & Tomic, W. (2000). A longitudinal study of teacher burnout and perceived self-efficacy in classroom management. *Teaching and Teacher Education*, *16*(2), 239–253. https://doi.org/10.1016/s0742-051x(99)00057-8

Bullough, R. V., & Draper, R. J. (2004). Mentoring and the emotions. *Journal of Education for Teaching*, *30*(3), 271–288. https://doi.org/10.1080/0260747042000309493

Bullough, R. V., Young, J. R., Hall, K. M., Draper, R. J., & Smith, L. K. (2008). Cognitive complexity, the first year of teaching, and mentoring. *Teaching and Teacher Education*, *24*(7), 1846–1858. https://doi.org/10.1016/j.tate.2008.02.001

Burger, J., Bellhäuser, H., & Imhof, M. (2021). Mentoring styles and novice teachers' well-being: The role of basic need satisfaction. *Teaching and Teacher Education*, *103*, 103345. https://doi.org/10.1016/j.tate.2021.103345

Burns, D., & Darling-Hammond, L. (2014). *Teaching around the world: What can TALIS tell us?* Stanford Center for Opportunity Policy in Education. Retrieved from https://edpolicy.stanford.edu/sites/default/files/publications/teaching-around-world-what-can-talis-tell-us_3.pdf

Callahan, J. (2016). Encouraging retention of new teachers through mentoring strategies. *Delta Kappa Gamma Bulletin*, *83*(1), 6–11.

Carter, M., & Francis, R. (2001). Mentoring and beginning teachers' workplace learning. *Asia-Pacific Journal of Teacher Education*, *29*(3), 249–262. https://doi.org/10.1080/13598660120091856

Chang, M.-L. (2009a). An appraisal perspective of teacher burnout: Examining the emotional work of teachers. *Educational Psychology Review*, *21*(3), 193–218. https://doi.org/10.1007/s10648-009-9106-y

Chang, M.-L. (2009b). *Teacher emotion management in the classroom: Appraisals, regulation, and coping with emotions* (Publication No. 3375724) [Doctoral dissertation, Ohio State University]. ProQuest Dissertations Publishing.

Chang, M.-L. (2020). Emotion display rules, emotion regulation, and teacher burnout. *Frontiers in Education*, *5*, 1–11. https://doi.org/10.3389/feduc.2020.00090

Chaplain, R. P. (2008). Stress and psychological distress among trainee secondary teachers in England. *Educational Psychology*, *28*(2), 195–209. https://doi.org/10.1080/01443410701491858

Charner-Laird, M., Kirkpatrick, C. L., Szczesiul, S., Watson, D., & Gordon, P. (2016). From collegial support to critical dialogue: including new teachers voices in collaborative work. *Professional Educator*, *40*(2), 1–17.

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, *9*(2), 233–255. https://doi.org/10.1207/s15328007sem0902_5

Chi, N.-W., & Wang, I.-A. (2018). The relationship between newcomers' emotional labor and service performance: The moderating roles of service training and mentoring functions. *The International Journal of Human Resource Management*, *29*(19), 2729–2757. https://doi.org/10.1080/09585192.2016.1259645

Chong, S. (2011). Development of teachers' professional identities: From pre-service to their first year as novice teachers. *KEDI Journal of Educational Policy*, *8*(2), 219–233.

Ciyin, G., & Erturan-Ilker, G. (2014). Student physical education teachers' well-being: Contribution of basic psychological needs. *Journal of Education and Training Studies*, *2*(3), 44–51. https://doi.org/10.11114/jets.v2i3.408

Clandinin, D. J., Long, J., Schaefer, L., Downey, C. A., Steeves, P., Pinnegar, E., . . . Wnuk, S. (2015). Early career teacher attrition: Intentions of teachers beginning. *Teaching Education*, *26*(1), 1–16. https://doi.org/10.1080/10476210.2014.996746

Cochran-Smith, M., & Paris, C. L. (1995). Mentor and mentoring: Did Homer have it right. In J. Smyth (Ed.), *Critical Discourses on Teacher Development* (pp. 181–202). Cassell.

Cochran-Smith, M., & Zeichner, K. (2005). *Studying teacher education: The report of the AERA panel on research and teacher education*. Lawrence Erlbaum.

Collie, R. J., Granziera, H., & Martin, A. J. (2018). Teachers' perceived autonomy support and adaptability: An investigation employing the job demands-resources model as relevant to workplace exhaustion, disengagement, and commitment. *Teaching and Teacher Education*, *74*, 125–136. https://doi.org/10.1016/j.tate.2018.04.015

Colognesi, S., van Nieuwenhoven, C., & Beausaert, S. (2020). Supporting newly-qualified teachers' professional development and perseverance in secondary education: On the role of informal learning. *European Journal of Teacher Education*, *43*(2), 258–276. https://doi.org/10.1080/02619768.2019.1681963

Cortina, K. S., & Thames, M. H. (2013). Teacher Education in Germany. In M. Kunter, J. Baumert, W. Blum, U. Klusmann, S. Krauss, & M. Neubrand (Eds.), *Cognitive activation in the mathematics classroom and professional competence of teachers* (pp. 49–62). Springer. https://doi.org/10.1007/978-1-4614-5149-5_3

Crasborn, F., Hennissen, P., Brouwer, N., Korthagen, F., & Bergen, T. (2008). Promoting versatility in mentor teachers' use of supervisory skills. *Teaching and Teacher Education*, *24*(3), 499–514. https://doi.org/10.1016/j.tate.2007.05.001

Crasborn, F., Hennissen, P., Brouwer, N., Korthagen, F., & Bergen, T. (2011). Exploring a two-dimensional model of mentor teacher roles in mentoring dialogues. *Teaching and Teacher Education*, *27*(2), 320–331. https://doi.org/10.1016/j.tate.2010.08.014

Da Rocha, K. (2014). Europe's got talent: Setting the stage for new teachers by educative mentoring. *Center for Educational Policy Studies Journal*, *4*(4), 99–120. https://doi.org/10.26529/cepsj.187

Darius, S., Bunzel, K., Ehms-Ciechanowicz, E., & Böckelmann, I. (2021). Psychische Gesundheit bei Referendaren [Novice teachers' mental health]. *Prävention und Gesundheitsförderung*, *16*(3), 215–224. https://doi.org/10.1007/s11553-020-00809-6

Darling-Hammond, L. (2003). Keeping good teachers: Why it matters, what leaders can do. *Educational leadership*, *60*(8), 6–13.

Darling-Hammond, L., Holtzman, D. J., Gatlin, S. J., & Heilig, J. V. (2005). Does teacher preparation matter? Evidence about teacher certification, Teach for America, and teacher effectiveness. *Education Policy Analysis Archives*, *13*(42). https://doi.org/10.14507/epaa.v13n42.2005

Deci, E. L., & Ryan, R. M. (2002). Overview of self-determination theory: An organismic dialectical perspective. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 3–33). The University of Rochester Press.

Deci, E. L., & Ryan, R. M. (2008a). Facilitating optimal motivation and psychological well-being across life's domains. *Canadian Psychology*, *49*(1), 14–23. https://doi.org/10.1037/0708-5591.49.1.14

Deci, E. L., & Ryan, R. M. (2008b). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology*, *49*(3), 182–185. https://doi.org/10.1037/a0012801

Decker, A.-T., Kunter, M., & Voss, T. (2015). The relationship between quality of discourse during teacher induction classes and beginning teachers' beliefs. *European Journal of Psychology of Education*, *30*(1), 41–61. https://doi.org/10.1007/s10212-014-0227-4

Delacre, M., Leys, C., Mora, Y. L., & Lakens, D. (2019). Taking parametric assumptions seriously: Arguments for the use of welch's *F*-test instead of the classical *F*-test in one-way ANOVA. *International Review of Social Psychology, 32*(1), 13. http://doi.org/10.5334/irsp.198

Desimone, L. M., Hochberg, E. D., Porter, A. C., Polikoff, M. S., Schwartz, R., & Johnson, L. J. (2014). Formal and informal mentoring. *Journal of Teacher Education*, *65*(2), 88–110. https://doi.org/10.1177/0022487113511643

Devos, C., Dupriez, V., & Paquay, L. (2012). Does the social working environment predict beginning teachers' self-efficacy and feelings of depression? *Teaching and Teacher Education*, *28*(2), 206–217. https://doi.org/10.1016/j.tate.2011.09.008

Dicke, T., Elling, J., Schmeck, A., & Leutner, D. (2015). Reducing reality shock: The effects of classroom management skills training on beginning teachers. *Teaching and Teacher Education*, *48*, 1–12. https://doi.org/10.1016/j.tate.2015.01.013

Dicke, T., Parker, P. D., Holzberger, D., Kunina-Habenicht, O., Kunter, M., & Leutner, D. (2015). Beginning teachers' efficacy and emotional exhaustion: Latent changes, reciprocity, and the influence of professional knowledge. *Contemporary Educational Psychology*, *41*, 62–72. https://doi.org/10.1016/j.cedpsych.2014.11.003

Dicke, T., Stebner, F., Linninger, C., Kunter, M., & Leutner, D. (2018). A longitudinal study of teachers' occupational well-being: Applying the job demands-resources model. *Journal of Occupational Health Psychology*, *23*(2), 262–277. https://doi.org/10.1037/ocp0000070

Du, F., & Wang, Q. (2017). New teachers' perspectives of informal mentoring: Quality of mentoring and contributors. *Mentoring & Tutoring: Partnership in Learning*, *25*(3), 309–328. https://doi.org/10.1080/13611267.2017.1364841

Dunst, C., Hamby, D., Howse, R., Wilkie, H., & Annas, K. (2019). Metasynthesis of preservice professional preparation and teacher education research studies. *Education Sciences*, *9*(1), 50. https://doi.org/10.3390/educsci9010050

Dupriez, V., Delvaux, B., & Lothaire, S. (2016). Teacher shortage and attrition: Why do they leave? *British Educational Research Journal*, *42*(1), 21–39. https://doi.org/10.1002/berj.3193

Enders, C., & Bandalos, D. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling: A Multidisciplinary Journal*, *8*(3), 430–457. https://doi.org/10.1207/s15328007sem0803_5

Enzmann, D., & Kleiber, D. (1989). *Helfer-Leiden: Streß und Burnout in psychosozialen Berufen* [Helper-ordeals: stress and burnout in the human services]. Asanger.

European Commission (2010). *Developing coherent and system-wide induction programmes for beginning teachers: A handbook for policymakers*. European Commission Staff Working Document SEC (2010) 538 Final. Commission of the European Communities.

Eurydice (2012). *Key Data on Education in Europe 2012*. Education, Audiovisual, and Culture Executive Agency, European Commission. Retrieved from https://eurydice.eacea.ec.europa.eu/publications

Evelein, F., Korthagen, F., & Brekelmans, M. (2008). Fulfilment of the basic psychological needs of student teachers during their first teaching experiences. *Teaching and Teacher Education*, *24*(5), 1137–1148. https://doi.org/10.1016/j.tate.2007.09.001

Evertson, C. M., & Smithey, M. W. (2000). Mentoring effects on protégés' classroom practice: An experimental field study. *The Journal of Educational Research*, *93*(5), 294–304. https://doi.org/10.1080/00220670009598721

Fauth, B., Decristan, J., Rieser, S., Klieme, E., & Büttner, G. (2014). Student ratings of teaching quality in primary school: Dimensions and prediction of student outcomes. *Learning and Instruction*, *29*, 1–9. https://doi.org/10.1016/j.learninstruc.2013.07.001

Feiman-Nemser, S. (2001). Helping novices learn to teach. *Journal of Teacher Education*, *52*(1), 17–30. https://doi.org/10.1177/0022487101052001003

Fives, H., Hamman, D., & Olivarez, A. (2007). Does burnout begin with student-teaching? Analyzing efficacy, burnout, and support during the student-teaching semester. *Teaching and Teacher Education*, *23*(6), 916–934. https://doi.org/10.1016/j.tate.2006.03.013

Fives, H., & Buehl, M. M. (2012). Spring cleaning for the "messy" construct of teachers' beliefs: What are they? Which have been examined? What can they tell us? In K. R. Harris, S. Graham, T. Urdan, S. Graham, J. M. Royer, & M. Zeidner (Eds.), *APA Educational Psychology Handbook, vol 2: Individual Differences and Cultural and Contextual Factors* (pp. 471–499). American Psychological Association. https://doi.org/10.1037/13274-019

Fletcher, S. H., & Strong, M. A. (2009). Full-release and site-based mentoring of new elementary grade teachers: An analysis of changes in student achievement. *The New Educator*, *5*(4), 329–341. https://doi.org/10.1080/1547688x.2009.10399583

Friedman, I. A. (2000). Burnout in teachers: Shattered dreams of impeccable professional performance. *Journal of Clinical Psychology*, *56*(5), 595–606. https://doi.org/10.1002/(sici)1097-4679(200005)56:5<595::aid-jclp2>3.0.co;2-q

Gardiner, W. (2009). Rudderless as mentors: The challenge of teachers as mentors. *Action in Teacher Education*, *30*(4), 56–66. https://doi.org/10.1080/01626620.2009.10734452

George, S. V., Richardson, P. W., & Watt, H. M. G. (2018). Early career teachers' self-efficacy: A longitudinal study from Australia. *Australian Journal of Education*, *62*(2), 217–233. https://doi.org/10.1177/0004944118779601

Gold, Y. (1996). Beginning teacher support: Attrition, mentoring, and induction. In J. Sikula (Ed.), *Handbook of research on teacher education* (pp. 548–594). Macmillan.

Gold, Y., Roth, R. A., Wright, C. R., Michael, W. B., & Chin-Yi, C. (1992). The factorial validity of a teacher burnout measure (educators survey) administered to a sample of beginning teachers in elementary and secondary schools in California. *Educational and Psychological Measurement*, *52*(3), 761–768. https://doi.org/10.1177/0013164492052003027

Gonzalez, A., Conde, A., Diaz, P., Garcia, M., & Ricoy, C. (2018). Instructors' teaching styles: Relation with competences, self-efficacy, and commitment in pre-service teachers. *Higher Education*, *75*(4), 625–642. https://doi.org/10.1007/s10734-017-0160-y

Gröschner, A. (2009). *Skalen zur Erfassung von Kompetenzen in der Lehrerausbildung. Ein empirisches Instrument in Anlehnung an die KMK „Standards für die Lehrerbildung: Bildungswissenschaften"* [Scales for the assessment of competences in teacher education. An empirical instrument following the KMK standards for educational sciences in teacher education]. Friedrich Schiller University Jena.

Grudnoff, L. (2012). All's well? New Zealand beginning teachers' experience of induction provision in their first six months in school. *Professional Development in Education*, *38*(3), 471–485. https://doi.org/10.1080/19415257.2011.636894

Hagenauer, G., Gläser-Zikuda, M., & Moschner, B. (2018). University students' emotions, life satisfaction, and study commitment: A self-determination theoretical perspective. *Journal of Further and Higher Education*, *42*(6), 808–826. https://doi.org/10.1080/0309877x.2017.1323189

Hargreaves, A. (2001). Emotional geographies of teaching. *Teachers College Record*, *103*(6), 1056–1080. https://doi.org/10.1111/0161-4681.00142

Harmsen, R., Helms-Lorenz, M., Maulana, R., & van Veen, K. (2018). The relationship between beginning teachers' stress causes, stress responses, teaching behaviour and attrition. *Teachers and Teaching*, *24*(6), 626–643. https://doi.org/10.1080/13540602.2018.1465404

Harrison, J. K., Lawson, T., & Wortley, A. (2005). Mentoring the beginning teacher: Developing professional autonomy through critical reflection on practice. *Reflective Practice*, *6*(3), 419–441. https://doi.org/10.1080/14623940500220277

Hascher, T., Cocard, Y., & Moser, P. (2004). Forget about theory—practice is all? Student teachers' learning in practicum. *Teachers and Teaching*, *10*(6), 623–637. https://doi.org/10.1080/1354060042000304800

Hascher, T., & Kittinger, C. (2014). Learning processes in student teaching: Analyses from a study using learning diaries. In K.-H. Arnold, A. Gröschner, & T. Hascher (Eds.), *Pedagogical field experiences in teacher education* (pp. 221–235). Waxmann.

Hawkey, K. (1998). Mentor pedagogy and student teacher professional development. *Teaching and Teacher Education*, *14*(6), 657–670. https://doi.org/10.1016/S0742-051X(98)00015-8

Hawkey, K. (2006). Emotional intelligence and mentoring in pre-service teacher education: A literature review. *Mentoring & Tutoring: Partnership in Learning*, *14*(2), 137–147. https://doi.org/10.1080/13611260500493485

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford publications.

He, Y., & Levin, B. B. (2008). Match or mismatch? How congruent are the beliefs of teacher candidates, teacher educators, and field mentors? *Teacher Education Quarterly*, *35*(4), 37–55.

Heikkinen, H. L. T., Jokinen, H., & Tynjälä, P. (2008). Reconceptualising mentoring as a dialogue. In G. Fransson & C. Gustafsson (Eds.), *Newly qualified teachers in Northern Europe* (pp. 107–124). University of Gävle.

Helmke, A. (2003). *Unterrichtsqualität erfassen, bewerten, verbessern* [Measuring, rating, and improving the quality of instruction]. Knallmeyer.

Herman, B. C., Olson, J. K., & Clough, M. P. (2019). The role of informal support networks in teaching the nature of science. *Research in Science Education*, *49*(1), 191–218. https://doi.org/10.1007/s11165-016-9610-2

Hermans, R., van Braak, J., & van Keer, H. (2008). Development of the beliefs about primary education scale: Distinguishing a developmental and transmissive dimension. *Teaching and Teacher Education*, *24*(1), 127–139. https://doi.org/10.1016/j.tate.2006.11.007

Himbert, M., & Imhof, M. (2022). Die Entwicklung der Selbstwirksamkeitserwartung im Vorbereitungsdienst: Die Rolle von Beziehungskompetenz, Emotionsarbeit und emotionaler Erschöpfung [Development of teacher self-efficacy in the induction phase: The role of relational competence, emotion work, and emotional exhaustion]. *Lehrerbildung auf dem Prüfstand*, *15*(2), 243–258.

Hipp, J. R., & Bauer, D. J. (2006). Local solutions in the estimation of growth mixture models. *Psychological Methods*, *11*(1), 36–53. https://doi.org/10.1037/1082-989X.11.1.36

Hobson, A. J. (2017). The terrors of judgementoring and the case for ONSIDE mentoring for early career teachers. In D. A. Clutterbuck, F. Kochan, L. G. Lunsford, N. Dominguez, & J. Haddock-Millar (Eds.), *The Sage handbook of mentoring* (pp. 335–357). SAGE Publications. https://doi.org/10.4135/9781526402011.n21

Hobson, A. J., Ashby, P., Malderez, A., & Tomlinson, P. D. (2009). Mentoring beginning teachers: What we know and what we don't. *Teaching and Teacher Education*, *25*(1), 207–216. https://doi.org/10.1016/j.tate.2008.09.001

Hobson, A. J., & Malderez, A. (2013). Judgementoring and other threats to realizing the potential of school-based mentoring in teacher education. *International Journal of Mentoring and Coaching in Education*, *2*(2), 89–108. https://doi.org/10.1108/IJMCE-03-2013-0019

Hobson, A. J., & Maxwell, B. (2017). Supporting and inhibiting the well-being of early career secondary school teachers: Extending self-determination theory. *British Educational Research Journal*, *43*(1), 168–191. https://doi.org/10.1002/berj.3261

Hobson, A. J., & van Nieuwerburgh, C. J. (2022). Extending the research agenda on (ethical) coaching and mentoring in education: Embracing mutuality and prioritising well-being. *International Journal of Mentoring and Coaching in Education*, *11*(1), 1–13. https://doi.org/10.1108/IJMCE-11-2021-0099

Hochberg, E. D., Desimone, L. M., Porter, A. C., Polikoff, M. S., Schwartz, R., & Johnson, L. J. (2015). A hybrid approach benefits beginning teachers. *Phi Delta Kappan*, *96*(8), 70–72. https://doi.org/10.1177/0031721715583968

Hochschild, A. R. (2012). *The Managed Heart*. University of California Press. https://doi.org/10.1525/9780520951853

Hoffman, J. V., Wetzel, M. M., Maloch, B., Greeter, E., Taylor, L., DeJulio, S., & Vlach, S. K. (2015). What can we learn from studying the coaching interactions between cooperating teachers and preservice teachers? A literature review. *Teaching and Teacher Education*, *52*, 99–112. https://doi.org/10.1016/j.tate.2015.09.004

Hofmann, F., & Springer, K. (2014). Wie Autonomie unterstützend agieren Mentorinnen und Mentoren bei ihrer Begleitung von Berufseinsteigerinnen und Berufseinsteigern [How autonomy-supporting mentors act when attending to young professionals]. In G. Beer, I. Benischek, O. Dangl, & C. Plaimauer (Eds.), *Mentoring im Berufseinstieg - eine mehrperspektivische Betrachtung* [Mentoring at career entry - a multi perspective approach] (pp. 57–95). LIT Publishing.

Hollingsworth, S. (1989). Prior beliefs and cognitive change in learning to teach. *American Educational Research Journal*, *26*(2), 160–189. https://doi.org/10.3102/00028312026002160

Holloway, J., Nielsen, A., & Saltmarsh, S. (2018). Prescribed distributed leadership in the era of accountability. *Educational Management Administration & Leadership*, *46*(4), 538–555. https://doi.org/10.1177/1741143216688469

Holzberger, D., Philipp, A., & Kunter, M. (2014). Predicting teachers' instructional behaviors: The interplay between self-efficacy and intrinsic needs. *Contemporary Educational Psychology*, *39*(2), 100–111. https://doi.org/10.1016/j.cedpsych.2014.02.001

Howe, E. R. (2006). Exemplary teacher induction: An international review. *Educational Philosophy and Theory*, *38*(3), 287–297. https://doi.org/10.1111/j.1469-5812.2006.00195.x

Hox, J. J., & Bechger, T. M. (1998). An introduction to structural equation modeling. *Family Science Review*, *11*, 354–373.

Hu, L.-T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55. https://doi.org/10.1080/10705519909540118

IBM Corp. (2015). IBM SPSS Statistics for Windows, Version 23.0. IBM Corp.

Imhof, M., Ohlemann, S., Burger, J., & Himbert, M. (2020). *Evaluation der Lehrkräfteausbildung unter besonderer Berücksichtigung des Vorbereitungsdienstes in Rheinland-Pfalz: Phasenübergreifende Kompetenzentwicklung in der Lehrkräfteausbildung* [Evaluation report on teacher education with a focus on the post-university induction phase in Rhineland-Palatinate: An integrated view of professional competence development in teacher education]. Johannes Gutenberg University Mainz. Available at https://fb02-psych-bildung-evd.uni-mainz.de/files/2017/06/17-Abschlussbericht-022020.pdf

Ingersoll, R. M., & Kralik, J. M. (2004). *The impact of mentoring on teacher retention: What the research says*. Education Commission of the States.

Ingersoll, R. M., & Smith, T. M. (2003). The wrong solution to the teacher shortage. *Educational Leadership*, *60*(8), 30–33.

Ingersoll, R. M., & Strong, M. (2011). The impact of induction and mentoring programs for beginning teachers. *Review of Educational Research*, *81*(2), 201–233. https://doi.org/10.3102/0034654311403323

Ingersoll, R. M., & Strong, M. (2012). What the research tells us about the impact of induction and mentoring programs for beginning teachers. *Teachers College Record: The Voice of Scholarship in Education*, *114*(14), 466–490. https://doi.org/10.1177/0161468112114014

Irwin, J. R., & McClelland, G. H. (2001). Misleading heuristics and moderated multiple regression models. *Journal of Marketing Research*, *38*(1), 100–109. https://doi.org/10.1509/jmkr.38.1.100.18835

Jaccard, J., Wan, C. K., & Turrisi, R. (1990). The detection and interpretation of interaction effects between continuous variables in multiple regression. *Multivariate Behavioral Research*, *25*(4), 467–478. https://doi.org/10.1207/s15327906mbr2504_4

Jalongo, M. R., & Heider, K. (2006). Editorial teacher attrition: An issue of national concern. *Early Childhood Education Journal*, *33*(6), 379–380. https://doi.org/10.1007/s10643-006-0122-y

James, J. M., Rayner, A., & Bruno, J. (2015). Are you my mentor? New perspectives and research on informal mentorship. *The Journal of Academic Librarianship*, *41*(5), 532–539. https://doi.org/10.1016/j.acalib.2015.07.009

Jaspers, W. M., Meijer, P. C., Prins, F., & Wubbels, T. (2014). Mentor teachers: Their perceived possibilities and challenges as mentor and teacher. *Teaching and Teacher Education*, *44*, 106–116. https://doi.org/10.1016/j.tate.2014.08.005

Jaspers, W. M., Prins, F., Meijer, P. C., & Wubbels, T. (2018). Mentor teachers' practical reasoning about intervening during student teachers' lessons. *Teaching and Teacher Education*, *75*, 327–342. https://doi.org/10.1016/j.tate.2018.07.004

Jones, M. (2000). Becoming a secondary teacher in Germany: A trainee perspective on recent developments in initial teacher training in Germany. *European Journal of Teacher Education*, *23*(1), 65–76. https://doi.org/10.1080/026197600411634

Kaplan, H. (2021). Promoting optimal induction to beginning teachers using self-determination theory. *SAGE Open*, *11*(2), 1–14. https://doi.org/10.1177/21582440211015680

Kaplan, H. (2022). The unique effects of supporting beginning teachers' psychological needs through learning communities and a teacher-mentor's support: A longitudinal study based on self-determination theory. *Frontiers in Psychology*, *13*, 859364. https://doi.org/10.3389/fpsyg.2022.859364

Kaplan, H., & Madjar, N. (2017). The motivational outcomes of psychological need support among pre-service teachers: Multicultural and self-determination theory perspectives. *Frontiers in Education*, *2*, 1–14. https://doi.org/10.3389/feduc.2017.00042

Kauper, T., Retelsdorf, J., Bauer, J., Rösler, L., Möller, L., Prenzel, M., & Drechsel, B. (2012). *PaLea- Panel zum Lehramtsstudium: Skalendokumentation und Häufigkeitsauszählungen des BMBF-Projektes, 2. Welle* [PaLea-panel study on pre-service teachers: Technical report of survey instruments and frequency analyses of the BMBF-project, survey 2]. Leibniz Institute of Pedagogy of Natural Sciences and Mathematics. Retrieved from: http://www.palea.unikiel.de/veroffentlichungen/downloads/

Keller, M. M., & Becker, E. S. (2021). Teachers' emotions and emotional authenticity: Do they matter to students' emotional responses in the classroom? *Teachers and Teaching*, *27*(5), 404–422. https://doi.org/10.1080/13540602.2020.1834380

Keller, M. M., Chang, M.-L., Becker, E. S., Goetz, T., & Frenzel, A. C. (2014). Teachers' emotional experiences and exhaustion as predictors of emotional labor in the classroom: An experience sampling study. *Frontiers in Psychology*, *5*, 1442. https://doi.org/10.3389/fpsyg.2014.01442

Kessels, C. (2010). *The influence of induction programs on beginning teachers' well-being and professional development* [Doctoral dissertation, Leiden University]. Leiden University Graduate School of Teaching (ICLON). Retrieved from: https://openaccess.leidenuniv.nl/handle/1887/15750

Kim, H., & Cho, Y. (2014). Pre-service teachers' motivation, sense of teaching efficacy, and expectation of reality shock. *Asia-Pacific Journal of Teacher Education*, *42*(1), 67–81. https://doi.org/10.1080/1359866X.2013.855999

Kinman, G., Wray, S., & Strange, C. (2011). Emotional labour, burnout and job satisfaction in UK teachers: The role of workplace social support. *Educational Psychology*, *31*(7), 843–856. https://doi.org/10.1080/01443410.2011.608650

Kitchel, T., & Torres, R. M. (2007). Possible factors in matching student teachers with cooperating teachers. *Journal of Agricultural Education*, *48*(3),13–24. https://doi.org/10.5032/jae.2007.03013

Klassen, R. M., & Durksen, T. L. (2014). Weekly self-efficacy and work stress during the teaching practicum: A mixed methods study. *Learning and Instruction*, *33*, 158–169. https://doi.org/10.1016/j.learninstruc.2014.05.003

Klassen, R. M., Tze, V. M. C., Betts, S. M., & Gordon, K. A. (2011). Teacher efficacy research 1998-2009: Signs of progress or unfulfilled promise? *Educational Psychology Review*, *23*(1), 21–43. https://doi.org/10.1007/s10648-010-9141-8

Klemm, K., & Zorn, D. (2019). *Steigende Schülerzahlen im Primarbereich: Lehrkräftemangel deutlich stärker als von der KMK erwartet* [Growing student numbers in primary level teaching: Teacher shortage is stronger than expected by the KMK]. Bertelsmann Stiftung.

Klusmann, U., Kunter, M., Voss, T., & Baumert, J. (2012). Berufliche Beanspruchung angehender Lehrkräfte: Die Effekte von Persönlichkeit, pädagogischer Vorerfahrung und professioneller Kompetenz [Occupational stress of beginning teachers: The effects of personality, pedagogical experience, and professional competence]. *Zeitschrift für Pädagogische Psychologie*, *26*(4), 275–290. https://doi.org/10.1024/1010-0652/a000078

König, J. (2015). Measuring classroom management expertise (CME) of teachers: A video-based assessment approach and statistical results. *Cogent Education*, *2*(1), 991178. https://doi.org/10.1080/2331186x.2014.991178

Korthagen, F. A.J., & Evelein, F. G. (2016). Relations between student teachers' basic needs fulfillment and their teaching behavior. *Teaching and Teacher Education*, *60*, 234–244. https://doi.org/10.1016/j.tate.2016.08.021

Kunter, M., Baumert, J., Leutner, D., Terhart, E., Seidel, T., Dicke, T., Holzberger, D., Kunina-Habenicht, O., Linninger, C., Lohse-Bossenz, H., Schulze-Stocker, F., & Stürmer, K. (2017). *Bildungswissenschaftliches Wissen und der Erwerb professioneller Kompetenz in der Lehramtsausbildung. Dokumentation der Erhebungsinstrumente der Projektphasen des BilWiss-Forschungsprogramms von 2009 bis 2016* [Professional teacher knowledge and acquisition of professional competencies in teacher education. Technical report of survey instruments in the BilWiss research project phases from 2009 to 2016]. Goethe University Frankfurt.

Kunter, M., Kleickmann, T., Klusmann, U., & Richter, D. (2013). The development of teachers' professional competence. In M. Kunter, J. Baumert, W. Blum, U. Klusmann, S. Krauss, & M. Neubrand (Eds.), *Cognitive activation in the mathematics classroom and professional competence of teachers* (pp. 63–77). Springer. https://doi.org/10.1007/978-1-4614-5149-5_4

Kunter, M., & Klusmann, U. (2010). Kompetenzmessung bei Lehrkräften: Methodische Herausforderungen [Measuring teachers' competence: Methodological challenges]. *Unterrichtswissenschaft*, *38*(1), 68–86.

Kutsyuruba, B., Godden, L., & Bosica, J. (2019). The impact of mentoring on the Canadian early career teachers' well-being. *International Journal of Mentoring and Coaching in Education*, *8*(4), 285–309. https://doi.org/10.1108/IJMCE-02-2019-0035

Langdon, F., & Ward, L. (2015). Educative mentoring: A way forward. *International Journal of Mentoring and Coaching in Education*, *4*(4), 240–254. https://doi.org/10.1108/ijmce-03-2015-0006

Lee, J. C., & Feng, S. (2007). Mentoring support and the professional development of beginning teachers: A Chinese perspective. *Mentoring and Tutoring: Partnership in Learning*, *15*(3), 243–263. https://doi.org/10.1080/13611260701201760

Lee, M., Pekrun, R., Taxer, J. L., Schutz, P. A., Vogl, E., & Xie, X. (2016). Teachers' emotions and emotion management: Integrating emotion regulation theory with emotional labor research. *Social Psychology of Education*, *19*(4), 843–863. https://doi.org/10.1007/s11218-016-9359-5

Lejonberg, E., Elstad, E., Sandvik, L. V., Solhaug, T., & Christophersen, K.-A. (2018). Mentors of preservice teachers: The relationships between mentoring approach, self-efficacy, and effort. *International Journal of Mentoring and Coaching in Education*, *7*(3), 261–279. https://doi.org/10.1108/ijmce-12-2017-0076

Levin, B. B. (2015). Development of teachers' beliefs. In H. Fives & M. G. Gill (Eds.), *International Handbook of Research on Teachers' Beliefs* (pp. 48–66). Routledge Taylor & Francis Group.

Lindgren, U. (2005). Experiences of beginning teachers in a school-based mentoring program in Sweden. *Educational Studies*, *31*(3), 251–263. https://doi.org/10.1080/03055690500236290

Linninger, C. A. (2016). *Reflexion bei angehenden Lehrkräften: Bedeutung und Förderung im Professionalisierungsprozess* [Reflection in early career teachers: Relevance and promotion during the process of professionalization], [Unpublished doctoral dissertation]. Goethe University Frankfurt.

Lozinak, K. (2016). Mentor matching does matter. *Delta Kappa Gamma Bulletin*, *83*(1), 12–24.

MacCallum, R. C., & Austin, J. T. (2000). Applications of structural equation modeling in psychological research. *Annual Review of Psychology*, *51*, 201–226. https://doi.org/10.1146/annurev.psych.51.1.201

MacKinnon, D. P., & Fairchild, A. J. (2009). Current directions in mediation analysis. *Current Directions in Psychological Science*, *18*(1), 16–20. https://doi.org/10.1111/j.1467-8721.2009.01598.x

Maguire, M. (2001). Bullying and the postgraduate secondary school trainee teacher: An english case study. *Journal of Education for Teaching*, *27*(1), 95–109. https://doi.org/10.1080/02607470120042564

Malderez, A., Hobson, A. J., Tracey, L., & Kerr, K. (2007). Becoming a student teacher: Core features of the experience. *European Journal of Teacher Education*, *30*(3), 225–248. https://doi.org/10.1080/02619760701486068

Manning, C., & Hobson, A. J. (2017). Judgemental and developmental mentoring in further education initial teacher education in England: Mentor and mentee perspectives. *Research in Post-Compulsory Education*, *22*(4), 574–595. https://doi.org/10.1080/13596748.2017.1381377

Marable, M. A., & Raimondi, S. L. (2007). Teachers' perceptions of what was most (and least) supportive during their first year of teaching. *Mentoring & Tutoring: Partnership in Learning*, *15*(1), 25–37. https://doi.org/10.1080/13611260601037355

Maslach, C., Jackson, S. E., Leiter, M. P., Schaufeli, W. B., & Schwab, R. L. (1986). *Maslach burnout inventory*. Consulting Psychologists press.

Mattern, J., & Bauer, J. (2014). Does teachers' cognitive self-regulation increase their occupational well-being? The structure and role of self-regulation in the teaching context. *Teaching and Teacher Education*, *43*, 58–68. https://doi.org/10.1016/j.tate.2014.05.004

McCurdy, K. (2016). *Supporting early career teacher learning: An investigation into induction supports and early career teacher professional learning in New Hampshire* (Publication No. 2249) [Doctoral dissertation, University of New Hampshire]. Scholars Repository.

McNeish, D. (2018). Thanks coefficient alpha, we'll take it from here. *Psychological Methods*, *23*(3), 412–433. https://doi.org/10.1037/met0000144

Meade, A. W., Johnson, E. C., & Braddy, P. W. (2006). The utility of alternative fit indices in tests of measurement invariance. *Academy of Management Proceedings*, *2006*(1), B1–B6. https://doi.org/10.5465/ambpp.2006.27182124

Meade, A. W., Johnson, E. C., & Braddy, P. W. (2008). Power and sensitivity of alternative fit indices in tests of measurement invariance. *The Journal of Applied Psychology*, *93*(3), 568–592. https://doi.org/10.1037/0021-9010.93.3.568

Mena, J., Hennissen, P., & Loughran, J. (2017). Developing pre-service teachers' professional knowledge of teaching: The influence of mentoring. *Teaching and Teacher Education*, *66*, 47–59. https://doi.org/10.1016/j.tate.2017.03.024

Meyer, D. K. (2009). Entering the emotional practices of teaching. In P. A. Schutz & M. Zembylas (Eds.), *Advances in Teacher Emotion Research* (pp. 73–91). Springer. https://doi.org/10.1007/978-1-4419-0564-2_5

Mok, S. Y., & Staub, F. C. (2021). Does coaching, mentoring, and supervision matter for pre-service teachers' planning skills and clarity of instruction? A meta-analysis of (quasi-)experimental studies. *Teaching and Teacher Education*, *107*, 103484. https://doi.org/10.1016/j.tate.2021.103484

Muthén, L. K., & Muthén, B. O. (2017). *Mplus: Statistical analysis with latent variables: User's guide (Version 8)*. The Authors.

Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A monte carlo simulation study. *Structural Equation Modeling: A Multidisciplinary Journal*, *14*(4), 535–569. https://doi.org/10.1080/10705510701575396

Oberski, I., Ford, K., Higgins, S., & Fisher, P. (1999). The importance of relationships in teacher education. *Journal of Education for Teaching*, *25*(2), 135–150. https://doi.org/10.1080/02607479919600

O'Brien, P., Goddard, R., & Keeffe, M. (2007, November 25-29). *Burnout confirmed as a viable explanation for beginning teacher attrition* [Paper presentation]. Australian Association for Research in Education (AARE) Annual Conference 2007, Fremantle, Australia. Retrieved from https://eprints.usq.edu.au/3813/2/O%27Brien_Goddard_Keefe_ARE_2007_PV.pdf

Oosterheert, I. E., & Vermunt, J. D. (2001). Individual differences in learning to teach: Relating cognition, regulation, and affect. *Learning and Instruction*, *11*(2), 133–156. https://doi.org/10.1016/S0959-4752(00)00019-0

Organisation for Economic Cooperation and Development [OECD] (2005). *Teachers matter: Attracting, developing and retaining effective teachers*. OECD Publishing. Retrieved from: https://www.oecd.org/education/school/34990905.pdf

Orland, L. (2001). Reading a mentoring situation: One aspect of learning to mentor. *Teaching and Teacher Education*, *17*(1), 75–88. https://doi.org/10.1016/s0742-051x(00)00039-1

Orland-Barak, L. (2005). Lost in translation: Mentors learning to participate in competing discourses of practice. *Journal of Teacher Education*, *56*(4), 355–366. https://doi.org/10.1177/0022487105279566

Orland-Barak, L. (2014). Mediation in mentoring: A synthesis of studies in Teaching and Teacher Education. *Teaching and Teacher Education*, *44*, 180–188. https://doi.org/10.1016/j.tate.2014.07.011

Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research*, *62*(3), 307–332. https://doi.org/10.3102/00346543062003307

Parise, L. M., & Spillane, J. P. (2010). Teacher learning and instructional change: How formal and on-the-job learning opportunities predict change in elementary school teachers' practice. *The Elementary School Journal*, *110*(3), 323–346. https://doi.org/10.1086/648981

Pearson, L. C., & Moomaw, W. (2005). The relationship between teacher autonomy and stress, work satisfaction, empowerment, and professionalism. *Educational Research Quarterly*, *29*(1), 38–54.

Pennanen, M., Heikkinen, H. L. T., & Tynjälä, P. (2020). Virtues of mentors and mentees in the Finnish model of teachers' peer-group mentoring. *Scandinavian Journal of Educational Research*, *64*(3), 355–371. https://doi.org/10.1080/00313831.2018.1554601

Pirkle, S. F. (2011). Stemming the tide: Retaining and supporting science teachers. *Science Educator*, *20*(2), 42–46.

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, *88*(5), 879–903. https://doi.org/10.1037/0021-9010.88.5.879

Pogodzinski, B. (2012). Considering the social context of schools: A framework for investigating new teacher induction. *Mentoring & Tutoring: Partnership in Learning*, *20*(3), 325–342. https://doi.org/10.1080/13611267.2012.701960

Porsch, R. (2018). Emotionen in der Lehrerinnenbildung [Emotions in teacher education]. In M. Huber & S. Krause (Eds.), *Bildung und Emotion* [Education and emotion] (pp. 269–287). Springer. https://doi.org/10.1007/978-3-658-18589-3_15

Prabjandee, D. (2022). Inconvenient truth? How different mentoring approaches impact student-teacher identity development. *Frontiers in Education*, *7*, 916749. https://doi.org/10.3389/feduc.2022.916749

Prilleltensky, I., Neff, M., & Bessell, A. (2016). Teacher stress: What it is, why it's important, how it can be alleviated. *Theory into Practice*, *55*(2), 104–111. https://doi.org/10.1080/00405841.2016.1148986

Putnam, R. T., & Borko, H. (2000). What do new views of knowledge and thinking have to say about research on teacher learning? *Educational Researcher*, *29*(1), 4–15. https://doi.org/10.3102/0013189x029001004

R Core Team (2014). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing, Vienna, Austria. Available from http://www.R-project.org/

Ragins, B. R., & Cotton, J. L. (1999). Mentor functions and outcomes: A comparison of men and women in formal and informal mentoring relationships. *The Journal of Applied Psychology*, *84*(4), 529–550. https://doi.org/10.1037/0021-9010.84.4.529

Raykov, T., & Marcoulides, G. A. (1999). On desirability of parsimony in structural equation model selection. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(3), 292–300. https://doi.org/10.1080/10705519909540135

Reeve, J., & Halusic, M. (2009). How K-12 teachers can put self-determination theory principles into practice. *Theory and Research in Education*, *7*(2), 145–154. https://doi.org/10.1177/1477878509104319

Richardson, P. W., Watt, H. M., & Devos, C. (2013). Types of professional and emotional coping among beginning teachers. In M. Newberry, A. Gallant, & P. Riley (Eds.), *Advances in Research on Teaching. Emotion and School: Understanding how the Hidden Curriculum Influences Relationships, Leadership, Teaching, and Learning* (Vol. 18, pp. 229–253). Emerald Group Publishing. https://doi.org/10.1108/S1479-3687(2013)0000018016

Richardson, V. (2003). Preservice teachers' beliefs. In J. Raths & A. C. McAninch (Eds.), *Teacher Beliefs and Classroom Performance: The Impact of Teacher Education, Volume 6: Advances in Teacher Education* (pp. 1–22). Information Age.

Richter, D., Kunter, M., Klusmann, U., Lüdtke, O., & Baumert, J. (2011). Professional development across the teaching career: Teachers' uptake of formal and informal learning opportunities. *Teaching and Teacher Education*, *27*(1), 116–126. https://doi.org/10.1016/j.tate.2010.07.008

Richter, D., Kunter, M., Lüdtke, O., Klusmann, U., Anders, Y., & Baumert, J. (2013). How different mentoring approaches affect beginning teachers' development in the first years of practice. *Teaching and Teacher Education*, *36*, 166–177. https://doi.org/10.1016/j.tate.2013.07.012

Richter, D., Kunter, M., Lüdtke, O., Klusmann, U., & Baumert, J. (2011). Soziale Unterstützung beim Berufseinstieg ins Lehramt [Social support at career entry for teachers]. *Zeitschrift für Erziehungswissenschaft*, *14*(1), 35–59. https://doi.org/10.1007/s11618-011-0173-8

Roehrig, A. D., Bohn, C. M., Turner, J. E., & Pressley, M. (2008). Mentoring beginning primary teachers for exemplary teaching practices. *Teaching and Teacher Education*, *24*(3), 684–702. https://doi.org/10.1016/j.tate.2007.02.008

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48*(2), 1–36.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*(1), 68–78. https://doi.org/10.1037/0003-066x.55.1.68

Scheopner, A. J. (2010). Irreconcilable differences: Teacher attrition in public and catholic schools. *Educational Research Review*, *5*(3), 261–277. https://doi.org/10.1016/j.edurev.2010.03.001

Schepens, A., Aelterman, A., & Vlerick, P. (2009). Student teachers' professional identity formation: Between being born as a teacher and becoming one. *Educational Studies*, *35*(4), 361–378. https://doi.org/10.1080/03055690802648317

Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of psychological research online*, *8*(2), 23–74.

Schmitz, G. S., & Schwarzer, R. (2000). Selbstwirksamkeitserwartung von Lehrern: Längsschnittbefunde mit einem neuen Instrument [Perceived self-efficacy of teachers: Longitudinal findings with a new instrument]. *German Journal of Educational Psychology, 14*(1), 12–25. https://doi.org/10.1024//1010-0652.14.1.12

Schutz, P. A., & Zembylas, M. (2009). Introduction to advances in teacher emotion research: The impact on teachers' lives. In P. A. Schutz & M. Zembylas (Eds.), *Advances in Teacher Emotion Research* (pp. 3–11). Springer. https://doi.org/10.1007/978-1-4419-0564-2_1

Schwarz, N. (1999). Self-reports: How the questions shape the answers. *American Psychologist*, *54*(2), 93–105. https://doi.org/10.1037/0003-066x.54.2.93

Selig, J. P., & Little, T. D. (2012). Autoregressive and cross-lagged panel analysis for longitudinal data. In B. Laursen, T. D. Little, & N. A. Card (Eds.), *Handbook of developmental research methods* (pp. 265–278). Guilford Press.

Shapira-Lishchinsky, O., & Levy-Gazenfrantz, T. (2016). The multifaceted nature of mentors' authentic leadership and mentees' emotional intelligence. *Educational Management Administration & Leadership*, *44*(6), 951–969. https://doi.org/10.1177/1741143215595413

Shirrell, M., Hopkins, M., & Spillane, J. P. (2019). Educational infrastructure, professional learning, and changes in teachers' instructional practices and beliefs. *Professional Development in Education*, *45*(4), 599–613. https://doi.org/10.1080/19415257.2018.1452784

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, *15*(2), 4–14. https://doi.org/10.3102/0013189x015002004

Skaalvik, E. M., & Skaalvik, S. (2017). Dimensions of teacher burnout: Relations with potential stressors at school. *Social Psychology of Education*, *20*(4), 775–790. https://doi.org/10.1007/s11218-017-9391-0

Smith, K. (2015). Mentoring: A profession within a profession. In H. Tillema, G. van Westhuisen, & K. Smith (Eds.), *Mentoring for learning: Climbing the mountain* (pp. 283–298). Sense Publishers.

Smith, K., & McLay, M. (2007). Curates' eggs? Secondary trainee teachers' experience of the Graduate Teacher Programme and the Postgraduate Certificate in Education. *Journal of Education for Teaching*, *33*(1), 35–54. https://doi.org/10.1080/02607470601098294

Smith, T. M., & Ingersoll, R. M. (2004). What are the effects of induction and mentoring on beginning teacher turnover? *American Educational Research Journal*, *41*(3), 681–714. https://doi.org/10.3102/00028312041003681

Soini, T., Pietarinen, J., & Pyhältö, K. (2016). What if teachers learn in the classroom? *Teacher Development*, *20*(3), 380–397. https://doi.org/10.1080/13664530.2016.1149511

Spurk, D., Hirschi, A., Wang, M., Valero, D., & Kauffeld, S. (2020). Latent profile analysis: A review and "how to" guide of its application within vocational behavior research. *Journal of Vocational Behavior*, *120*, 103445. https://doi.org/10.1016/j.jvb.2020.103445

Stanulis, R. N., & Floden, R. E. (2009). Intensive mentoring as a way to help beginning teachers develop balanced instruction. *Journal of Teacher Education*, *60*(2), 112–122. https://doi.org/10.1177/0022487108330553

Steinmetz, H. (2015). *Lineare Strukturgleichungsmodelle: Eine Einführung mit R* [Linear structural equation modeling: An introduction using R]. Rainer Hampp.

Struyve, C., Daly, A., Vandecandelaere, M., Meredith, C., Hannes, K., & Fraine, B. de (2016). More than a mentor: The role of social connectedness in early career and experienced teachers' intention to leave. *Journal of Professional Capital and Community*, *1*(3), 198–218. https://doi.org/10.1108/JPCC-01-2016-0002

Sutton, R. E. (2004). Emotional regulation goals and strategies of teachers. *Social Psychology of Education, 7*(4), 379–398. https://doi.org/10.1007/s11218-004-4229-y

Sutton, R. E., & Harper, E. (2009). Teachers' emotion regulation. In L. J. Saha & A. G. Dworkin (Eds.), *International Handbook of Research on Teachers and Teaching* (pp. 389–401). Springer US. https://doi.org/10.1007/978-0-387-73317-3_25

Taylor, M., McLean, L., Bryce, C. I., Abry, T., & Granger, K. L. (2019). The influence of multiple life stressors during teacher training on burnout and career optimism in the first year of teaching. *Teaching and Teacher Education*, *86*, 102910. https://doi.org/10.1016/j.tate.2019.102910

Timperley, H., Wilson, A., Barrar, H. & Fung, I. (2007). *Teacher professional learning and development: Best evidence synthesis iteration (BES)*. Ministry of Education, Wellington, New Zealand. Retrieved from: https://www.educationcounts.govt.nz/__data/assets/pdf_file/0017/16901/TPLandDBESentireWeb.pdf

Tschannen-Moran, M., Hoy, A. W., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research*, *68*(2), 202–248. https://doi.org/10.3102/00346543068002202

Tuten, T. L., Urban, D. J., & Bosnjak, M. (2002). Internet surveys and data quality: A review. In B. Batinic, U.-D. Reips, & M. Bosnjak (Eds.), *Online social sciences* (pp. 7–26). Hogrefe & Huber.

Tynjälä, P., & Heikkinen, H. L. (2011). Beginning teachers' transition from pre-service education to working life. *Zeitschrift Für Erziehungswissenschaft*, *14*(1), 11–33. https://doi.org/10.1007/s11618-011-0175-6

Uitto, M., Jokikokko, K., & Estola, E. (2015). Virtual special issue on teachers and emotions in Teaching and teacher education (TATE) in 1985-2014. *Teaching and Teacher Education*, *50*, 124–135. https://doi.org/10.1016/j.tate.2015.05.008

Uzman, E. (2014). Basic psychological needs and psychological health in teacher candidates. *Procedia - Social and Behavioral Sciences*, *116*, 3629–3635. https://doi.org/10.1016/j.sbspro.2014.01.814

Valencic, M., & Vogrinc, J. (2007). A mentor's aid in developing the competences of teacher trainees. *Educational Studies*, *33*(4), 373–384. https://doi.org/10.1080/03055690701423473

Van de Schoot, R., Lugtig, P., & Hox, J. (2012). A checklist for testing measurement invariance. *European Journal of Developmental Psychology*, *9*(4), 486–492. https://doi.org/10.1080/17405629.2012.686740

Van Ginkel, G., Verloop, N., & Denessen, E. (2016). Why mentor? Linking mentor teachers' motivations to their mentoring conceptions. *Teachers and Teaching*, *22*(1), 101–116. https://doi.org/10.1080/13540602.2015.1023031

Veenman, S. (1984). Perceived problems of beginning teachers. *Review of Educational Research*, *54*(2), 143–178. https://doi.org/10.3102/00346543054002143

Voss, T., Kleickmann, T., Kunter, M., & Hachfeld, A. (2013). Mathematics teachers' beliefs. In M. Kunter, J. Baumert, W. Blum, U. Klusmann, S. Krauss, & M. Neubrand (Eds.), *Cognitive Activation in the Mathematics Classroom and Professional Competence of Teachers* (pp. 249–271). Springer. https://doi.org/10.1007/978-1-4614-5149-5_12

Voss, T., & Kunter, M. (2020). "Reality shock" of beginning teachers? Changes in teacher candidates' emotional exhaustion and constructivist-oriented beliefs. *Journal of Teacher Education*, *71*(3), 292–306. https://doi.org/10.1177/0022487119839700

Voss, T., Kunter, M., & Baumert, J. (2011). Assessing teacher candidates' general pedagogical-psychological knowledge: Test construction and validation. *Journal of Educational Psychology*, *103*(4), 952–969. https://doi.org/10.1037/a0025125

Voss, T., Wagner, W., Klusmann, U., Trautwein, U., & Kunter, M. (2017). Changes in beginning teachers' classroom management knowledge and emotional exhaustion during the induction phase. *Contemporary Educational Psychology*, *51*, 170–184. https://doi.org/10.1016/j.cedpsych.2017.08.002

Wanberg, C. R., Welsh, E. T., & Hezlett, S. A. (2003). Mentoring research: A review and dynamic process model. *Research in Personnel and Human Resources Management*, *22*, 39–124. https://doi.org/10.1016/S0742-7301(03)22002-8

Wang, J., & Fulton, L. A. (2012). Mentor-novice relationships and learning to teach in teacher induction: A critical review of research. *Multidisciplinary Journal of Educational Research*, *2*(1), 56–104.

Wang, J., & Odell, S. J. (2002). Mentored learning to teach according to standards-based reform: A critical review. *Review of Educational Research*, *72*(3), 481–546. https://doi.org/10.3102/00346543072003481

Wang, J., & Odell, S. J. (2007). An alternative conception of mentor-novice relationships: Learning to teach in reform-minded ways as a context. *Teaching and Teacher Education*, *23*(4), 473–489. https://doi.org/10.1016/j.tate.2006.12.010

Wang, J., Odell, S. J., & Schwille, S. A. (2008). Effects of teacher induction on beginning teachers' teaching. *Journal of Teacher Education*, *59*(2), 132–152. https://doi.org/10.1177/0022487107314002

Wang, Z., Chen, L., Duan, Y., & Du, J. (2018). Supervisory mentoring and newcomers' work engagement: The mediating role of basic psychological need satisfaction. *Social Behavior and Personality: An International Journal*, *46*(10), 1745–1760. https://doi.org/10.2224/sbp.7609

Watson, S., & Marschall, G. (2019). How a trainee mathematics teacher develops teacher self-efficacy. *Teacher Development*, *23*(4), 469–487. https://doi.org/10.1080/13664530.2019.1633392

Weinert, F. E. (2001). Concept of competence: A conceptual clarification. In D. S. Rychen & L. H. Salganik (Eds.), *Defining and selecting key competencies* (pp. 45–65). Hogrefe & Huber.

Whisnant, E., Elliott, K., & Pynchon, S. (2005*). A review of literature on beginning teacher induction*. Center for Strengthening the Teaching Profession.

Wildman, T. M., Magliaro, S. G., Niles, R. A., & Niles, J. A. (1992). Teacher mentoring: An analysis of roles, activities, and conditions. *Journal of Teacher Education*, *43*(3), 205–213. https://doi.org/10.1177/0022487192043003007

Wolters, C. A., & Daugherty, S. G. (2007). Goal structures and teachers' sense of efficacy: Their relation and association to teaching experience and academic level. *Journal of Educational Psychology*, *99*(1), 181–193. https://doi.org/10.1037/0022-0663.99.1.181

Yadav, A., & Koehler, M. (2007). The role of epistemological beliefs in preservice teachers' interpretation of video cases of early-grade literacy instruction. *Journal of Technology and Teacher Education*, *15*(3), 335–361.

Yuan, E. R. (2016). The dark side of mentoring on pre-service language teachers' identity formation. *Teaching and Teacher Education*, *55*, 188–197. https://doi.org/10.1016/j.tate.2016.01.012

Yuan, R., & Lee, I. (2016). 'I need to be strong and competent': A narrative inquiry of a student-teacher's emotions and identities in teaching practicum. *Teachers and Teaching*, *22*(7), 819–841. https://doi.org/10.1080/13540602.2016.1185819

Yuan, K.-H., Chan, W., & Bentler, P. M. (2000). Robust transformation with applications to structural equation modelling. *The British Journal of Mathematical and Statistical Psychology*, *53*(1), 31–50. https://doi.org/10.1348/000711000159169

Zapf, D., Vogt, C., Seifert, C., Mertini, H., & Isic, A. (1999). Emotion work as a source of stress: The concept and development of an instrument. *European Journal of Work and Organizational Psychology*, *8*(3), 371–400. https://doi.org/10.1080/135943299398230

Zapf, D., Seifert, C., Schmutte, B., Mertini, H., & Holz, M. (2001). Emotion work and job stressors and their effects on burnout. *Psychology & Health*, *16*(5), 527–545. https://doi.org/10.1080/08870440108405525

Zee, M., & Koomen, H. M. (2016). Teacher self-efficacy and its effects on classroom processes, student academic adjustment, and teacher well-being. *Review of Educational Research*, *86*(4), 981–1015. https://doi.org/10.3102/0034654315626801

Appendix

Appendix A - Fragebogen-Skalen der vorliegenden Studien

Skala Transmissives Mentoring (adaptiert von Richter et al., 2013)
verwendet in: Studie 1, Studie 2, Studie 3

	Meine Ausbildungslehrkraft/Mentor(in)/ Ausbildungsleiter(in), betreuende Fachlehrkraft...	Trifft nicht zu			Trifft zu
int_ausblk_trans_1	…gibt mir vor, was ich verbessern muss.	○	○	○	○
int_ausblk_trans_2	…hat konkrete Vorstellungen darüber, wie ich die Unterrichtsinhalte vermitteln soll.	○	○	○	○
int_ausblk_trans_3	…gibt mir vor, was ich im Unterricht anders machen muss.	○	○	○	○

Skala Konstruktivistisches Mentoring (adaptiert von Richter et al., 2013)
verwendet in: Studie 1, Studie 2, Studie 3

	Meine Ausbildungslehrkraft/Mentor(in)/ Ausbildungsleiter(in), betreuende Fachlehrkraft...	Trifft nicht zu			Trifft zu
int_ausblk_kons_1	…hilft mir, mich selbstständig zu verbessern.	○	○	○	○
int_ausblk_kons_2	…unterstützt mich darin, verschiedene Unterrichtsmethoden auszuprobieren.	○	○	○	○
int_ausblk_kons_3	…gibt mir Gelegenheit, meine eigenen Schlüsse zu ziehen.	○	○	○	○
int_ausblk_kons_4	…regt mich mit ihren Ideen zum Nachdenken an.	○	○	○	○

Appendix A - Fragebogen-Skalen der vorliegenden Studien (Fortsetzung I)

Skala: Basic Needs Satisfaction (Kauper et al., 2012)
verwendet in: Studie 1

Subskala Kompetenz-Unterstützung

	Bitte geben Sie an, wie sehr die folgenden Aussagen auf Ihre Erfahrungen im Vorbereitungsdienst während des letzten Jahres zutreffen.	Trifft nicht zu			Trifft zu
ba_need_kompun_1	Ich kann bei Schwierigkeiten jederzeit sinnvolle Hilfe in Anspruch nehmen.	○	○	○	○
ba_need_kompun_2	Mir werden konkrete Möglichkeiten aufgezeigt, wie ich mich verbessern kann.	○	○	○	○
ba_need_kompun_3	Ich bekomme klare und detaillierte Rückmeldung zu meinen Leistungen.	○	○	○	○

Subskala Autonomie-Unterstützung

	Bitte geben Sie an, wie sehr die folgenden Aussagen auf Ihre Erfahrungen im Vorbereitungsdienst während des letzten Jahres zutreffen.	Trifft nicht zu			Trifft zu
ba_need_autoun_1	Ich kann mir meine Zeit selbst einteilen.	○	○	○	○
ba_need_autoun_2	Ich habe die Gelegenheit, mich mit interessanten Inhalten intensiver zu beschäftigen.	○	○	○	○
ba_need_autoun_3	Ich kann meine Aufgaben auf meine Art erledigen.	○	○	○	○

Appendix A - Fragebogen-Skalen der vorliegenden Studien (Fortsetzung II)

Skala: Emotionale Erschöpfung (Kunter et al., 2017)
verwendet in: Studie 1, Studie 3

Die folgenden Aussagen beziehen sich auf alle Aktivitäten und Tätigkeiten Ihres Vorbereitungsdienstes. Wie viel Freude macht Ihnen Ihre Tätigkeit? Beziehen Sie sich bitte auf Ihre Fächer und Ihren Unterricht in diesen. Inwieweit treffen folgende Aussagen auf Sie zu?

		Trifft nicht zu			**Trifft zu**
em_erschou_1	Ich fühle mich bei der Arbeit oft erschöpft.	○	○	○	○
em_erschou_2	Ich fühle mich vom Vorbereitungsdienst insgesamt überlastet.	○	○	○	○
em_erschou_3	Ich merke öfter bei der Arbeit, wie lustlos ich bin.	○	○	○	○
em_erschou_4	Manchmal bin ich am Ende des Arbeitstages richtig deprimiert.	○	○	○	○

Appendix A - Fragebogen-Skalen der vorliegenden Studien (Fortsetzung III)

Skala: Lehrer-Selbstwirksamkeit (adaptiert von Schmitz & Schwarzer, 2000)
verwendet in: Studie 2, Studie 3

Bitte beurteilen Sie die folgenden Aussagen daraufhin, inwieweit diese auf Sie und Ihren Unterricht zutreffen.

		Trifft nicht zu			**Trifft zu**
u_swk_1	Ich weiß, dass ich es schaffe, selbst den problematischsten Schüler(inne)n den prüfungsrelevanten Stoff zu vermitteln.	○	○	○	○
u_swk_2	Ich weiß, dass ich zu den Eltern guten Kontakt halten kann, selbst in schwierigen Situationen.	○	○	○	○
u_swk_3	Ich bin mir sicher, dass ich auch mit den problematischen Schüler(inne)n in guten Kontakt kommen kann, wenn ich mich darum bemühe.	○	○	○	○
u_swk_4	Ich bin mir sicher, dass ich mich in Zukunft auf individuelle Probleme der Schüler(innen) noch besser einstellen kann.	○	○	○	○
u_swk_5	Selbst wenn mein Unterricht gestört wird, bin ich mir sicher, die notwendige Gelassenheit bewahren zu können.	○	○	○	○
u_swk_6	Selbst wenn es mir mal nicht so gut geht, kann ich doch im Unterricht immer noch gut auf die Schüler(innen) eingehen.	○	○	○	○
u_swk_7 (*invers*)	Auch wenn ich mich noch so sehr für die Entwicklung meiner Schüler(innen) engagiere, weiß ich, dass ich nicht viel ausrichten kann.	○	○	○	○
u_swk_8	Ich bin mir sicher, dass ich kreative Ideen entwickeln kann, mit denen ich ungünstige Unterrichtsstrukturen verändere.	○	○	○	○
u_swk_9	Ich traue mir zu, die Schüler(innen) für neue Projekte zu begeistern.	○	○	○	○
u_swk_10	Ich kann innovative Veränderungen auch gegenüber skeptischen Lehrkräften durchsetzen.	○	○	○	○

Appendix A - Fragebogen-Skalen der vorliegenden Studien (Fortsetzung IV)

Skala: Emotionales Dissonanz-Erleben (adaptiert von Zapf et al., 1999)
verwendet in: Studie 2

Arbeitsplätze unterscheiden sich darin, wie stark man auf die Gefühle anderer (Schüler(innen)/Eltern/Kolleg(inn)en) eingehen muss, und in der Notwendigkeit die eigenen Gefühle zu kontrollieren, um den Anforderungen der Tätigkeit gerecht werden zu können. Schätzen Sie bitte ein, wie sehr die im Folgenden beschriebenen Situationen auf Ihre Schule (nach Ihren bisherigen Erfahrungen; auch Praktika) zutreffen.

		Sehr selten / nie	[Genaue Antwort-Alternativen siehe unten.*]			**Sehr oft**
emreg_1	Wie häufig kommt es vor, dass Sie in der Schule Gefühle unterdrücken müssen, um nach außen hin „neutral“ zu erscheinen?	○	○	○	○	○
emreg_2	Wie oft kommt es in Ihrer Schule vor, dass Sie Gefühle zeigen müssen, die nicht mit dem übereinstimmen, was Sie momentan gegenüber anderen (Schüler(inne)n/Eltern/Kolleg(inn)en) fühlen?	○	○	○	○	○
emreg_3	Wie oft kommt es in Ihrer Schule vor, dass Sie angenehme Gefühle (zum Beispiel Freundlichkeit) oder unangenehme Gefühle (zum Beispiel Strenge) zeigen müssen, während Sie innerlich gleichgültig sind?	○	○	○	○	○
emreg_4	Wie oft kommt es in Ihrer Tätigkeit vor, dass Sie Gefühle zeigen müssen, die mit Ihren eigentlichen Gefühlen nicht übereinstimmen?	○	○	○	○	○

* *Skalierung*: 1= sehr selten/nie; 2= selten (etwa 1x pro Woche); 3= gelegentlich (etwa 1x pro Tag); 4= oft (mehrmals am Tag); 5= sehr oft (mehrmals pro Stunde).

Appendix A - Fragebogen-Skalen der vorliegenden Studien (Fortsetzung V)

Skala: Lehr-Lern-Überzeugungen (Kunter et al., 2017)
verwendet in: Studie 2

Subskala Transmissive Überzeugungen

Denken Sie an typische Situationen der Lehrtätigkeit und bewerten Sie die Aussagen bitte daraufhin, ob Sie persönlich eher zustimmen oder nicht.

		Trifft nicht zu			Trifft zu
uez_trans_1	Schüler(innen) lernen am besten, indem sie den Erklärungen der Lehrerin oder des Lehrers folgen.	○	○	○	○
uez_trans_2	An einem vorgeführten Beispiel lernen die Schüler(innen) am besten.	○	○	○	○
uez_trans_3	Den meisten Schüler(inne)n muss man an einer Reihe von Beispielen zeigen, wie Aufgaben zu bearbeiten sind.	○	○	○	○
uez_trans_4	Schüler(innen) lernen durch die Demonstration von Beispielaufgaben am besten.	○	○	○	○
uez_trans_5	Um erfolgreich im Unterricht zu sein, müssen Schülerinnen und Schüler gute Zuhörerinnen und Zuhörer sein.	○	○	○	○
uez_trans_6	Schülerinnen und Schüler benötigen immer eine ausführliche Anleitung dazu, wie Arbeitsaufträge zu bearbeiten sind.	○	○	○	○
uez_trans_7	Am besten lernen Schüler(innen) aus Darstellungen und Erklärungen ihrer Lehrkraft.	○	○	○	○

Subskala Konstruktivistische Überzeugungen

Denken Sie an typische Situationen der Lehrtätigkeit und bewerten Sie die Aussagen bitte daraufhin, ob Sie persönlich eher zustimmen oder nicht.

		Trifft nicht zu			Trifft zu
uez_kons_1	Schüler(innen) lernen im Unterricht am besten, indem sie selbst Wege zur Beantwortung von Aufgaben finden.	○	○	○	○

uez_kons_2	Es ist wichtig für eine(n) Schüler(in), selbst zu entdecken, wie Aufgaben zu bearbeiten sind.	○	○	○	○
uez_kons_3	Man sollte Schüler(inne)n erlauben, sich eigene Wege zur Bearbeitung von Aufgaben auszudenken, bevor die Lehrperson vorführt, wie diese zu beantworten sind.	○	○	○	○
uez_kons_4	Im Unterricht werden die Lehrziele am besten erreicht, wenn Schüler(innen) ihre eigenen Methoden finden, um Aufgaben zu bearbeiten.	○	○	○	○
uez_kons_5	Es hilft Schüler(inne)n, Unterrichtsinhalte zu begreifen, wenn man sie ihre eigenen Ideen diskutieren lässt.	○	○	○	○
uez_kons_6	Lehrerinnen und Lehrer sollten Schülerinnen und Schülern, die Schwierigkeiten mit dem Bearbeiten einer Aufgabe haben, erlauben, mit eigenen Bearbeitungsversuchen fortzufahren.	○	○	○	○
uez_kons_7	Lehrpersonen sollten Schüler(innen) auffordern, eigene Wege zur Aufgabenbearbeitung zu entdecken.	○	○	○	○

Appendix A - Fragebogen-Skalen der vorliegenden Studien (Fortsetzung VI)

Skala: Kolleg*innen als Interaktionspartner (adaptiert von Kunter et al., 2017)
verwendet in: Studie 3

Inwieweit treffen folgende Aussagen auf Sie und Ihre Lehrkräfte zu?

		Trifft nicht zu			Trifft zu
int_lehrk_1	Die Diskussionen mit Lehrkräften regen mich zum Nachdenken an.	○	○	○	○
int_lehrk_2	Unter den Lehrkräften herrscht eine rege Diskussionskultur.	○	○	○	○
int_lehrk_3	Durch die Ansichten der Lehrkräfte werde ich angeregt, meine eigene Meinung noch mal zu überdenken.	○	○	○	○

Skala: Soziale Unterstützung durch Peers (adaptiert von Richter, Kunter, Lüdtke, et al., 2011)
verwendet in: Studie 3

Im Vorbereitungsdienst kann man sich bei anderen Anwärter(inne)n Rat und Unterstützung holen. Wie nehmen Sie die Unterstützung durch Ihre Mit-Anwärter(innen) wahr?

		Trifft nicht zu			Trifft zu
pee_infu_1	Ich bespreche Probleme, die in meinem Unterricht aufgetreten sind, mit den anderen Anwärter(inne)n.	○	○	○	○
pee_infu_2	Habe ich Probleme mit anderen Lehrkräften, kann ich das mit Mit-Anwärter(inne)n besprechen.	○	○	○	○
pee_infu_3	Wenn ich Probleme mit Schüler(inne)n habe, dann sind die anderen Anwärter(innen) wichtige Ansprechpartner für mich.	○	○	○	○

Appendix A - Fragebogen-Skalen der vorliegenden Studien (Fortsetzung VII)

Skala: Unterrichten (adaptiert von Gröschner, 2009)
verwendet in: Studie 3

In meiner bisherigen Ausbildung habe ich gelernt…

		Ganz und gar unzutreffend					**Voll zutreffend**
unterr_1	…schulische Inhalte als Bildungsinhalte für Schülerinnen und Schüler zu begründen.	○	○	○	○	○	○
unterr_2	… Unterricht in meinen Fächern didaktisch begründet zu planen.	○	○	○	○	○	○
unterr_3	…Lernsituationen Schülerinnen und Schülern gegenüber klar zu strukturieren.	○	○	○	○	○	○
unterr_4	…mit Hilfe didaktischer Theorien mein eigenes Vorgehen im Unterricht kritisch zu bewerten.	○	○	○	○	○	○
unterr_5	… schülerorientierte Unterrichtsmethoden (z. B. Projektarbeit, Gruppenarbeit, Präsentationen) im Klassenraum umzusetzen.	○	○	○	○	○	○
unterr_6	…Aufgaben in meinen Unterrichtsfächern zu konstruieren, die das Lernen von Schülerinnen und Schülern fördern.	○	○	○	○	○	○
unterr_7	…die Medienauswahl für meinen Unterricht zu begründen.	○	○	○	○	○	○
unterr_8	…zur aktiven Auseinandersetzung mit den Inhalten meiner Fächer anzuregen.	○	○	○	○	○	○
unterr_9	…die Inhalte meiner Fächer im Unterricht kompetent darzustellen.	○	○	○	○	○	○

Appendix A - Fragebogen-Skalen der vorliegenden Studien (Fortsetzung VIII)

Skala: Diagnostizieren und Bewerten (adaptiert von Gröschner, 2009)
verwendet in: Studie 3

In meiner bisherigen Ausbildung habe ich gelernt…

		Ganz und gar unzutreffend					**Voll zutreffend**
diagno_1	…Schülerinnen und Schülern zu zeigen, wie sie ihren Lernweg selbst kontrollieren können.	○	○	○	○	○	○
diagno_2	…den Leistungsfortschritt der Schülerinnen und Schüler mit unterschiedlichen Instrumenten festzustellen.	○	○	○	○	○	○
diagno_3	…leistungsschwächere Schülerinnen und Schüler zu erkennen und individuell zu fördern.	○	○	○	○	○	○
diagno_4	..leistungsstärkeren und besonders begabten Schülerinnen und Schülern differenzierte Aufgaben zu stellen.	○	○	○	○	○	○
diagno_5	…differenzierte Rückmeldungen an Schülerinnen und Schülern zu geben.	○	○	○	○	○	○
diagno_6	…kooperatives Arbeiten von Schülerinnen und Schülern (zu zweit, in Gruppen) zu bewerten.	○	○	○	○	○	○
diagno_7	…Leistungsergebnisse meiner Schülerinnen und Schüler nach spezifischen Kriterien zu benoten.	○	○	○	○	○	○

Appendix A - Fragebogen-Skalen der vorliegenden Studien (Fortsetzung IX)

Skala: Klassenführung - Unterrichtsstörungen und Zeitverschwendung (adaptiert von Baumert et al., 2008)

verwendet in: Studie 3

Denken Sie an berufliche Erfahrungen, die Sie als angehende Lehrkraft bereits machen konnten. Inwieweit treffen folgende Aussagen auf Ihren Unterricht zu?

		Trifft nicht zu			**Trifft zu**
kla_fueh_stoe_1	In meinen Klassen ist es schwer, den Unterricht pünktlich zu beginnen.	◯	◯	◯	◯
kla_fueh_stoe_2	Es dauert zu Beginn des Unterrichts sehr lange, bis die Schüler(innen) ruhig werden und zu arbeiten beginnen.	◯	◯	◯	◯
kla_fueh_stoe_3	Ich habe oft den Eindruck, dass in meinem Unterricht viel Zeit vertrödelt wird.	◯	◯	◯	◯
kla_fueh_stoe_4 (*invers*)	Ich muss den Unterricht nur selten unterbrechen, um Schüler(innen) zur Ruhe zu ermahnen.	◯	◯	◯	◯

Appendix B - Angabe zu Teilveröffentlichungen der vorliegenden Dissertation

Diese Promotionsschrift enthält mehrere Teilstudien, die bereits in Fachjournalen mit Peer-Review publiziert oder zur Publikation eingereicht wurden. Dies betrifft folgende Teilkapitel:

Teilkapitel 5:

Burger, J., Bellhäuser, H., & Imhof, M. (2021). Mentoring styles and novice teachers' well-being: The role of basic need satisfaction. *Teaching and Teacher Education, 103,* 103345. https://doi.org/10.1016/j.tate.2021.103345

Teilkapitel 6:

Burger, J. (in press). Constructivist and transmissive mentoring: Effects on teacher self-efficacy, emotional management, and the role of novices' initial beliefs. *Journal of Teacher Education*.

Teilkapitel 7:

Burger, J., Schulz, P., & Imhof, M. (2022). Patterns of formal and informal support within teacher induction: Latent classes and their implications for novices' competence and well-being [Manuscript under review]. *Mentoring & Tutoring: Partnership in Learning.*