Aus der Klinik und Poliklinik für Psychosomatische Medizin und Psychotherapie
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Potential Risk Factors of Employment for Mental Health of Residents in Former East and West Germany

Potenzielle Risikofaktoren der Erwerbstätigkeit für die mentale Gesundheit von Ansässigen in den neuen und alten Bundesländern Deutschlands

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Abbreviations

CBI	Copenhagen Burnout Inventory
COR	Conservation of resources
ERI	Effort-reward imbalance
FRG	Federal Republic of Germany
GDR	German Democratic Republic
GSOEP	German Socio-Economic Panel
ICD	International Classification of Diseases
ICT	Information and communication technologies
JD-R	Job demand-resources
OLS	Ordinary least squares
WHO	World Health Organization

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“The Republic shall establish uniform labor legislation, a uniform system of labor courts and uniform legislation for the protection of labor, in all of which the working population shall play a decisive part.

Working conditions must be such as to safeguard the health, cultural requirements and family life of the workers.

Remuneration for work must correspond to performance and must provide a worthwhile existence for the worker and those dependents entitled to his support.

Men and women, adults and juveniles, are entitled to equal pay for equal work.

Women enjoy special protection in employment relations. The laws of the Republic shall provide for institutions enabling women to co-ordinate their tasks as citizens and workers with their duties as wives and mothers.

Juvenile workers shall be protected against exploitation and saved from falling into moral, physical or mental neglect. Child labor is prohibited.”

Constitution of the German Democratic Republic (7 October 1949), Article 18

“All Germans shall have the right freely to choose their occupation, place of work and place of training. The practice of an occupation may be regulated by legislation.

No one may be compelled to perform a particular kind of work except within the framework of an established general compulsory public service equally applicable to everybody.

Forced labour shall be admissible only in the event of imprisonment ordered by a court.”

The Basic Law of the Federal Republic of Germany (23 May 1949), Article 12

1 Deutschsprachige Zusammenfassung

Psychologische Anforderungen im Job sind in den letzten Jahrzehnten gestiegen (Rigó et al., 2021). Darum ist es von großer Bedeutung zu erfassen, welche Anforderungen Disstress unter Erwerbstätigen fördern und welche Ressourcen diese Assoziationen abschwächen. Da sich Arbeitsstrukturen sowie (häufig ökonomische) Ressourcen zwischen den ehemaligen ost- und westdeutschen Bundesländern unterscheiden, können ebenso regionale Unterschiede hinsichtlich des Prozesses der Stressgenese vermutet werden.

Zu diesem Zweck wurde in dieser Dissertation ein theoretisches Modell gebildet, das die Mechanismen der Auswirkungen von jobspezifischen Anforderungen, umweltbezogenen sowie individuellen Ressourcen und Personenmerkmalen auf den evaluativen Bewertungsprozess von Stressoren als überwältigend (Disstress) oder positiv fordernd (Eustress) erklärt. Disstress stellt einen gesundheitlichen Risikofaktor dar. All diese Komponenten sind auf einer höheren (Makro-)Ebene davon betroffen, die sich durch den Wohnort in ehemaligen ost- oder westdeutschen Bundesländern ergibt. Auf diesem Modell aufbauend kann die Frage beantwortet werden, wie sich die Assoziationen und Effekte hinsichtlich jobspezifischer Anforderungen und anderer jobspezifischer Attribute sowie Arbeitsgesundheit zwischen den neuen und alten Bundesländern Deutschlands unterscheiden. Regionenspezifische Arbeitsbedingungen und Gesundheit wurden hierbei betont.

Der erste Artikel dieser Dissertation nutzte querschnittliche Daten einer repräsentativen Bevölkerungsumfrage aus 2014 (N = 1.065). Für die Spezifikation der abhängigen Variable emotionaler Erschöpfung wurde das Copenhagen Burnout Inventory (Kristensen et al., 2005) genutzt. Disstress durch digitale Medien gilt als Technostress. Dieser wurde durch mehrere einzelne Variablen indiziert: Belastung durch die Internetnutzung am Arbeitsplatz, die Anzahl an eingehenden E-Mails während Arbeits- und Freizeit sowie den wahrgenommenen sozialen Druck ständig erreichbar sein zu müssen. Mit diesen sowie weiteren soziodemographischen Variablen wurden umweltbezogene, jobspezifische Anforderungen sowie Personenmerkmale in ihren Assoziationen mit mentaler Gesundheit beobachtet. Die Ergebnisse wurden zwischen Personen wohnhaft in neuen oder alten Bundesländern verglichen. Die Kleinstquadratemethode (OLS-Regression) wurde genutzt, um emotionale Erschöpfung vorherzusagen. Zusätzlich wurden in einem weiteren Schritt Interaktionsterme zwischen den unabhängigen Variablen und dem Wohnort in Ost oder West hinzugefügt, um regionale Unterschiede zu erfassen. Im zweiten Artikel dieser Dissertation wurden 3.848 Befragte zu zwei Zeitpunkten (2006 und 2011) des Sozioökonomischen Panels beobachtet. Als abhängige Variable diente die allgemeine Lebenszufriedenheit, welche eine Komponente des subjektiven Wohlbefindens bildet (Diener et al., 1999; Fergusson et al., 2015). Siegrists (1996) Maß der beruflichen Gratifikation stellte einen Indikator für Arbeitsbedingungen dar. Zu hohe persönliche Anstrengungen (‘Overcommitment’) sowie das persönliche Nettoeinkommen waren weitere zentrale Prädiktoren. Durch diese und die weitere Integration soziodemographischer Variablen konnten jobspezifische umweltbezogene sowie individuelle Ressourcen und Personenmerkmale berücksichtigt werden, um Wohlbefinden vorherzusagen. Ein Within-Between-Modell wurde eingesetzt, um sowohl Fixed als auch Random Effects zu messen. Somit konnten Unterschiede zwischen den Befragten sowie Veränderungen zwischen den Befragungswellen berücksichtigt werden. Zusätzliche Interaktionsterme zwischen dem Wohnort in den neuen oder alten Bundesländern und der beruflichen Gratifikation, Overcommitment und dem Einkommen gaben einen Einblick in regionale Differenzen.

Die zwei Studien bestätigten die vermuteten Mechanismen des theoretischen Modells, indem sie zeigten, dass die neuen und alten Bundesländer sich hinsichtlich der jobspezifischen Anforderungen und Ressourcen unterschieden. Die Makroebene des Wohnorts bedingt den Prozess der arbeitsbezogenen Stressgenese. Während der erste Artikel betonte, dass die Prävalenz von jobspezifischen Anforderungen, welche durch Technostress indiziert wurden, in variierenden Richtungen zwischen den beiden Regionen differierte, wiesen Westdeutsche

höhere Ausmaße emotionaler Erschöpfung auf. Dies könnte aus der stärkeren Assoziation zwischen Technostress-Indikatoren und Erschöpfung in Westdeutschland resultieren. Es signalisiert zudem, dass Ost- und Westdeutsche Stressoren auf unterschiedliche Weise bewerten, da sich die Komponenten, die diese Bewertung bedingen, ebenso unterscheiden. Der zweite Artikel konnte zeigen, dass Ostdeutsche im Vergleich zu Westdeutschen weniger Belohnungen für ihre geleistete Arbeit erhielten, was zu stärkeren Ungleichgewichten zwischen Arbeit und Belohnung im Osten führte. Außerdem verfügten Ostdeutsche über ein größeres Ausmaß an Overcommitment, was darauf hindeutet, dass sie eher auf ungesunde Weise Einsatz für ihren Job erbringen. Somit erhielten Ostdeutsche weniger umweltspezifische Ressourcen und verfügten über mehr schädliche individuelle Ressourcen in Form von Overcommitment. Diese Befunde konnten teilweise erklären, wieso Ostdeutsche weniger zufrieden mit ihrem Leben waren als Westdeutsche. Weiterhin profitierte die Lebenszufriedenheit von Ostdeutschen mehr von einem steigenden Einkommen als die von Westdeutschen. Dies betonte wiederum die unterschiedlichen Bewertungsprozesse von Stressoren zwischen Ost- und Westdeutschen. Durch eine höhere umweltspezifische Ressource durch persönliches Einkommen wurden Ostdeutsche weniger durch Arbeitsbedingungen beeinflusst. Hierdurch konnte die Bedeutung jobspezifischer Belohnungen (insbesondere durch finanzielle Gratifikation) für die Verbesserung ostdeutscher Arbeitsbedingungen unterstrichen werden, um die soziale und gesundheitsbezogene Chancengleichheit zwischen den neuen und den alten Bundesländern weiter anzugleichen. Im Allgemeinen konnte gezeigt werden, dass die beobachteten jobspezifischen Anstrengungen, die niedrigen individuellen sowie umweltspezifischen Ressourcen und deren Ungleichgewicht die Gesundheit sowie das Wohlbefinden von Erwerbstätigen beeinträchtigen. Dadurch wurde die Bedeutung von umweltbezogenen und individuellen Ressourcen für die Arbeitsgesundheit bestätigt. Regionale Differenzen und Eigenheiten hinsichtlich Arbeitsstrukturen und jobspezifischer Charakteristika wurden zudem herausgestellt und sollten in künftiger Forschung weiter untersucht werden.

2 Introduction

Health is a multifaceted concept which exhibits a close interplay between physical, mental, and social dimensions (Ertel et al., 2022). It is well-known that employment offers individuals a wide range of protective factors for their health. This knowledge especially stems from one of the first studies on unemployment: the unemployed of Marienthal (Jahoda et al., 1933). It was qualitatively observed that employment grants people a sense and structure of time, a feeling of being needed, potential social contacts, as well as a purpose in life (Jahoda, 1986). At the same time, however, high job demands and inadequate coping techniques can aggravate employees' health problems (Semmer & Mohr, 2001). Work stressors have been rising between 1995 and 2015 with the increase of psychological demands in terms of tight deadlines and increasing time pressure (Rigó et al., 2021). Therefore, the focus on job demands is becoming more important. In this dissertation, a model is presented which integrates the mechanism of job demands affecting employees, while resources received from the employer, individually possessed resources, as well as personality can buffer or enhance the effect of job demands. What these components encompass is shortly presented in the introduction and more thoroughly discussed in the theory section.

Previous research has already focused on a wide range of job demands as stressors and their effects on health as well as health-related behavior. Examples of psychological demands as job-related stressors enhancing physical symptoms are interpersonal conflict, lack of control, role ambiguity, role conflict, and workload (Nixon et al., 2011). Further, time pressure at the job is related to higher levels of exhaustion (Kunzelmann & Rigotti, 2021; Schilbach et al., 2022) as well as lower levels of work engagement and self-esteem (Schilbach et al., 2022). Globally, work stressors increase morbidity in regards to coronary heart disease, stroke, and type 2 diabetes (Kivimaki & Kawachi, 2015). Moreover, high levels of distress increase the odds of work-family conflict which, in turn, worsens organizational commitment (Tran, 2022).

Thus, health and productivity suffer from deleterious working conditions. Often, burnout is implemented as outcome variable with workplace characteristics as predictors. Burnout applies to employees who become unable to deal with chronic distress (Maslach, 1993) and is accompanied by several somatic implications (Freudenberger, 1974). However, as questionnaires insufficiently cover the concept of clinical burnout (van Dam, 2021), emotional exhaustion is a more adequate alternative to grasp one of the most prominent consequences of detrimental working conditions. The first article within this dissertation was concerned with emotional exhaustion as outcome variable related to deleterious job demands. Emotional exhaustion comprises a feeling of emotional overextension as well as perceived missing emotional resources (Maslach, 1993). Due to the fact that emotional exhaustion predicts behavioral health risk factors and morbidity (Ahola et al., 2012; Rose et al., 2017; van Dam, 2021), job demands are crucial when it comes to mental health problems resulting from the job. This is why demands attract attention in all theories on work which are introduced in greater detail at a later stage. The most commonly used theories to explain negative health outcomes ensuing from bad working conditions (Shoman et al., 2021) include the model of effort-reward-imbalance (ERI; Siegrist, 1996), the job demand-control model (Karasek, 1979), the demand-control-support model (Karasek & Theorell, 1990), and finally, the job demand-resources model (Demerouti et al., 2001). All of them include job demands and their influence on employees. The second article within this dissertation focused on the ERI model as focal independent variable. This model presents the advantage of covering environmental resources and individual resources, as well as their interplay which can become a stressor.

Resources such as coping techniques or those stemming from one's personality can buffer detrimental effects of demands. Coping may be defined as ongoing cognitive and behavioral efforts to handle demands which are perceived as challenging (Lazarus & Folkman, 1984). Therefore, with the appropriate individual resources, stressors can also have beneficial effects instead of being consistently detrimental: through a moderating effect, higher levels of emotional coping and focused action increase the positive association between time pressure and work engagement (Kunzelmann & Rigotti, 2021). This underlines that the differentiation between distress, as negatively evaluated stress, and eustress, as positively evaluated stress, is of high importance. Moreover, it deems the emergence of distress as multifaceted process which relies on mechanisms as inevitable. Besides individual resources, employers can offer their employees environmental resources aiming at improving employee well-being. Among other examples, these environmental resources might encompass social support (e.g., Demerouti et al., 2001; Karasek & Theorell, 1990), employee benefits (e.g., Bourne et al., 2012; Ko & Hur, 2014), immaterial or material rewards (e.g., Siegrist, 1996), or workplace health interventions (e.g., Aust et al., 1997; Keeman et al., 2017; Kroll et al., 2017; Lefebvre et al., 2020). In the articles within this dissertation, the focus was on the resources relying on personal characteristics, efforts at the job, and environmental resources received from the employer.

Though detrimental working conditions found large recognition in research, analyses on their regional disparities are limited. This dissertation aims at filling this gap in research and offering a model of work stress and its evaluation that considers the micro level of employees, the meso level of employers, as well as the macro level of region. Region was displayed by place of residence in the former East or West German states which will also be referred to as East and West Germany for simpler readability. Since there are differences within the labor market and other job-related structures in East and West Germany, job demands could differ regionally, as well. Therefore, the differentiation between East and West Germany was added to the analyses. Due to their former separation and their diverging state ideologies, the two states exhibit different labor structures. Remnants of these structures can still be found even after unification. In conclusion, the apparent assumptions regarding regional differences in working conditions and the gap in research lead to the overarching research question of this dissertation: In which way do the associations and effects related to job demands as well as other workplace characteristics and employee health differ between East and West Germany? To answer this question, disadvantageous working conditions were focused on in the analyses. Thus, constant availability as well as relatively low rewards accompanied by high efforts were

included to portray detrimental job-related demands. The association between constant availability and exhaustion was tested while controlling for sociodemographic variables. Further, the effect of an increasing job-related imbalance between high efforts and low rewards on life satisfaction was estimated. One aim of the two approaches was to shed light on varying aspects of mental health as well as job demands. Moreover, they should cover extensive job-related problems. Place of residence within former Eastern or Western German states moderated associations between demands and mental health. The importance of implementing regional aspects was reinforced by the theoretical backgrounds, the results and the discussion.

3 Background

3.1 Stress

The core of work-related adverse health outcomes and theories explaining the potential pathogenesis lies in stress. Four stress concepts have been determined in previous research: the stimulus concept, the response concept, the transactional concept, and the discrepancy concept (Sonnentag & Frese, 2012): Situational conditions or events which are considered stressful cause stress in the stimulus concept. Physiological reactions are responsible for stress in the response concept. The relation between an individual and its environment are accounted for in the transactional concept. The discrepancy concept depicts the imbalance between the individual's desires and what they get in return by the environment.

However, defining and thus conceptualizing stress has been problematic for researchers so far. "What is stress? […] Stress is the rate at which we live at any moment. All living beings are constantly under stress, and anything – pleasant or unpleasant – that speeds up the intensity of life causes a temporary increase in stress, the wear and tear extended upon the body. A painful blow and a passionate kiss can be equally stressful." (Selye, 1965, p. 97). This early ambiguous definition of stress shows that the term is far from being concise enough for research. Another widely used attempt to define stress declares: "Stress is a systemic concept referring to a disequilibrium of the system as a whole, in particular of the system's control capabilities" (Karasek and Theorell, 1990, p. 87). In contrast to this disequilibrium, an equilibrium is the homeostasis or the balance which should be maintained (Karasek & Theorell, 1990). If the balance is lost, the disequilibrium emerges. Nevertheless, Lazarus and Folkman (1984) deem the homeostatic approach problematic as they state everything in life produces or reduces the equilibrium of the system. Even Selye (1965) admitted that his faulty English led to the term stress and that strain was in fact preferable; nevertheless, the term stress has been used so widely that he integrated the concept of stressors, since in physics, stress is the outcome of strain (then stressors). However, this approach only describes the relationship between stressful situations and strain (Sonnentag & Frese, 2012).

The stress process, in turn, was only modelled theoretically (Sonnentag & Frese, 2012). Early physiological stress theories, namely those of Cannon (1932) and Selye (1936), consider stress a response to the disequilibrium (Hobfoll, 1989). Especially prolonged states of this disequilibrium lead to the breakdown of the system (Cannon, 1932). Henry and Stephens (1977) claimed that the perceived intensity and quality of stressors activate different hormonal stress axes via differing cerebral areas, releasing cortisol and other stress hormones if the stressors are considered overburdening. Therefore, distinct stressors constitute the stimuli of stress when they produce stressful behavioral or physiological responses (Lazarus & Folkman, 1984) and can be divided into three types: major cataclysms which influence many people, major changes which influence only few people, and daily hassles (Lazarus & Cohen, 1977). This shows that the impact of different stressors may vary as well as the sensibility of the affected (Lazarus & Folkman, 1984).

Still, these definitions have not yet conceptualized the ambiguous nature of stress which can lead to positive or negative individual evaluation. By this time, distress and eustress are

commonly used to differentiate between the negative and positive outcome of the stressor, respectively. Biologically, stress is defined as inferred internal state, while distress is produced by coping and adaptation processes failing to reach homeostasis (National Research Council (US) Committee, 2008). In other words, distress is the reaction to experiencing high demands which exceed the body's capacity to maintain homeostasis (Selye, 1976). Nevertheless, the terms stress, strain, psychological stress, and distress are not well-separated in previous literature (Ridner, 2004). Therefore, the terms need to be used carefully in the following passages. Stress is used to refer to the overall physiological response to a stressor, distress results from the negative appraisal of the stressor, and eustress follows the positive appraisal. Eustress displays stress beneficial in achieving goals (Selye, 1976; Simmons & Nelson, 2007). The difference between eustress and distress also becomes clear when looking at their diverging effects on health: Kozusznik et al. (2015) clustered employees according to their levels of distress and eustress and found significant differences between groups regarding their exhaustion. It thus becomes clear that distress can be harmful to health, while eustress exhibits a protective factor. To determine why stressors can have either a negative or a positive effect, Paracelsus is oftentimes quoted as he concludes: "The dose makes the poison". This is why work-related theories contribute to research by including the extent of demands and one or more resources fostering coping mechanisms.

Following the conceptualization of stress being inferred, work-related theories include environmental stressors, thus exceeding purely individual aspects which can only portray acute rather than chronic stress (Karasek & Theorell, 1990). Karasek and Theorell (1990) reassert the importance of including the environment in theories of work as the environment being the source of one's distress is the common denominator of all stress theories. In this dissertation, both the meso level (employer) and the macro level (region) account for the employee's environment. Moreover, stress should preferably be considered a concept consisting of various variables and processes rather than of a single variable (Lazarus & Folkman, 1984). To account for the aspects of time and complexity of distress, individual attributes, environmental as well as behavioral aspects that affect the evaluative appraisal of stressors are discussed in the following paragraphs.

3.1.1 Individual attributes

While the prominence of environmental factors is acknowledged by Lazarus and Folkman (1984), they also highlight the influence of individual appraisal: people exhibit various levels of vulnerability and sensitivity to differing events. Individual reactions and interpretations vary, as well (Lazarus & Folkman, 1984). Thus, different reactions to same stressors might be explained by individual disparities in people's evaluative appraisals of encounters. Sonnentag and Frese (2012) provide evidence for this assumption, since they observed that over 40% of longitudinal studies did not find a significant association between stressors and later strain. Again, the importance of acknowledging the relationship between stressors and health outcomes as multifaceted mechanism is highlighted. According to Lazarus and Folkman (1984), appraisal is affected by various aspects:

1) *commitment*: what is important to a person; commitment influences people to take up or evade challenges; cue-sensitivity can be stressful; the more committed a person is, the more vulnerable they are to distress in this area; commitment to reduce threat by sustaining coping techniques;
2) *beliefs*: what is fact; beliefs about control, powers of mastery over the environment; existential beliefs and hope;
3) *novelty of stressful situations*: completely new situations cannot be appraised as threatening or challenging; previous associations with harm, danger, or mastery are needed for appraisals;
4) *event uncertainty*: subjectively perceived probability that an event occurs;
5) *temporal uncertainty*: it is unclear when an event occurs; the presence of imminence can be perceived as threatening;

6) *imminence of a certain event taking place*: how much time is left before the event occurs; appraisals become more intense with higher imminence; complexity of appraisals rises with anticipation time;
7) *duration of the stressful event*: habituation or exhaustion can occur with ongoing duration;
8) *ambiguity of information evaluation*: lack of situational clarity; the evaluation of the other factors is unclear; demands are unpredictable;
9) *context during one's life cycle*: other related events can be distant, recent, or concurrent; thus, the timing deems events welcome, bothersome or something different.

However, these influences only cover personal characteristics or aspects of the stressor. Resources, whether individual or environmental, are not acknowledged. Moreover, the context apart from point 9) is not integrated. Therefore, the process of appraisal should be enhanced to more thoroughly account for stress mechanisms.

Other individual attributes can further be part of the stress process. For example, in the context of work-family conflict, it was shown that work-related beliefs or attitudes of an employee who experiences distress at the workplace impacts how this distressed state affects their family (A. Li et al., 2021). Therefore, individual attributes do not only influence employees themselves but also their peers' distress levels. Moreover, individual resources can be beneficial for the appraisal: Lazarus and Folkman (1984) focus on coping which reduces distress by solving problems with realistic as well as flexible thoughts and acts. Again, resources differ individually which is why a sole focus on environments lacks foundation. Additionally, some individual resources foster coping: Higher self-esteem, low levels of neuroticism, as well as beliefs about control over one's life are associated with problem-focused coping to reduce distress (D. J. Terry et al., 1995). In turn, problem-focused coping reduces mental ill-health and negative affects (A. Richter et al., 2013; Turgut et al., 2017). It becomes clear that appraisal as well relies on both individual and environmental factors. However, the quantitative number and intensity of demands as environmental factors are not part of the reasoning of the appraisal approach. Simultaneous demands might alter the form of appraisal. Thus, integrating demands specifically into theories of job-related distress is preferable.

Certain personal characteristics can either directly impact the appraisal of stressors or be beneficial for individual resources. For instance, with increasing age, psychological distress diminishes (McDonough & Strohschein, 2003). Following the appraisal approach, this might be due to the lower probability of a novel stressful event in older age. It is also possible that older people had more time to accumulate resources. Sex also displays an individual attribute which was found to exhibit different levels of psychological distress: Already in adolescence, girls report higher psychological as well as chronic distress and daily hassles (Matud et al., 2023). The same was observed with Spanish (Matud et al., 2015) and Canadian (McDonough & Strohschein, 2003) adults. The gendered gap in distress even widens starting at a middle age of 45 to 54 (McDonough & Strohschein, 2003). Grant and Langan-Fox (2006) observed the relationships between the Big Five traits and occupational distress as well as coping. People exhibiting high levels of extraversion or conscientiousness or low levels of neuroticism are less inclined to evaluate stressors negatively. In contrast, high levels of neuroticism increase the probability to use dysfunctional coping techniques. The latter finding indicates that individual personality and individual resources can be related when it comes to the appraisal of stressors. This might also explain why women are more prone to higher distress.

Regarding eustress, some individual predictors have already been tested in previous research. A mixed-methods approach including nurses revealed that eustress enhances job satisfaction and is associated with individual feelings of usefulness as well as involvement facilitation (Califf et al., 2020). Therefore, appraisals are also of importance for eustress and its consequences. The individual resources self-worth and work meaningfulness are boosted by respondents appraising demands as challenges rather than hindrances, whereas they diminish in course of negative appraisals of demands (M. Kim & Beehr, 2020). Thus, it needs to be focused what

causes employees to appraise challenges positively rather than negatively. Further, it shows that the stress process might be circular in some cases.

3.1.2 Environmental factors

Two major environmental domains in life are work and family. This is why conflicts between these two oftentimes find attention in research. Spillover and crossover effects can explain how an interindividual transmission of distress occurs. A spillover effect takes place if an individual experiences an intraindividual transmission of emotions from one domain to another, for example from the work to the home domain (Demerouti et al., 2005; Marcus, 2013). The interindividual transmission is indicated by the crossover effect which comprises the transfer of emotions from one person to another, for example to a family member (Demerouti et al., 2005; Song et al., 2011). While work-to-family conflicts explain negative intraindividual spillover effects of the work domain on the family domain, family-to-work conflicts describe the opposite. Crossover effects may then emerge which means that other, indirectly affected, persons are influenced via a close relationship with the directly affected person, as well. Work-to-family conflict correlates with life satisfaction, job stressors, non-work stressors, organizational withdrawal behaviors, and health (Mesmer-Magnus & Viswesvaran, 2005). Individual work-family conflict is distinctly influenced by the environment-level working hours; individually, levels of vigor and exhaustion mediate the effect of working hours on family life (Pak et al., 2022). This finding indicates the strong interplay of work-related individual and environmental factors of distress. Moreover, organizational support is strongly associated with lower work-to-family conflict (K. French et al., 2018). Therefore, including aspects of organizational support as in the following theoretical work models is crucial.

Family-to-work conflict proved to both positively and negatively affect life satisfaction, though negative aspects (e.g., home life interferes with responsibilities at work) are more influential than positive ones (e.g., taking responsbilities at work more seriously due to being recquired to do the same at home; De Simone et al., 2014). This indicates that the respective demand and the individual appraisal of demands are also important when it comes to balancing the two domains of work and family.

A meta-analysis indicated that both family-to-work conflict and work-to-family conflict are associated with higher levels of exhaustion and cynicism (Reichl et al., 2014). Individual health therefore suffers from environmental demands that exceed one's capacity. In countries with a higher global competitive index, such as Germany, holding a balance between engagement in the work and family domain is associated with higher life satisfaction and better subjective well-being (Mitra et al., 2021). It is thus illustrated that it is too simple that the individual is only affected by one environmental domain. The balance between the two most important domains, work and family, should be maintained to generate resources for the individual and to prevent distress among the afflicted and their peers.

An important environmental aspect of modern workplaces is their use of technology. Reports show that while 60% of German employees often use digital devices at work, a small majority states that because of digitalization their work load as well as multitasking have increased (DGB-Index Gute Arbeit, 2017). Early on, it was stated that technology can be a detrimental factor when it comes to work: In their balance model, Smith and Sainfort (1989) already include technology to either overload employees because of its complexity or benefit them. The case of overload is also picked up by Ragu-Nathan et al. (2008) who defined the technology-related creators of distress or, in this distinct case, technostress:

1) *techno-invasion* is constant connectivity due to technological devices,
2) *techno-overload* addresses the multiple devices and tools used simultaneously,
3) *techno-complexity* describes that technology is oftentimes complex and it may be hard to learn how to use it,
4) *techno-insecurity* refers to the fear of job loss due to lacking technology skills,

5) *techno-uncertainty* accounts for the rapid shifts and advancements in technology that employees need to keep up with.

Though it was shown that technology can also be beneficial for employee health (Arnold et al., 2023; Ninaus et al., 2021), it is detrimental more frequently (Ninaus et al., 2021). For example, nurses' levels of distress are significantly associated with higher techno-uncertainty and techno-overload (Califf et al., 2020). Higher distress is related to the use of technology at work though an effect of increasing use of technology on employee health was not found (Berg-Beckhoff et al., 2017). However, a meta-analysis observed a medium mean impact of technostress on psychological outcomes (Nastjuk et al., 2023).

Nevertheless, the workplace environment can also benefit employees' resources. Social support helps distressed employees to adjust their psychological well-being and job satisfaction (D. J. Terry et al., 1995). Moreover, the protective effects of environmentally induced eustress due to team stress climate on psychological health was confirmed for Poland and Spain (Kozusznik et al., 2012). In teleworkers, eustress is fostered by individual autonomy, and environmental managerial support, as well as technical support (van Slyke et al., 2022). As the simultaneous influences of both individual and environmental factors are observed, it is again indicated that individual appraisal is affected by both environmental and personal factors.

3.1.3 Behavior

Coping techniques are helpful when it comes to maintaining homeostasis as they exhibit a resource beneficial for positive evaluative appraisals of demands (Lazarus & Folkman, 1984). However, different coping techniques have been observed by previous researchers. Emotion-focused coping and problem-focused coping were developed by Folkman and Lazarus (1980): Problem-focused coping relates to solving the problem causing distress, emotion-focused coping refers to actively changing the negative evaluation of the stressors. While emotion-focused coping is associated with higher odds of burnout, the probability is reduced with problem-focused coping (Shin et al., 2014). In contrast, it was found that self-monitoring to control feelings is a protective mechanism to prevent stress, anxiety, and depression (Ghasemi, 2022).

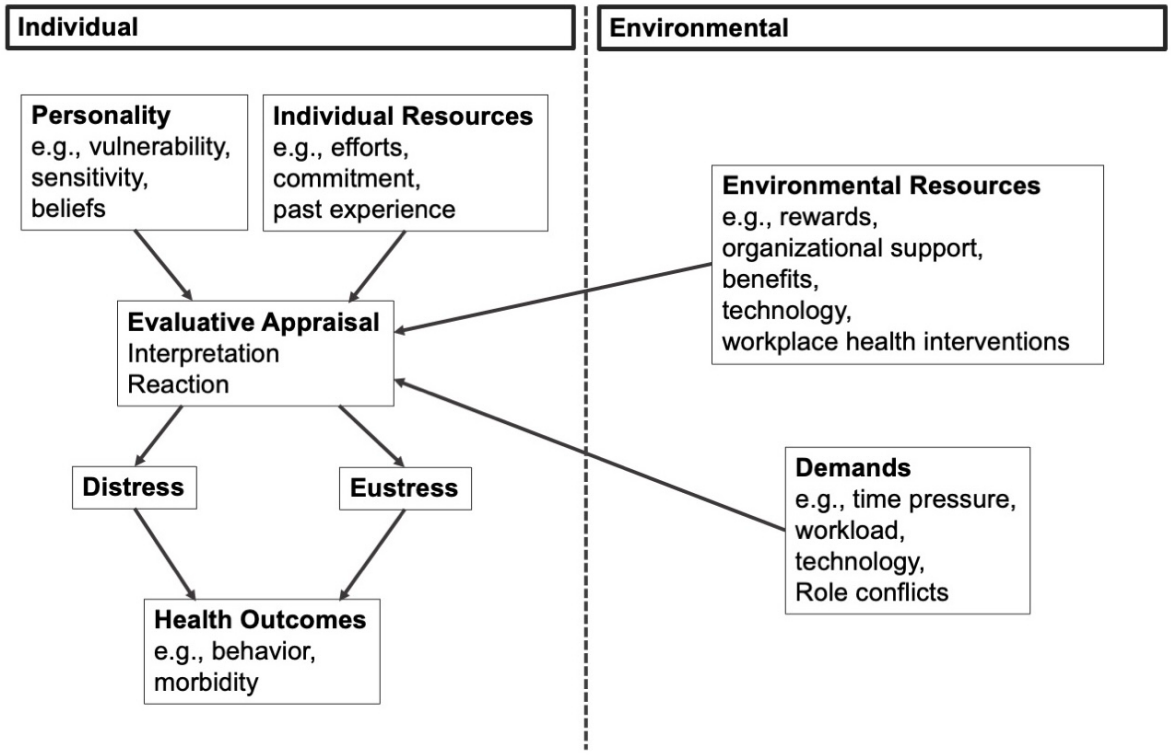
A meta-analysis of 23 prospective studies which focus on the effect of working conditions on chronic low-grade inflammation displayed that physical interventions (aerobic exercise, walking, yoga, cycling) reduce inflammation-related plasma molecules (Kaltenegger et al., 2021). Therefore, such interventions might reduce distress. Moreover, mental interventions by providing opportunities and skills to enhance employee well-being partially attenuate inflammation-related processes on intra-cellular level (gene expression; Kaltenegger et al., 2021). Thus, specific actions can be taken to prevent or reduce physical symptoms of distress. Social behavior towards one's spouse in terms of intimacy, support, or withdrawal also mediates the crossover effects of job-related distress on partners (A. Li et al., 2021). A meta-analytical review collected interventions to reduce detrimental effects of information overload: Behavior in terms of deciding how to handle incoming information is crucial for the evaluative processing of information (Arnold et al., 2023). Additionally, employees should set boundaries to protect themselves from e-mail overload during leisure time (Arnold et al., 2023). Employees at the risk of distressing job demands should therefore increase their resources by using adequate coping techniques, making use of one's social network, or detaching from the job during leisure time.

Dysfunctional coping behavior like smoking cigarettes increases the risks of high levels of distress, anxiety, and depression (Ghasemi, 2022). Further, exhaustion is fostered by dysfunctional coping patterns which comprised alcohol use and other behavioral aspects (J. Becker et al., 2022). It thus becomes apparent that some coping behavior can cause distress rather than prevent it.

3.1.4 Stress and Health

The considerations above can be condensed to generate a first stress model to explain health outcomes of employees. Combining the previous considerations of this section, a model could be built that integrated stress appraisal as defined by Lazarus and Folkman (1984) while also accounting for eustress, distress, and health as a broad outcome. This model can be seen in Figure IV-1. As discussed above, environmental as well as individual factors should be regarded in the case of work-related stress. According to Lazarus and Folkman (1984), it can be argued that stress differs individually due to an individual evaluative appraisal that originates from personality as well as distinct resources. From their environment, employees receive demands but also resources which, again, influence the evaluative appraisal. This might lead to a change in the equilibrium of the affected person's system and thus to distress or eustress. Both can affect health behavior or a person's health status. Since appraisal can only be measured directly after the incidence of a stressor (Bakker & Oerlemans, 2012; Xanthopoulou et al., 2012), the direction of the evaluation can oftentimes only be deduced by the outcomes which occur at a later time.

Figure IV-1. Stress Model to Explain Health Outcomes of Employees



3.2 Theories on Job-Related Stress and Resources

Previous researchers came up with different models to explain or even conceptualize work-related distress and its effects on employee health. Despite their disparities, demands are the stressor underlying these theories. The crucial difference between these models is the conceptualization of the individual or environmental protective factors.

For instance, drawing on Russell's (1980) circumplex model of affect, Bakker and Oerlemans (2012) developed a model on subjective well-being in organizations. Affective states or

emotions are related to a pleasure-misery continuum and to the arousal-sleepiness scale (Russell, 1980). In their model, Bakker and Oerlemans (2012) integrate work engagement as well as job satisfaction as positive indicators of work-related subjective well-being and workaholism as well as burnout as negative factors. Further, differentiations between high or low activation and a pleasant-unpleasant scale are added to the model to associate different emotions (e.g., irritated, fatigued, energized, relaxed) to a specific place in the circumplex model (Bakker & Oerlemans, 2012). As this model fails to integrate environmental influences of the workplace on the employee, it is questionable if it is sufficient in estimating employee well-being. In the following sections, theories of work will be introduced that account for the interplay of individual and environment. This may explain why they are the most widely used theories to explain how working conditions can affect employee health (Shoman et al., 2021).

3.2.1 Effort-Reward Imbalance at Work Model

The ERI work model was developed by Siegrist (1996) to examine the ratio between the employees' efforts at work and their perceived returned rewards. Therefore, the model clearly follows the discrepancy concept of stress. Experiencing interruptions, the extent of work hours, or of the employee's perceived time pressure at work refers to efforts, while recognition at the job, job security, and promotion opportunities account for rewards (Siegrist, 1996). An imbalance between efforts and rewards can cause negative outcomes in afflicted employees. Individuals strive for cognitive balance which is why attitudes or cognitions are changed when a cognitive imbalance occurs (Carson et al., 1997). Therefore, if employees' rewards are too low proportional to their efforts, they either reduce their efforts or they experience cognitive imbalance.

Althaus et al. (2013) claim that the ERI model basically stems from the person-environment fit model. In this model, the objective environment and person influence the subjective environment and person which predict short-term reactions and ultimately health (J. R. P. French et al., 1982). It is argued that when comparing ERI with the person-environment fit model, employee efforts signal the personal fit, while the rewards display the environmental fit (Althaus et al., 2013). Moreover, another possible predecessor of ERI is the balance model by Smith and Sainfort (1989) in which working conditions generate a stress load while the afflicted employee exhibits an individual personality as well as past experiences and is affected by differing social situations. The theory also includes maladaptive emotional, behavioral, or biological responses to be the consequences of working conditions accompanied by high demands (Smith & Sainfort, 1989). However, a more general approach to conceptualizing balance within personal relations is Heider's (1958) balance theory. In this model, cognitions and sentiments are received that determine the perceived quality of a relation (Heider, 1958). In this model, rewards can be explained by positive sentiments (Alessio, 1990). An even broader, grand theory that describes the balance of the relation between employee and workplace is social exchange theory. It claims that people exhibit different resources which they can invest to achieve reciprocity in a relationship (Blau, 1964; Homans, 1958). Distributive justice or reciprocity is achieved when costs and rewards are equally high (Homans, 1958). Therefore, as efforts can account for costs, the conceptualization of ERI is not far from social exchange theory. This is why it is not surprising that researchers simply used social exchange theory as a mechanism to analyze the transactional relation between employee and employer. For example, Ko and Hur (2014) used workplace benefits, procedural justice, and managerial trustworthiness as employers' exchange goods and job satisfaction as well as turnover intention as employees' resources to support the implementation of social exchange theory to organizational research. Further, social exchange theory was combined with Heider's balance theory to empirically observe an exchange ratio between two entities (Alessio, 1990). Nevertheless, it was argued that social exchange theory is not able to explain work relationships sufficiently anymore due to the frequency of changing relations in the work domain (Chernyak-Hai & Rabenu, 2018). By referring to several persons within the work environment and general job-related opportunities or job characteristics to measure rewards, ERI evades this problem of frequently changing transaction partners within the workplace. In

conclusion, broader theories regarding balance exist though ERI more specifically accounts for the work domain and includes the conceptualization to estimate the balance's extent.

At a later time, Siegrist et al. (2004) included the construct overcommitment to their model on work stress. Job-related time pressure, ruminating, as well as career sacrifices are acknowledged in the questionnaire. Though the construct of overcommitment might be similar to that of efforts (Kunz, 2019; Sonnentag, 2012; Sonnentag & Fritz, 2007), it can additionally explain variance of health outcomes (Preckel et al., 2005; Siegrist et al., 2004) which indicates that it measures a different concept than efforts. A conceptual difference between overcommitment and efforts is provided by Steptoe et al. (2004) who deem overcommitment the intrinsic and efforts the extrinsic component of job behavior. The relevance of adding overcommitment to the work stress model was signaled by Siegrist (2001) stating that it causes employees to remain in straining jobs. He explains this by the attitudes, behaviors, and emotions the overcommitted employees exert which leads them to excessively attempt and desire approval and esteem (Siegrist, 2001). They do this by taking up too many or too demanding tasks and exhibit exaggerated efforts to solve them (Siegrist et al., 2004). Job demands as well as job-related resources are then viewed in an inappropriate way (Siegrist, 2000). Overcommitted employees are more easily frustrated, since the rewards they receive do not fit their excessive efforts (Siegrist et al., 2004). This can also be explained by the claim which was mentioned above: The more committed people are to something, the more vulnerable they become in this respect (Lazarus & Folkman, 1984). Nevertheless, a healthy amount of affective commitment increases work well-being while lowering the odds of adverse health effects such as burnout (Chambel & Carvalho, 2022). Job commitment also enhances employees' task performance and organizational citizenship behavior and lowers job burnout and counter-productive work behavior (Yin, 2018). Originally, an interplay between ERI and overcommitment was assumed with the effect of ERI on health outcomes being intensified by a higher level of overcommitment (Siegrist et al., 2004). This assumption was supported by several researchers (e.g., Hinsch et al., 2019; Kudielka et al., 2004; Kunz, 2019; Siegrist et al., 2004; Steptoe et al., 2004). However, a review claims that the majority of studies do not find a moderating effect of overcommitment on ERI (van Vegchel, de Jonge, Bosma, et al., 2005).

Apart from its specific focus on the work domain, ERI also integrates health as an outcome of the imbalance an employee is experiencing at the workplace. Implementing ERI, multiple links between job conditions and health could be confirmed. In a review of 45 studies relying on the ERI model, it was shown that the majority of studies support the associations between ERI and the respective health outcome (van Vegchel, de Jonge, Bosma, et al., 2005). Thus, there is reliable proof that health can be affected by deleterious working conditions and predicted by ERI specifically.

The studies that could confirm the relation between ERI and health indicators used several different outcome variables. For example, ERI is associated with higher psychological distress of Italian university students (Porru et al., 2021). Moreover, overcommitment, anxiety, exhibiting lower levels of sense of coherence, perceived self-efficacy, well-being, and life satisfaction are affected by the imbalance of Swiss physicians (Buddeberg-Fischer et al., 2008). Further, depressive symptoms are more prevalent with employees indicating an ERI (Buddeberg-Fischer et al., 2008; Larisch et al., 2003; Leineweber et al., 2020; Siegrist, 2011). Thus, mental health and well-being can be negatively affected by the imbalance. In previous research, the relationship between the components of ERI, efforts and rewards, were also tested individually. Lower reward is also associated with a limited subjective feeling of personal accomplishment, which is a burnout symptom (Aronsson et al., 2017).

In some cases, there was no significant relation between ERI and health-adverse effects. For example, there is an inconsistency whether there is a relation between ERI and self-reported health (Leineweber et al., 2020) or not (Niedhammer et al., 2004). Another study found that mental health problems and self-reported mental health are only indirectly affected by ERI through the mediating variable overcommitment (Hinsch et al., 2019). There is no association between ERI, cortisol, and ambulatory blood pressure (Steptoe et al., 2004). ERI does not

predict exhaustion, whereas both higher efforts and lower rewards separately do (Gorgievski et al., 2019). Since ERI was less predictive of more specific psychosomatic health outcomes (van Vegchel, de Jonge, Bosma, et al., 2005), the inconsistency can partially be explained by the varying outcome variables. Another explanation can be found in the result that ERI affects psychological distress and physical complaints only after a 1-year time-lag (Shimazu & de Jonge, 2009). Due to the fact that most of the previous research used cross-sectional data, their analyses could not account for that lag. Moreover, the studies which could not find significant relations between ERI and health focused on specific subgroups (Gorgievski et al., 2019; Hinsch et al., 2019; Niedhammer et al., 2004; Steptoe et al., 2004), indicating that some occupational groups experience health effects because of an imbalance between efforts and rewards and some do not. Therefore, it can be concluded that longitudinal data should be enhanced to benefit research on imbalances between efforts and rewards in their effect on employee health. Further, as the inconsistent findings might be a consequence of the distinct focus on certain occupational groups, the general working population should be implemented into analyses to estimate the effect of ERI on health aspects for the majority of occupational groups.

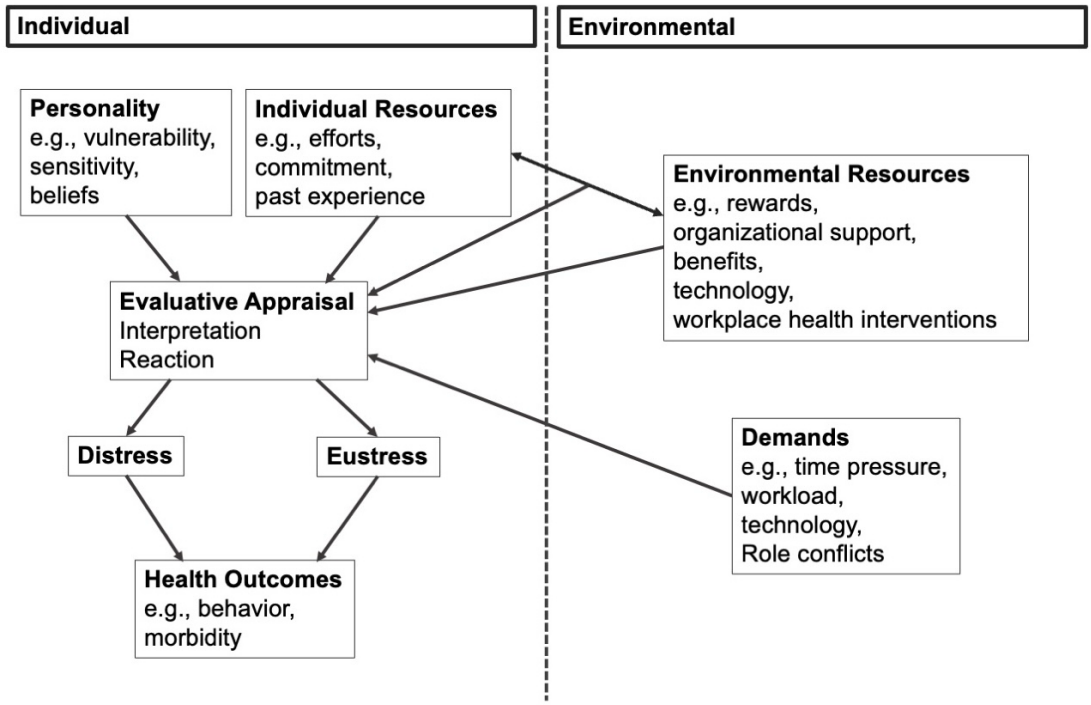
Apart from mental health, other important health aspects can be associated with ERI. An imbalance between efforts and rewards is related to employees with lower work ability, indicating that they are more likely to be hindered to manage job demands due to their health (Spanier et al., 2018). Lower cognitive functioning, in the form of perceptual speed and word fluency, is also related to ERI (Riedel et al., 2017). Sleep disturbances as well as fatigue were more prevalent with those indicating an ERI, as well (Fahlén et al., 2006). Further, ERI both predicted cardiovascular disease and fostered it at an earlier age (van Vegchel, de Jonge, Bosma, et al., 2005). Employees with an increasing imbalance between efforts and rewards, at the cost of the latter, later suffered from migraine more often (Leineweber et al., 2020).

Further, health behavior is related to ERI, as the latter is associated with increased smoking and alcohol consumption (van Vegchel, de Jonge, Bosma, et al., 2005). In addition, employees with an existing imbalance are inclined to have both more short and long spells of sickness absence (Head et al., 2007; Leineweber et al., 2020). With a changing health behavior, mental or physical health might alter because of it.

A qualitative study of employees within the IT sector showed that ERI can account for changes in strain in course of a system of permanent probation (Kämpf, 2015). Antonovsky's (1997) approach of salutogenesis is added to explain how the affected lose their sense of coherence and agency as important resources (Kämpf, 2015). Kämpf (2015) concludes that new structures of work-related strain are emerging that foster psychological as well as psychosomatic symptoms such as nervousness, tinnitus, depression, and burnout. While in the past, monotonous routines at work and lacking control were responsible for poor employee health, Kämpf (2015) now deems the lack of alternatives because of missing resources and capacities of both employees and organization responsible, which leads to excessive demands. Thus, in times of fast-changing work structures, it becomes more important to observe employee health while integrating demands they face at the job. Moreover, as highlighted above, resources should be acknowledged, as well, which deems the ERI model fit to focus on the process of work distress.

In conclusion, it is an important advancement to consider the distinct balance of the transaction between employee and employer. This transaction can be explained in different ways as this section discusses. However, ultimately following social exchange theory, the stress model can be enhanced by adding this employee-employer transaction. Thus, Figure IV-2 includes that individual resources of the employee and environmental resources the employee receives from their employer jointly contribute to the individual’s evaluative appraisal due to the balance of the transaction.

Figure IV-2. Exchange-Stress Model to Explain Health Outcomes of Employees



Even though the ERI model was used in the analyses within this dissertation, it is important to also introduce the other two most used theories of work to get a clear picture of how job demands can affect employee health. This way, the advantages of integrating ERI instead of the other conceptualizations can also become more apparent. Therefore, the next sections comprise information on the job demand-control(-support) model and the job demand-resources model.

3.2.2 Job Demand-Control(-Support) Model

The job demand-control model was first tested for the male work force of the United States and Sweden (Karasek, 1979): Depression, exhaustion, absenteeism and job satisfaction were related to the model in both countries. In this model, the focal assumption is that most of the adverse health outcomes of psychological strain are consequences of high job-related demands and simultaneous low decision latitude in the employee's tasks (Karasek, 1979; Karasek & Theorell, 1990). As the model neglects the individual evaluation of stressors, it can be considered following the response concept of stress. Demands are characterized as psychosocial stressors, including deadlines or other task requirements, and need to be differentiated between physical and psychological demands (Karasek & Theorell, 1990). Job control or decision latitude is important as the energy originating from stress can be released into action: due to the freedom of decision-making, the stress can be better managed, otherwise it could lead to distress (Karasek, 1979). While in this first questionnaire, seven items account for job decision latitude, six variables indicate job demands (Karasek, 1979). As can be seen, the job-demands control model accounts for both the negative and positive effects of stressors, meaning that eustress is considered as well as distress. The employee's ability to use specific job skills (skill discretion) as well as the extent of autonomy in decision making (decision authority) further explain one's job control (Häusser et al., 2010). The original questionnaire was shortened over time. Including 17 European cohort studies following the job demand-control model, it was observed that partial scales assess the underlying concept of job demands and control equally well as the full scales (Fransson et al., 2012). Thus, a parsimonious scale is supported. Nevertheless, the best results are achieved when the items

of demands and control refer to the same job dimension (Häusser et al., 2010). Kristensen (1995) suggested to include only non-representative samples as well as well-chosen occupations. This is explained by the use of analytical studies which focus on possible causal relations and the variation of exposure (Kristensen, 1995).

When the job-demand-control model is implemented, oftentimes the strain hypothesis as well as the buffer hypothesis are mentioned which focus on additive, multiplicative, and buffering effects. The strain hypothesis assumes that individuals who work in high-strain jobs are more likely to suffer from mental or physical illness as well as reduced well-being because of the additive or multiplicative effects of job demands and job control (van Vegchel, de Jonge, & Landsbergis, 2005). The buffer hypothesis, however, suggests only a buffering effect of control on the interactive effect of demands and control (van der Doef & Maes, 1999) and can thus be considered a specific form of the strain hypothesis (Häusser et al., 2010). After testing the strain hypothesis, it was shown that only mental and emotional, but not physical demands interact with control when influencing job satisfaction (de Jonge et al., 2010). In one example, the strain hypothesis is confirmed when using the Hospital Anxiety and Depression Scale as an outcome of the model as both additive and non-interactive effects can be observed (Sanne et al., 2005).

As discussed above, Karasek and Theorell (1990) explain the negative cognitive state because of stressors with the person's disequilibrium of their system. Demands can be accompanied by strain, which is labelled as an overload condition of one's control system. This can lead to a state of disorder of the system – an entropy. To reach an adequate homeostasis – the rest state or equilibrium of the system – energy and work are needed, oftentimes leading to strain or fatigue. Nevertheless, successful experiences with high demands can have a learning effect: future challenges can be faced with less effort (Karasek & Theorell, 1990).

Kristensen (1995) recommends only using longitudinal data to employ the job demand-control model because of the problematic causal direction between health and job stressors. The longitudinal effect was found in 52% of the studies, though the support rates were higher for analyses with psychological well-being indicators as outcomes compared to job satisfaction and emotional exhaustion (Häusser et al., 2010). Using Swedish longitudinal data, higher decision latitude significantly increased both job and life satisfaction while reducing sick days (Karasek, 1979). Meanwhile, higher demands significantly increased pill consumption (Karasek, 1979). Analyzing data from the United States between 1969 and 1977, it was found that women's mean decision latitude is markedly lower compared to men, though women's psychological demands were only slightly higher (Karasek & Theorell, 1990). Since even today, women descriptively exhibit less job control compared to men (Osca & López-Araújo, 2020; Pan et al., 2023; S. Wang & Li, 2023), it can still be assumed that women are more inclined to adverse health due to their working conditions. In contrast, it was found that women with supervisory responsibilities as indicator of job control tend to have more depression symptoms compared to women without supervisory responsibilities; the contrary applies to men who are less depressed if they have job authority (Pudrovska & Karraker, 2014).

58% of cross-sectional studies support the association between the job demands-control model and health-related outcomes (Häusser et al., 2010). Nevertheless, demands can have a multifaceted effect: high job demands combined with high control is associated with higher job satisfaction and fewer psychosomatic health symptoms in Dutch health care employees; only when control is low, demands worsen job satisfaction and health (de Jonge et al., 2010). The combination of higher job demands and low job control is further associated with a higher work-family conflict, indicating a spillover effect (Grönlund, 2007). Additionally, the combination turned out to be depressogenic in contrast to only one of these conditions being present (Stuke & Bermpohl, 2016). However, it was found that low control over the own worktime alone is related to depressive symptoms, psychological distress, fatigue, as well as burnout (Shiri et al., 2022). The importance of the combination of high demands and low control still indicates that the job demands-control model is less parsimonious than ERI.

The original job demand-control model was expanded to include social support at work as an environmental protective factor (Karasek & Theorell, 1990) which was already observed by Johnson and Hall (1988): Social support acts as a buffer of the effect of demands on the prevalence of cardiovascular disease. Karasek and Theorell (1990) define social support as the overall level of helpful social interactions on the job from co-workers as well as supervisors. The validated questionnaire added four questions on supervisor social support and co-worker social support each (Karasek et al., 1982). Social support is conducive to health in a multifaceted manner (Karasek & Theorell, 1990):

1) it buffers mechanisms between psychological stressors at work and deleterious health outcomes,
2) it influences focal psychological processes to protect long-term health and to acquire new knowledge,
3) it strengthens coping patterns,
4) and it gives a positive sense of identity.

However, even without job demands, the combination of low social support and low control is also associated with a higher probability of suffering from cardiovascular disease (Johnson & Hall, 1988). Therefore, the model might not be discriminatory enough. Nevertheless, there was no indication of the model influencing low-grade inflammatory responses, which means that cardiovascular morbidity due to job demands and control is not assumed to include inflammatory processes (Shirom et al., 2008). In another study, the buffer hypothesis was refuted, meaning that social support does not buffer the effects of job demands and control on Hospital Anxiety and Depression values (Sanne et al., 2005). These findings indicate that it is not surprising that Häusser et al. (2010) found less support for the enhanced model compared to the original one. In one example implementing the job demand-control as well as the job demand-control-support model, both of them can explain a high amount of variance of burnout of municipal police employees (Marchand & Durand, 2011).

Several studies support the association between the job demands-control-support model and health. Well-being in general is associated with the job demands-control-support model (van der Doef et al., 2000). The model was tested in a meta-analysis including research on students' academic burnout symptoms: while higher schoolwork demands increase the risks of suffering from burnout, higher perceived control of work as well as more social support diminish the probability (S. Kim et al., 2021). Also in the case of disability support workers, higher colleague support and control as well as lower demands are related to a lower probability of burnout (Vassos et al., 2019). Moreover, support from co-workers as well as job control are mediators in the effect of workload on burnout and work engagement (Vassos et al., 2019). The interactive effect of high demands as well as low control and social support on strain was also confirmed with qualitative data (Ricciardelli & Carleton, 2022). Higher support from colleagues also directly improves leisure satisfaction (Lin et al., 2015).

Apart from adverse mental health, the job demands-control-support model was also found to predict physical health aspects. For instance, occupational safety well-being criteria as workplace injuries can be predicted by the model (Snyder et al., 2008). Moreover, work stress increases the risk of recurrent coronary heart disease events of those who have already experienced one event by 65% (J. Li et al., 2015).

In conclusion, the job demand-control model as well as the job demand-control-support model were found to be related both to mental and physical health. Due to better predictions, the first is preferred to the second. However, without implementing social support, a theoretically important protective factor is missing. As was discussed, social support can also directly influence health. Its interaction with job demands or control is thus problematic. In a review of a large amount of studies that included the job demand-control model, it could be shown that job demands and job control affected the outcome in an additive rather than an multiplicative way (Häusser et al., 2010). It is thus questionable if the model has the foundation to explain a mechanism of job demands and control to influence employee health. Due to the fact that the interaction between the two constructs is not given, the model might be too complex.

3.2.3 Job Demand-Resources Model

The job demands-resources model also implements demands which ‘refer to those physical, social, or organizational aspects of the job that require sustained physical or mental effort and are therefore associated with certain physiological and psychological costs (e.g., exhaustion)’ (Demerouti et al., 2001, p. 501). This model also follows the response concept of stress. Originally, it was designed and validated to explain the emergence of burnout (Demerouti et al., 2001). The authors rely on Hockey's (1993) control model of demand management in which performance protection is achieved after mobilizing one’s autonomic and endocrine sympathetic activation or higher subjective effort: the individual’s physiological costs increase with higher activation and effort. However, Demerouti et al. (2001) suggest that resources keep individuals healthy. These distinctly external resources refer to aspects which help individuals to achieve their work goals, reduce the physiological or psychological costs of job demands, or stimulate development and personal growth (Demerouti et al., 2001). External resources may be separated into organizational and social rexources: while job control, qualification opportunities, decision latitude, and task variety account for organizational resources, social resources include support from colleagues, family, and peer groups (Demerouti et al., 2001). It can be seen that the model combines rewards, job control and social support as resources, and thereby integrates parts of the work theories, ERI as well as the job demand-control(-support) model, mentioned above. The authors suggest that burnout is the result of high demands which led to exhaustion and an esuing withdrawal behavior due to lacking resources to cope with the distress (Demerouti et al., 2001).

External resources might be more relevant than internal ones as it was shown that emotional intelligence as internal resource does not mediate the protective effect of external resources on work engagement (Johari et al., 2022). This is supported by the finding that individual and thus intrinsic engagement does not mediate the effect of affective commitment on health outcomes, meaning that it does not prevent from adverse health outcomes (Chambel & Carvalho, 2022). However, self-regulation as an internal resource was found to mediate the effects of job strain on burnout: when afflicted by job strain, the probability of choosing maladaptive self-regulation strategies as coping inflexibility or self-undermining is enhanced (Bakker & de Vries, 2021). A meta-analytic review indicated that resources should be increased to lower job insecurity which diminishes performance (Zhao et al., 2016). In contrast, the loss of job-related resources increases the probability of suffering from burnout (Chambel & Carvalho, 2022). The model was further supported by the finding that resources as role clarity and interpersonal justice alone do not account for better employee health but need to be combined with low job demands (Thomson et al., 2021). It becomes clear that various external and internal resources were used to test this model, leading to differing degrees of support.

Not only typical occupational settings can be observed using the job demands-resources model, but also classrooms: peer support was a crucial resource in buffering the outcomes of the demands of teachers’ academic pressures (Lee et al., 2021). In turn, academic burnout, academic hatred, as well as low engagement were less probable among those with higher support (Lee et al., 2021). That the model can be conveyed from the work domain to the educational realm exhibits that it originates from a broader mechanism as included in social exchange theory. Social exchange theory was also already connected to the job demands-resources model (Birtch et al., 2016): the job characteristics demands and resources are considered the exchanged goods coming from the employer, while job outcomes as job satisfaction or commitment refer to the employee’s exchanged goods. Following the psychological contract indicates the transaction of the exchange (Birtch et al., 2016). Psychological contracts may be defined as the belief about mutual obligations between employer and employee (Rigotti et al., 2007b; Rousseau, 1990). The authors showed that more resources attenuate the negative effect of higher job demands on psychological contract fulfillment (Birtch et al., 2016). These findings are supported by the observations that employees are more inclined to breach the psychological contract if their employer has already

offended against it (Bordia et al., 2017). However, by breaching the psychological contract, employees harm their career in terms of promotions and promotability (Bordia et al., 2017).

A systematic review of the studies containing the job demands-resources model exhibited that resources benefit productivity as well as employee work-related well-being (Roczniewska et al., 2022). However, 64% of the 113 observed studies find no significant association between job resources and health (Roczniewska et al., 2022). This finding indicates that the model might be too complex. Since the integrated resources differ distinctly from one another, some of them might be beneficial for health while others are not. This assumption derives from the rather low item correlations Demerouti et al. (2001) present. Moreover, just like the job demands-control(-support) model, the job demand-resources model does not integrate the individual level. Both models only observe the environmental level by including demands and environmental resources provided by the employer. Therefore, by also integrating individual resources, the ERI model provides a more profound picture of work strain while also being more parsimonious in its length. Thus, several instances indicate that the ERI model is preferable when it comes to observing work strain.

3.3 Effects of deleterious working conditions on health

The previous passages explained through which mechanisms deleterious working conditions can harm individuals. In this section, observed outcomes are further described. High demands at the work place can have adverse health consequences (Semmer & Mohr, 2001). Some of them were already mentioned in the preceding section. In this section, a special focus lies on the relation between the health indicators integrated in the analyses of this dissertation and working conditions. Emotional exhaustion and life satisfaction served as health indicators. It will be shown that both of them can be affected by excessive job demands via distress.

3.3.1 Exhaustion

Three different types of exhaustion have been characterized in previous research: emotional, mental, and physical exhaustion (Malakh-Pines, 1981). As mentioned above, emotional exhaustion is accompanied by lacking emotional resources as well as emotional overextension (Maslach, 1976). Mental exhaustion comprises a negative self-perception or view of other people (Malakh-Pines, 1981). Physical exhaustion is defined by low energy, weakness, and weariness (Malakh-Pines, 1981). Apart from exhaustion that is related to physical or mental health issues (Werner et al., 2022), job-related exhaustion directly addresses consequences of deleterious working conditions or limited coping resources. Therefore, the following considerations focus on emotional exhaustion. In quantitative analyses, job-related emotional exhaustion is oftentimes mistaken for occupational burnout (van Dam, 2021). One of the first definitions of burnout implies an enhanced frequency of physical signs such as headaches, gastrointestinal problems, shortness of breath, or sleep troubles (Freudenberger, 1974). The current definition of burnout by the ICD-11 also presupposes chronic work distress to lead to 1) exhaustion, 2) mental distance from the job and a negative or cynic view on it, as well as 3) the feeling of ineffectiveness and lacking accomplishments (WHO, 2022). Schaufeli and Greenglass (2001) consider burnout a consequence of emotionally demanding work situations which lead to physical, emotional, as well as mental exhaustion. However, as questionnaires seldom ask for the duration of symptoms, the use of the term burnout is not appropriate when collecting data via surveys (van Dam, 2021). Thus, in this dissertation burnout implies a chronic state, while the terms job-related or emotional exhaustion are used when the duration of symptoms remains unknown. It is also problematic that many studies which use the term burnout focus on emotional exhaustion, but not on the other symptoms of burnout (Aronsson et al., 2017). Therefore, it is important to examine such studies very carefully and to gauge which term should be used.

In general, increasing values of emotional exhaustion are more often related to adverse changes at work than within the family domain (Persson & Osterberg, 2020). Therefore, people

might use more adequate coping mechanisms concerning their home domain. As a mere rise in job tasks does not necessarily increase exhaustion (Konze et al., 2017), it is again highlighted that protective factors mediate the effect of potentially deleterious working conditions on health. Thus, model specifications should rely on protective factors, generated from individual or environmental resources and personality, as well as demands. It also highlights again that the ERI model is preferable to the other models of work stress as it comprises individual resources. Still, other work stress conceptualizations were able to predict employee health. For example, a meta-analysis demonstrated that emotional exhaustion diminishes with increasing job control, while it is fostered by lower workplace support (Aronsson et al., 2017). Another demand and source of job-related distress is constant availability. Digital connectivity has a curvilinear effect on emotional exhaustion: Up to a certain point, emotional exhaustion decreases with constant availability; after that, it increases and thus lowers employee job performance (Ren et al., 2022). Environmental resources as well as demands are therefore predictive of exhaustion. However, some individual characteristics increase the odds of burn out: all five indicators of the Big Five personality dimensions are associated with the three burnout symptoms, emotional exhaustion, depersonalization, and personal accomplishment (Swider & Zimmerman, 2010). It was shown that workers with high levels of neuroticism and low levels regarding the rest of the Big Five traits were most prone to burnout (Mäkikangas et al., 2015). Therefore, the used model (Figure IV-2) illustrates adequately how employees individual and environmental situations affect their job-related exhaustion.

Ultimately, burnout is a consequence of distress: Distress at the job should ideally be resolved at the work place; otherwise it can be reduced at home (Maslach, 1976). However, sometimes people become accustomed to stressful times, maintaining high levels of task performance without resting; they are not able to rest anymore until they collapse (van Dam, 2021). This may be called allostatic load which causes changes in the body enabling pathogenesis (Sterling & Eyer, 1988). In such cases, the prolonged elevation of blood pressure due to high allostatic load as a stressor constitutes a risk factor for pathogenesis (Sterling & Eyer, 1988). This outcome can be explained by the diminishing protective influences of recovery experiences - such as psychological detachment, relaxation, mastery, or control - on health (Sonnentag & Fritz, 2007). With increasing exhaustion, the association between recovery experiences and distress is buffered (Headrick et al., 2022). Since higher demands decrease recovery, as well (Steed et al., 2021), an association between demands and emotional exhaustion is provided. Further, burnout and job stressors affect each other reciprocally (Guthier et al., 2020). Thus, the afflicted spiral into mental health problems. In conclusion, emotional exhaustion is a focal part of research of job-related mental health research. This can be reasoned with its dual role as outcome of deleterious working conditions and predictor of further mental health problems.

3.3.2 Life Satisfaction

Life satisfaction displays an indicator of subjective well-being (Diener et al., 1999; Fergusson et al., 2015; Linley et al., 2009). The other two components of subjective well-being are positive and negative affect (Linley et al., 2009). Previous research has emphasized the important associations between life satisfaction or subjective well-being and health outcomes. Life satisfaction is closely related to mental health as they affect each other reciprocally (Fergusson et al., 2015). Further, physical health and longevity also depend on life satisfaction and vice versa (Diener & Chan, 2011). Mortality is lower with higher levels of subjective well-being (Chida & Steptoe, 2008). A meta-analysis also revealed that health status and subjective well-being are closely related (Ngamaba et al., 2017). Therefore, it can be deduced that life satisfaction is a good global indicator of people’s lives and how they evaluate it. In the case of work stress, life satisfaction is an important outcome, since work is among the most important life domains in our society. Deleterious working conditions can be related to lower life satisfaction as distress is also associated with satisfaction with life (Hamarat et al., 2001). Among others, additional job-related predictors of life satisfaction are tension (Erdogan et al.,

2012), subjective meaningfulness of one's job (Allan et al., 2019), and work engagement (De Simone et al., 2014).

Interpersonal differences in life satisfaction can be explained by top-down (individual) and bottom-up (situational) approaches (Erdogan et al., 2012): top-down perspectives focus on relatively stable individual attributes, while bottom-up approaches concentrate on contentment in multiple domains. For example, top-down analyses displayed that neuroticism, extraversion, agreeableness, and conscientiousness are related to life satisfaction (D. Heller et al., 2004; Steel et al., 2008). Situational domain satisfaction is also associated with it (D. Heller et al., 2004). Bottom-up approaches focus on the association between domain satisfaction and life satisfaction. Health satisfaction is a strong predictor of life satisfaction; work satisfaction is related to life satisfaction via control (Hnilica, 2004). Moreover, life satisfaction is related to career satisfaction (Hagmaier et al., 2018). Therefore, it is shown that the domains of work and health are closely related to the evaluation of one's life. A meta-analysis of 21 studies showed that leisure satisfaction is also related to life satisfaction on a moderate level (Kaas & Icigen, 2022). Financial satisfaction (Ngamaba et al., 2020; Pawsey et al., 2023) as well as socioeconomic status (Tan et al., 2020) are related to life satisfaction. It is therefore not surprising that wealth and household income are also predictors of life satisfaction (Kasinger et al., 2023; Salinas-Jimenez et al., 2011; Schöllgen et al., 2019). Thus, it was important to include personal income in the analyses of the second article within this dissertation. Moreover, spillover effects could be observed, as well, as lower life satisfaction is related to higher work-to-family conflict (Mesmer-Magnus & Viswesvaran, 2005). In general, the association between life satisfaction, job satisfaction, and family satisfaction is stronger in less collectivistic countries as Germany (Allen et al., 2020). It is therefore important to acknowledge life satisfaction as possible outcome variable in analyses of work stress that use German data. Simultaneously, the finding could indicate that the results of the second paper within this article cannot be conveyed to less collectivistic countries as German data was used. In conclusion, it can still be emphasized that life satisfaction is closely related to other domains like health, work, leisure, family, and finances.

Individual resources exhibit protective factors regarding the effect of job-related demands on life satisfaction. Individual aspects such as relaxation and mastery experiences positively predict life satisfaction (Headrick et al., 2022). Well-being is also positively related to recovery (Steed et al., 2021). In contrast, rumination is proposed as factor which disturbs recovery from work as it is related to lower well-being (Blanco-Encomienda et al., 2020). Therefore, employees do not stop to think about their job even after work. This indicates that they are not able to rest anymore. Since ruminating and other inabilities to detach after work are part of the overcommitment concept, it provides an important individual resource indicator to predict life satisfaction. Again, the used model (Figure IV-2) seems adequate to explain differences in the life satisfaction of employees.

Life satisfaction is also related to environmental resources and demands at the work place. Erdogan et al. (2012) reviewed that work-related studies on life satisfaction use job-related tension among others to explain satisfaction with life; one mediator was quality of work life. Therefore, job-related aspects proved to be predictive of life satisfaction. Another job-related factor is meaningful work (i.e., job tasks subjectively contribute to the greater good): a meta-analysis presented moderate to large correlations between meaningful work and higher life satisfaction (Allan et al., 2019). Moreover, positive working conditions exhibit an advantageous environmental resource as they have a larger impact on work engagement, which also increases life satisfaction (De Simone et al., 2014). Due to the fact that life satisfaction significantly differs between East and West Germany (Frijters et al., 2004; Kasinger et al., 2023; Petrunyk & Pfeifer, 2016a), the environmental meso level as well as the macro level should be thoroughly considered when analyzing it.

In conclusion, it could be highlighted that life satisfaction is not only related to health, but also to job-related aspects in the exchange-stress model to explain health outcomes of employees (Figure IV-2). Individual resources, personality, as well as environmental resources and job

demands are all associated with life satisfaction. In turn, life satisfaction differs between place of residence in the former East or West German states. The following section describes more thoroughly that work structures differentiate regionally, as well. Thereby, the micro and meso levels of the exchange-stress model to explain health outcomes of employees is enhanced by adding the macro level.

3.4 Adding the Macro Level to the Model: Work Structures in East and West Germany

3.4.1 The Conservation of Resources-Theory

As was mentioned before, the environment affects how individuals evaluate stressors, since it provides both demands and resources. However, in the exchange-stress model to explain health outcomes of employees, the environment is the workplace where the individual is employed, meaning that the environment is on the meso level. The macro level is not acknowledged in the aforementioned stress theories. In contrast, the model of conservation of resources (COR) accepts that cultural aspects, which happen on the macro level, exhibit a crucial impact when it comes to distress as people within certain groups or cultures share a similar resources and mentalities to a certain extent (Hobfoll, 1998). Hobfoll (1989) criticizes that Folkman and Lazarus' (1980) transactional model of coping only concentrates on the environment from the individual's perception, which is why he argues in support of integrating more objective cultural influences. In this dissertation, an attempt is made to account for the regional work-related differences between East and West Germany. These are partially due to cultural differences, socioeconomic disparities, and diverging historical pathways. These disparities will be thoroughly introduced below.

3.4.2 Differing Structures of Work in East and West Germany

Labor structures not only differed between the Eastern German Democratic Republic (GDR) and the Western Federal Republic of Germany (FRG), but the disparities have been persistently continuing since unification. This might have been caused by internalized work values. Work was considered both a right and a duty in the GDR (Schmidt, 2003). Thus, unemployment rates have been held low, consistently achieving 0%, officially (Diewald et al., 1999). While in the FRG, unemployment rates were higher (destatis, 2022), it was practically unknown in the East. Moreover, East German women were fully included on the labor market, thereby normalizing female employment much earlier than in the West (Nickel, 2011). This shows that employment was an integral part of women's and men's lives in the GDR, whereas it was more common in the FRG to be out of the workforce or unemployed. The GDR's welfare state was considered a social achievement by its citizens (Winkler, 1989). Social services were often integrated into companies which offered their employees housing, childcare, or medical services (Ketzmerick, 2016). This is why former GDR citizens were afraid of reduced social security after unification (Roller, 1997) and why loyalty to companies was widespread (Ketzmerick, 2016). It becomes apparent that labor was propagated as focal to each individual's life. Everything else should be integrated into this labor-oriented lifestyle. This explains why work centrality has been higher among East Germans compared to West Germans (Jaufmann, 1995, 2000). In contrast, work and home spheres were separated in the FRG: a woman's life was divided into work before marriage and care after marriage, while men were responsible for the work domain throughout their lives (Nickel, 2011). This differing focus on employment can still be observed decades later: East Germans still deem a successful career more important than West Germans (Buchinger et al., 2022). Moreover, a high pay is more important for Easterners, whereas West Germans appreciate intrinsic work values more (Borg & Braun, 1996a; M. Braun & Borg, 2004). In conclusion, historically diverging pathways of work structures and the importance of work are also partially responsible for the persistent cultural differences in work values between East and West. Moreover, environmental resources the employer provides differ between East and West Germany in this case.

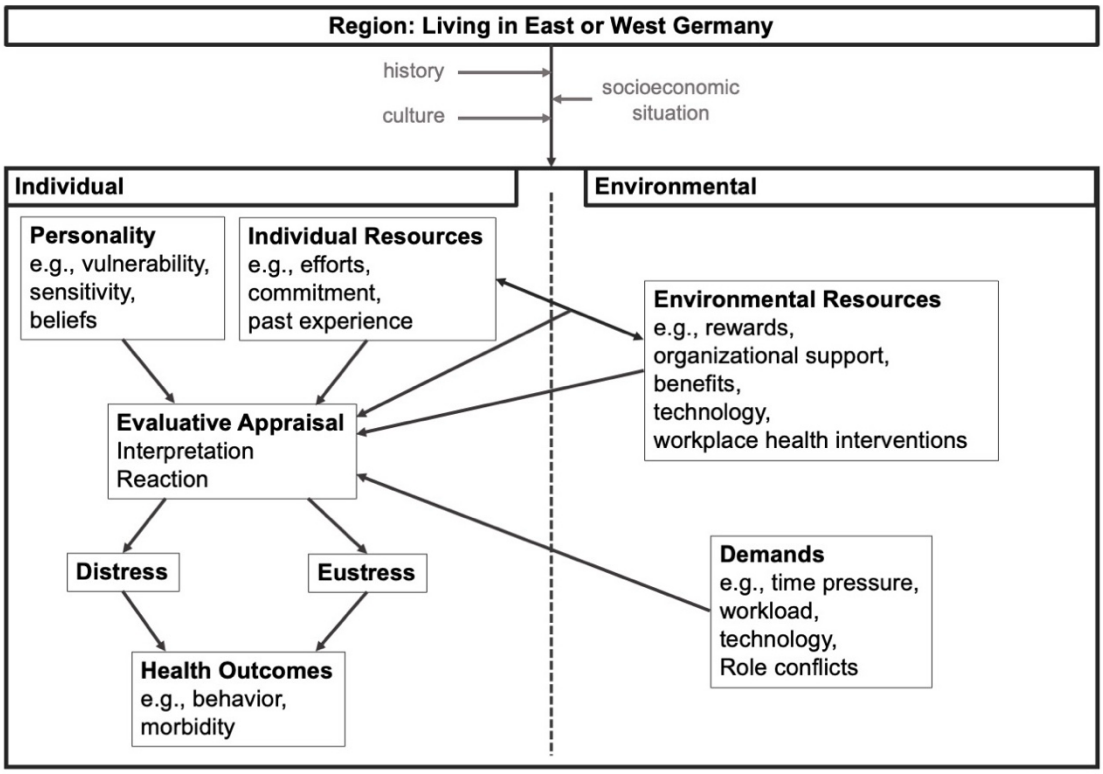
Before unification, the primary and secondary economic sectors constituted the center of the GDR's economy (Ketzmerick, 2016). With the unification of the GDR and the FRG, the Western

economic, legal, corporate, and institutional system was transferred to the East (Rigotti et al., 2007b). These conformation processes led to East Germans distancing themselves from West German structures that were contrary to their beliefs, values, and learned behavior (Wingens, 1999). The attempts of economic integration and modernization of the East German labor market failed at first (Lehmbruch, 2000). Eastern unemployment rates increased drastically because of mass sectoral layoffs (Ketzmerick, 2016). Women, younger as well as older workers suffered the most from these layoffs (Wagner et al., 2020). Often, it was not economically possible to combine wages similar to West German standards (Lehmbruch, 2000). Therefore, less jobs were open as they could hardly be afforded by companies. However, everyone could have been affected by the economic regulations of the West as work experiences of former GDR citizens were frequently degraded (Peters, 2021). Moreover, atypical work was widened to reduce unemployment in the East: low-paid, precarious as well as short-time work increased but was accompanied by long-term unemployment spells afterwards (Ketzmerick, 2016). East Germans thus experienced distinct changes in their working lives, leading to job losses, job insecurity, and status inconsistency. It would not be surprising if witnessing such times led to the development of a different perspective on work.

Working conditions have proven to differ between the former Eastern and Western states of Germany even long after unification. Especially socioeconomic differences have been widely studied. The overall income level has been higher in the West for decades (Grabka, 2014; Kasinger et al., 2023). This can partially be explained by the finding that East Germans pursue jobs with lower skill levels and prestige than Westerners despite exhibiting the same educational and occupational levels (Granato, 2011). Cultural disparities between regions are also multifaceted. For example, perceived quality of employment relations in form of psychological contracts is lower in the East (Rigotti et al., 2007b). This also emphasizes that place of working can impact environmental resources the job provides. Still, East Germans are more committed to their work (Otto & Dalbert, 2012; Rigotti et al., 2007b) which is even unrelated to unemployment rates, indicating a high importance of employment among Easterners (Rigotti et al., 2007b). Potentially because of this already high Eastern commitment, job insecurity lowers commitment only in the East, not in the West (Andolšek & Štebe, 2004). Another explanation could be provided by the lack of alternative jobs, making the current job of Easterners indispensable (Siegrist, 2001). This is again highlighted by the finding that, in contrast to Westerners, Easterners' commitment levels are unaffected by bad working conditions (Andolšek & Štebe, 2004). This illustrates that not only working conditions differ between the two regions, but also the effects they have on employees. Since with differing levels of commitment, individual resources also differentiate between East and West, the association between the macro level and the micro level is provided. East Germans therefore appraise job-related stressors differently than West Germans. Moreover, following Siegrist's (2001) assumption that a lack of alternative jobs causes employees to remain in deleterious working conditions, East German's commitment to their jobs combined with the regional lack of workplaces might be detrimental for them. In contrast, it might signal that East Germans are more resilient than West Germans which was already shown by previous research (Beutel et al., 2022).

These findings and assumptions lead to the need of integrating place of residence in East or West Germany as macro level into the model of employee stress. The now final model is portrayed in Figure IV-3. Individual and environmental predictors of stress as well as health itself differ regionally. Thus, region encompasses the previous model to depict that it affects each aspect included in the model of employee stress and health. While previous research confirmed some aspects of job-related individual and environmental resources differ between East and West Germany, findings on regional disparities in job-related demands seem very scarce. This dissertation aims at filling this gap by enhancing analyses on regional differences in resources and by adding job-related demands, simultaneously. To the author's knowledge, thereby, a first attempt was made to account for an encompassing estimation of work stress that differentiates between East and West Germany while simultaneously integrating micro, meso, and macro levels.

Figure IV-3. Exchange-Stress Model to Explain Health Outcomes of Employees in East and West Germany



The theory chapter offered examples of work theories, effects of deleterious working conditions, as well as the diverging work domain between East and West Germany. An exchange-stress model to explain employee health which accounts for regional differences could be deduced from previous research and ensuing assumptions. As work theories always integrate environmental demands and some kind of individual or environmental resource, the model could be combined with the definition of stress by Lazarus and Folkman (1984) which also considers stressors and buffering individual influences. After introducing these theories, the ERI model will be further focused in the analyses to explain the effect of an imbalance between individual efforts and environmental rewards on life satisfaction. Moreover, environmental demands and resources as well as individual resources were integrated into a model to predict emotional exhaustion. All analyses differ between East and West Germany to account for their regional disparities.

4 Issues and Hypotheses

Two articles were written for this dissertation and published in international peer-reviewed journals. They both aimed at filling the gap in research regarding region-specific working conditions in East and West Germany. As the background in this dissertation could show, most studies focusing on such regional job-related differences were composed shortly after unification. Therefore, the need for more current analyses is evident to find sources of social inequality between East and West Germans. Both studies were written within the project “GDR-past and mental health: Risk and protective factors (DDR-PSCH)”. The project concentrates on uncovering influences of GDR socialization on mental health, well-being, and predictors of psychological resilience as well as remaining differences between the former East and West German states. Both of the studies included in this dissertation supported the project’s aim by revealing further remnants of German division, especially regarding regional job-related differences and their consequences for mental health. Regarding the preparation of the

articles, the doctoral candidate was responsible for the conceptualization, the first draft, the methodology, the formal analysis, as well as the visualization in their entirety. The co-authors supported the doctoral candidate regarding reviewing, editing, supervision, funding acquisition, and project administration.

4.1 Study 1

Study 1 was guided by the research question whether region-specific working conditions as well as individual aspects were associated with emotional exhaustion in East and West Germany. Thereby, in respect to Figure IV-3, aspects of personality and environmental demands were observed, while accounting for different levels between East and West Germans.

Since study 1 followed an explorative approach, no hypotheses were postulated. This was also due to the lacking state of research regarding regional differences in job demands. As technostress served as focal set of predictor variables and there were no previous findings on its distribution in East and West, the article constitutes the first publication accounting for this research question. Nevertheless, the study set two aims:

1. Associations between job-related (environmental) and individual predictors of exhaustion were examined.
2. Predictors were tested for their differing associations with place of residence in East or West Germany.

The study was published by the International Journal of Environmental Research and Public Health in September 2022.

4.2 Study 2

The research question of study 2 was to observe how imbalances between subjective job-related efforts and rewards, overcommitment at the job, and personal income affect life satisfaction of employees in Germany. Moreover, the study aimed at shedding light on the differences in the observed job-related aspects between East and West Germans. Similar to study 1, there was an evident research gap regarding regional differences in job-related efforts, rewards, and overcommitment. While previous research compared commitment or work centrality between East and West Germans, overcommitment has not been integrated in regional comparisons before. Moreover, most research concentrates on socioeconomic disparities between the former East and West German states by including income, but neglects other forms of resources. Still, this knowledge on regional differences in commitment and incomes could be used to deduce following hypotheses:

H1: Increasing levels of overcommitment reduce life satisfaction.

H2: Rising levels of ERI decrease life satisfaction.

H3: An increasing personal income improves life satisfaction.

H4: Compared to West Germans, East Germans exhibit higher levels of ERI.

H5: Higher levels of ERI diminish life satisfaction more strongly in the East than in the West.

H6: Compared to West Germans, East Germans exhibit higher levels of overcommitment.

H7: Compared to West Germans, East Germans' life satisfaction diminishes more with increasing levels of overcommitment.

H8: East Germans' life satisfaction benefits more from rising income levels compared to West Germans.

The study was published by Social Science & Medicine in January 2024.

5 Methods

Methods are thoroughly explained in chapters 6 and 7 within the respective articles. However, to further put them into perspective of the overarching theoretical background of this dissertation, this chapter explains how the studies fit the exchange-stress model to explain health outcomes in East and West Germany.

5.1 Study 1

Study 1 observed the health outcome emotional exhaustion. It was accounted for region by comparing East and West Germans' levels of emotional exhaustion as well as how its predictors varied between place of residence. Technostressors were included to indicate a form of environmental demands. Its indicators consisted of perceived strain due to Internet use, the perceived social pressure to be constantly online, and the number of e-mails employees receive, which is why in this case, technology was burdening rather than being a resource. While the control variable work hours performed as an additional environmental demand, work-life balance was controlled which indicated an interplay between environmental and individual resources. The assumption that technostress is associated with emotional exhaustion requires the afflicted employees to appraise the technostressors negatively, leading to distress.

5.2 Study 2

In Study 2, life satisfaction served as health outcome. Again, the place of residence in the former East or West German states was used to observe regional differences in labor structures and a health outcome related to occupational distress. By implementing the ERI ratio, an interplay between individual and environmental resources was included. Further, overcommitment to the job was an individual resource, whereas personal income served as additional environmental resource. A negative appraisal of the misfit between performed efforts and received rewards suggests negative effects on individual life satisfaction. In the study, it was discussed that East Germans could be less inclined to appraise work stress negatively.

6 Study 1: Individual and Work-Related Predictors of Exhaustion in East and West Germany[1]

6.1 Introduction

Information and communication technologies (ICTs) have reached a pervasive level in the labor domain. Conventional workday frames have become blurred as many organizational tasks are now independent of time and distance (Ragu-Nathan et al., 2008). The growing intrusion of occupational aspects into leisure time might worsen the balance between the two domains. With less time to recover from everyday work-related stress, one might burn out (Ninaus et al., 2021) due to "excessive demands on energy, strength, or resources" (Freudenberger, 1974). Aside from work-related aspects such as ICT demands, individual factors play an important role for exhaustion or subsequent burnout (Shoman et al., 2021). The effort–reward imbalance model constitutes an example, in which work-related and individual factors both foster exhaustion through high demands and little gratification (Feuerhahn et al., 2012).

[1] Braunheim, L., Otten, D., Kasinger, C., Brähler, E., & Beutel, M. E. (2022). Individual and Work-Related Predictors of Exhaustion in East and West Germany. International Journal of Environmental Research and Public Health, 19(18), 11533. https://doi.org/10.3390/ijerph191811533

As a major public health concern, exhaustion increases behavioral health risk factors (Ahola et al., 2012; Rose et al., 2017) and in turn the morbidity risk (van Dam, 2021). Malakh-Pines (1981) defined three types of exhaustion: emotional, mental, and physical exhaustion. Emotional exhaustion can be described as feeling emotionally overextended and a perceived absence of emotional re- sources (Maslach, 1993). Mental exhaustion goes along with negative attitudes towards one's self, one's own life, or other people (Malakh-Pines, 1981). Physical exhaustion is associated with low energy, weakness, and weariness (Malakh-Pines, 1981). Overall, exhaustion is one of the symptoms of burnout (WHO, 2022) which is correlated with low mental and general health (Kristensen et al., 2005). By the first definition of burnout, Freudenberger (1974) listed frequent headaches, gastrointestinal problems, sleep trouble, and shortness of breath as its physical signs. In recent research, assessing burnout and differentiating it from exhaustion turned out to be problematic (van Dam, 2021). van Dam (2021) stated that clinical burnout could not be measured using the common questionnaires, as they overestimated the burnout prevalence due to the participants′ short-term stress, neglecting the duration of the symptoms.

Previous research has shown the occupational environment in East Germany differs from West Germany, even after the reunification: compared to West Germany, East Germans′ jobs are more often shaped by Tayloristic work practices of monotonous pro- duction procedures (K. Becker et al., 2010). This may be a remnant of the strong primary and secondary sectors of the economy of the German Democratic Republic (GDR), as opposed to the industrialized West as well as the Federal Republic of Germany (FRG) (Ketzmerick, 2016). Therefore, the occupational environment may be associated with the general psychological health differences that were found between the two regions over the past 30 years (Beutel et al., 2021). However, despite their different work environments, exhaustion has not been compared between the former eastern and western states of Germany. Thus, this paper aims at adding knowledge to this lack of research. Regional differences of the occupational environment in the past and present are highlighted to determine their association with exhaustion predictors that may be related to an existing or impending case of burnout. As a result, the importance of focusing on the occupational environments within clustered regions is presented. The concepts exhaustion, burnout, technostress, and constant availability are introduced in the next steps. Additionally, the different occupational environments in East and West Germany are described.

6.2 Theoretical Background

6.2.1 The Definition and Identification of Exhaustion and Burnout

Originally, the concept of burnout was related to people working in human ser- vice jobs who became "unable to cope with this continual emotional stress" (Maslach, 1976, p. 16). Kristensen et al. (2005) have extended exhaustion as a key component of burnout to any- one. This stems from the definition of Schaufeli & Greenglass (2001), who see emotionally demanding jobs as sources of physical, emotional, and mental exhaustion. Kristensen et al. (Kristensen et al., 2005) thus developed and validated the Copenhagen Burnout Inventory (CBI) and its subgroup on personal burnout, which asks for the intensity of one's physical and psycho- logical exhaustion unrelated to a certain domain. Still, they found its correlation with the other subgroup of work-related burnout ($r = 0.72$, $p < 0.001$) to be very high.

For a long time, the International Classification of Diseases (ICD), ICD-10, merely mentioned burnout to be a "state of vital exhaustion" (WHO, 2016). Only in the upcoming ICD- 11 is burnout treated as an illness (QD85) under "Factors influencing health status or contact with health services" (WHO, 2022). It is defined as a consequence of chronic work stress and characterized by three dimensions: (1) exhaustion; (2) mental distance from the job, negativism or cynicism towards it; and (3) feeling ineffective or lacking accomplishment (WHO, 2022). Thus, as chronic work stress increases the risk for burnout (van Dam, 2021; WHO, 2022), many questionnaires that try to assess burnout, such as the CBI (Kristensen et al., 2005) or the more commonly used Maslach Burnout Inventory (Maslach et al., 1997), are not sufficient due to their lack of assessment of the symptoms' time span. However, the duration

of the feelings of exhaustion is crucial for the emergence of clinical burnout (van Dam, 2021). People suffering from clinical burnout oftentimes even become accustomed to their stressful lives until they collapse; while they were trying to maintain high standards of task performance, they were not able to recover from stressful times anymore (van Dam, 2021). Because of this circumstance, we used the term exhaustion instead. The majority of previous research used the term burnout, although their scale did not ask for the duration of the symptoms. Moreover, exhaustion can indicate more phenomena than only burnout, as multiple physical or mental health issues are related to it (Werner et al., 2022). Since Kristensen's et al. (Kristensen et al., 2005) burnout concept does not assess the duration of the symptoms, the term exhaustion is more appropriate.

A meta-analysis by Shoman et al. (2021) showed that situational and work-related (e.g., job demands, interpersonal relationships) as well as individual factors (e.g., personality traits, job attitudes), work–individual (conflicts, enrichment), and finally perceived intermediate work consequences (stress, satisfaction) predicted exhaustion in employees. Further, the work–family balance or work–life balance have an important mediating role when it comes to the association between ICT demands (e.g., pressure to be constantly available, interruptions during work time, work overload) and exhaustion as a higher balance reduces the risks of exhaustion (Ninaus et al., 2021). Comparing several analyses, the Cohen's f2 effect sizes of the work–family conflict range from small (<0.02) to medium (<0.15) (Shoman et al., 2021). Using prospective data, the correlations between job insecurity as well as emotional demands regarding the job and later burnout symptoms are positive (Nuebling et al., 2022).

6.2.2 Constant Availability and Technostress as Modern Side Effects

ICT use can simplify many aspects of everyday life and work, as it is able to structure work in a different, more independent way (Berg-Beckhoff et al., 2017). However, an overload of ICT use can be problematic. Ragu-Nathan et al. (2008) developed the conceptual framework of technostress creators. First, constant connectivity, technoinvasion, enables people to be contacted anywhere and at any time; many of them feel forced to respond. Second, techno-overload explains how it becomes more difficult for workers to handle several mobile communication tools simultaneously as internal and external information increases. Previous research has shown adverse health effects related to technostress creators. Information overload and communication demands related to ICT use in the private sphere predict perceived stress for the group within the ages of 50 and 85 (Reinecke et al., 2017). Moreover, Misra & Stokols (2012) proposed that information overload as a consequence of the increasing use of ICTs were deleterious to attentional capacities and well-being. Technoinvasion was found to have a mediating role regarding the effect of techno-overload on burnout (Mahapatra et al., 2018), using the scale developed by Malakh-Pines (2005). ICT demands have a higher impact on exhaustion, work–family balance and job satisfaction, which outweighs its supporting aspects (Ninaus et al., 2021). A meta-analysis by Berg-Beckhoff et al. (2017) revealed associations between ICT use within occupational settings and stress, whereas intervention studies did not find this. ICT use and burnout are positively associated, especially within the groups of middle-aged workers between the age of 35 and 45. Therefore, ICT demands were considered work-related predictors of exhaustion in this paper.

6.2.3 Different Occupational Environments in East and West Germany

K. Becker et al. (2010) focused on past and present working conditions and aspects in East and West Germany. They reported that East Germans more often reported mental strains related to work than West Germans, especially due to financial loss or interruptions during work hours. In their argumentation, due to lower levels of wages before reunification and the rather slow convergence to West German standards, the ratio of income and working hours was lower in East Germany, providing West Germans with a higher financial gratification for their labor. Furthermore, they reported that East Germans worked more often in on-call duty as well as shift duty, and thus, needed to be available during leisure time more frequently than West Germans. In general, working conditions were partially less favorable in the former eastern states of Germany, posing a potential health risk for its employed inhabitants.

However, in the GDR, compared to the FRG, a different and regulatorily broader approach to worker protection and occupational health existed, though its realization varied (K. Becker et al., 2010). East German employees partly suffered from the adaptation to less protective West German occupational health after reunification, as they were accustomed to this form of working socialization.

Nevertheless, more West Germans call in sick because of mental health issues which is why K. Becker et al. (2010) assume that East Germans tend to continue working while being sick, exhibiting so-called presenteeism. This stems from having suffered from pervasive layoffs after the reunification and an insufficient protection of advocacies (Kocyba & Voswinkel, 2007). Moreover, East Germans tend to deny being ill (Kocyba & Voswinkel, 2007). This raises the question whether different working conditions and related stresses in the former eastern and western states of Germany affect exhaustion.

6.2.4 Aims of the Study

The purposes of this study were twofold:

(1) To examine the associations of work-related and individual predictors with exhaustion.

(2) To examine whether associations between work-related and individual predictors

with exhaustion differed between East and West Germany.

6.3 Materials and Methods

6.3.1 Sample

Data were based on a German representative survey from 2014 by the University of Leipzig that was approved by its ethics committee (Az.: 063-14-10032014). It assessed sociodemographic aspects as well as physical and mental well-being. The commercial survey institute USUMA (Independent Service for Survey, Methods and Analysis) collected the data, using a multistage random-route technique. First, 258 randomly drawn nonoverlapping regions from the last political election register, covering urban and rural areas from all regions in Germany, were selected. Out of these, 4386 households were randomly drawn. Using a Kish selection grid, household members of at least 14 years of age who understood the German language were chosen. A total of N = 2527 participants and thus 54.8% of the selected persons were questioned face to face. All participants gave their informed consent.

Because of the focus on perpetual job-related availability and ICT use during leisure time, we excluded participants without employment. We also omitted participants with missing values on the used items. This led to a final sample of N = 1065. The detailed characteristics of our sample can be found in Table VI-1.

Table VI-1. Study participants according to East and West Germany.

	Total (n = 1065)	**West (n = 896)**	**East (n = 169)**	
Variable	N(%)/Mean(SD)	N(%)/Mean(SD)	N(%)/Mean(SD)	Sig. test[V-1-1]
Sociodemographic factors				
Sex (Women)[V-1-2]	535 (50.20%)	448 (50%)	87 (51.50%)	$\chi2 = 0.072$
Work hours (Part-time)[IV-1-2]	261 (24.50%)	230 (25.70%)	31 (18.30%)	$\chi2 = 3.739$*
Household (No partner)[V-1-2]	521 (48.90%)	446 (49.80%)	75 (44.40%)	$\chi2 = 1.449$
Children (Yes)[V-1-2]	708 (66.50%)	590 (65.80%)	118 (69.80%)	$\chi2 = 0.837$

Age	42.65 (11.37)	42.54 (11.39)	43.22 (11.26)	F = 0.503
Household income (€)	2,784.11 (1,164.63)	2,855.16 (1,173.32)	2,407.40 (1,042.38)	F = 21.42***
Psychological factors				
Exhaustion	29.13 (19.80)	29.67 (19.97)	26.29 (18.67)	F = 4.136**
Work-Life-Balance	70.04 (21.89)	69.85 (21.91)	71.08 (21.87)	F = 0.452
ICT use				
Strain: Internet use	0.59 (0.95)	0.57 (0.94)	0.66 (0.98)	F = 1.16
E-mails during work time	4.92 (10.04)	5.17 (10.61)	3.59 (6.05)	F = 3.543*
E-mails during leisure time	1.46 (5.18)	1.52 (5.55)	1.14 (2.43)	F = 0.776
Social pressure	34.22 (30.39)	33.18 (30.06)	39.70 (31.65)	F = 6.576**

Note. SD = standard deviation; sig. = significance; ICT = information and communication technology. [V-1-1]p < .05, ** p < .01, *** p < .001. [V-1-2]Only one category is presented for dummy variables which is indicated in brackets.

6.3.2 Measures

Exhaustion

We used the German version of the six validated items of the component personal burnout of the CBI (Kristensen et al., 2005) to assess exhaustion. The questionnaire contains questions on physical, mental, and emotional exhaustion. It was asked how frequently the participants felt or thought in a distinct way. The answers ranged from 1 “never/almost never” to 5 “always”. To see if the personal burnout subgroup was related to the work domain, we used the three dimensions stated by the WHO (2022) in regards to burnout: (1) the level of exhaustion was measured by the items of the personal burnout subgroup; (2) for the distance from the job and negativism, we chose the participants’ satisfaction with the job; (3) to assess the feeling of ineffectiveness and lack of accomplishment, we estimated the validated German perceived stress scale (PSS-10; Klein et al., 2016), translated from Cohen et al. (2007). The correlations between the CBI subgroup personal burnout and the other mentioned dimensions of burnout are shown in Table VI-2. They ranged from moderate (r between ±0.30 and ±0.49) to high (r ≥ ±0.50) and pointed to the expected directions: a higher exhaustion score was negatively correlated with a higher job satisfaction ($r = -0.323$; $p < 0.001$) and the second factor of the PSS-10 ($r = -0.296$; $p < 0.001$), which assesses perceived self- efficacy (Roberti et al., 2006). The correlation with the first factor of the PSS-10, which indicates perceived helplessness (Roberti et al., 2006), was high and positive ($r = 0.619$; $p < 0.001$). Thus, it could be assumed that the personal burnout subgroup, which we labelled exhaustion due to its neglection of symptoms′ duration, adequately assessed work-related exhaustion.

Table VI-2. Person’s Product-Moment Correlations of Dimensions of Burnout with Exhaustion Factor Score.

Item	***t***	***r***	***p***
Satisfaction with job	-11.732	-.323	< .001
Perceived self-efficacy	-10.669	-.296	< .001
Perceived helplessness	27.087	.619	< .001

On an 8-point scale ranging from 0 to >100, the number of job-related e-mails received during work as well as leisure time was measured. As the answers had categorical ranges, they were transformed into continuous variables, using the means of the ranges. Additionally, the strain of the Internet use regarding the participants' work was asked. Between 0 "never" and 4 "very often", they answered how often they perceived themselves to be strained because of their Internet use related to their work.

Constant Availability

Three items based on the perceived norm scale by Fishbein & Ajzen (2010) assessed the importance of being perpetually available within the occupational environment (e.g., "I feel social pressure in my work life to be constantly available"). On a 5-point Likert scale the answers ranged from 1 "does not apply at all" to 5 "fully applies".

Work–Life Balance

Syrek et al. (2011) developed and validated a scale to measure work–life balance, which consisted of five items asking for satisfaction with participants' balance between work and private life. The answers varied on a 5-point Likert scale between 1 "strongly disagree" and 5 "strongly agree". With Cronbach's $\alpha = 0.95$ and $\alpha = 0.88$ in their validation paper of the scale, a good internal consistency, along with a good construct validity, was indicated.

Sociodemographic Aspects

In the cross-sectional survey, we compared participants living in former western and former eastern regions of Germany. Moreover, age, sex, and household income were dependent variables. Household income originally was a categorical item but was transformed into a quasi-metric one using the means of the ranges. As only employed participants were included in the analyses, we constructed a dummy variable, differing between full-time and part-time workers. Because of the mediating role of work–life balance regarding burnout, we implemented dummy variables for having a partner in the household and having children as well.

6.3.3 3.3. Analyses

All analyses were calculated with Rstudio (version 1.4.1106) and its packages lavaan, psych, and arsenal. Descriptive statistics showed the numbers, mean values, and standard deviations of the used variables in the two regions so that sociodemographic differences between them could be observed. To test the significance of the regional differences, $\chi 2$- and F-tests were used. Using an ordinary least squares regression (OLS regression), predictors of exhaustion in Germany were found. An interaction term between the region and the respective predictors identified significant differences of the predictors between East and West Germany. In the final step, two separate OLS regressions were estimated for East and West Germany.

6.4 **Results**

6.4.1 Descriptive Results

Descriptive results can be found in Table VI-1. Only cases without missing values are presented. The exhaustion factor score was lower in East Germany compared to West Germany (W.: 29.667 vs. E.: 26.294, $p < 0.01$). West Germans worked part-time significantly more often (W.: 25.70% vs. E.: 18.30%, $p < 0.05$). Moreover, the household net income (W.: 2855.162 vs. E.: 2407.396, $p < 0.001$) and the number of e-mails during work time (W.: 5.169 vs. E.: 3.586, $p < 0.05$) ranked lower in the former eastern states of Germany. The social pressure to be constantly available within the occupational environment was significantly higher in the East (W.: 33.182 vs. E.: 39.701, $p < 0.01$).

In Table VI-3, the exhaustion factor means for specific demographic subgroups, also differentiated between Easterners and Westerners, are presented. Men had lower mean values of the exhaustion score (male: 25.811 vs. female: 32.553, $p < 0.001$), while East German men were least concerned with this symptom (mean = 20.543). The differences within the subgroups household (W.: partner: 28.456 vs. no partner: 30.911, $p < 0.05$) and children (W.: yes: 28.877 vs. no: 31.504, $p < 0.05$) were only significant in West Germany. In the East, both having a partner in the household or not (E.: partner: 24.469 vs. no Partner: 28.576, $p = 0.129$), and having children (E.: yes: 26.259 vs. no: 27.105, $p = 0.768$) did not show a significant difference compared to the reference group. Contrary to that, in the West, participants without a partner in the household or with children reported significantly higher exhaustion scores.

Table VI-3. Means of the Exhaustion Factor Scores per Group.

	Total			**West**			**East**		
	Mean	SD	$p^{V\text{-}3\text{-}1}$	Mean	SD	$p^{V\text{-}3\text{-}1}$	Mean	SD	$p^{V\text{-}3\text{-}1}$
Region			< .05						
West	29.785	19.801							
East	26.543	19.105							
Sex			< .001			< .001			< .001
Male	25.811	18.779		26.769	19.055		20.543	16.292	
Female	32.553	20.043		32.742	20.088		31.654	19.894	
Household			< .05			< .05			.129
Partner	27.761	18.883		28.456	19.156		24.469	17.247	
No partner	30.550	20.340		30.911	20.281		28.576	20.650	
Children			< .05			< .05			.768
Yes	30.802	20.108		28.877	19.553		26.259	18.986	
No	28.443	19.473		31.504	20.178		27.105	19.469	

Note. SD = standard deviation; $^{V\text{-}3\text{-}1}$t-tests were performed according to region, sex, household, and children.

6.4.2 Predictors of Exhaustion in Germany

Table VI-4 shows the regression results for Germany. With an adjusted R^2 of 0.253, the model was able to explain 25.3% of the variance of exhaustion. East Germans were significantly less afflicted by it (std. $\beta = -0.17$, std. $p < 0.05$). Women (std. $\beta = 0.25$, std. $p < 0.001$) and also part-time workers (std. $\beta = 0.15$, std. $p < 0.05$), compared to those working full-time, had a higher exhaustion score. As expected, an increasing age was associated with increased exhaustion values (std. $\beta = 0.16$, std. $p < 0.001$). Being without a partner in the same household was positively related to exhaustion as well (std. $\beta = 0.19$, std. $p < 0.01$). Moreover, having children was associated with increased symptoms of exhaustion (std. $\beta = 0.17$, std. $p < 0.01$). The tendency of the association between an increased household income and exhaustion was negative, despite being insignificant (std. $\beta = -0.17$, std. $p = 0.079$). The factor score of a higher work–life balance was significantly and negatively related to exhaustion and exhibited the most influential protective factor (std. $\beta = -0.39$, std. $p < 0.001$). Regarding the technostress

variables, the extent of feeling strained because of one's Internet use (std. β = 0.08, std. p < 0.01) and the social pressure to stay connected within the occupational environment (std. β = 0.10, std. p < 0.01) were positively associated with exhaustion. Neither receiving e-mails during work time (std. β = 0.05, std. p = 0.112), nor during leisure time (std. β = 0.02, std. p = 0.461) were related to exhaustion.

Table VI-4. Ordinary Least Squares Regression: Predictors of Exhaustion.

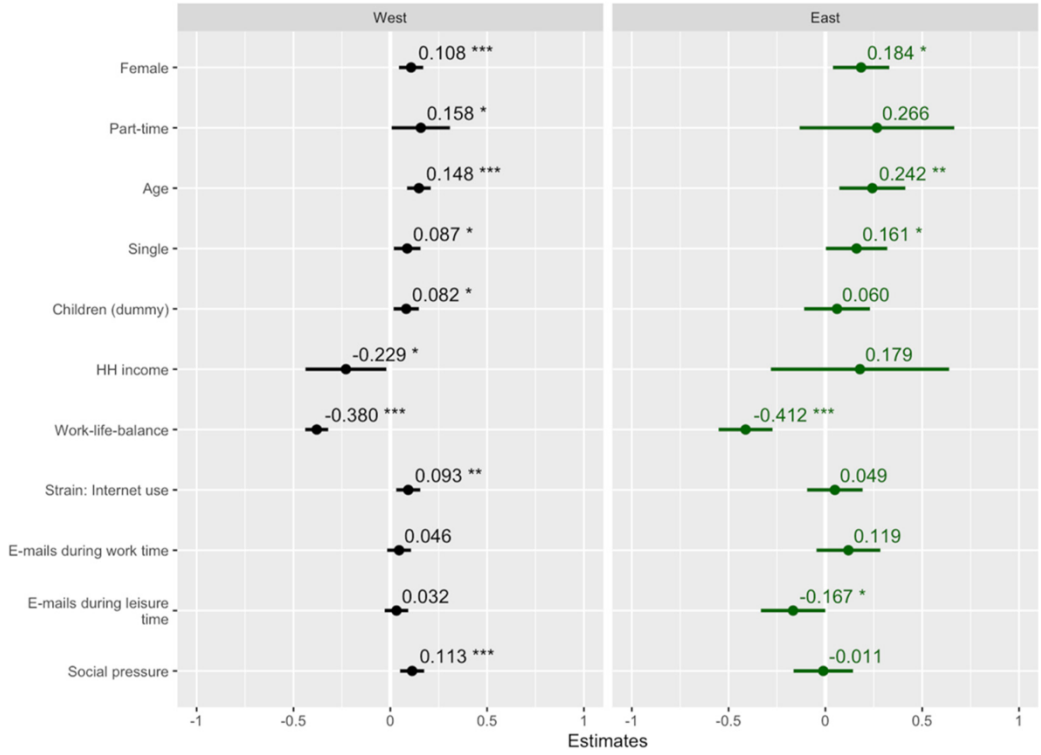
Predictors	*Estimates*[V-4-1]	*std. β*	*std. CI*	*p*	*std. p*
(Intercept)	52.35	-.10	-0.36 – 0.17	<.001	.479
East (ref = West)	-3.47 *	-.17	-0.32 – -0.03	.020	.020
Female (ref = male)	4.96 ***	.25	0.14 – 0.36	<.001	<.001
Part-time job (ref = full-time)	2.95 *	.15	0.01 – 0.29	.037	.033
Age	0.28 ***	.16	0.10 – 0.22	<.001	<.001
No partner within household (ref = partner within household)	3.79 **	.19	0.07 – 0.32	.003	.003
Children (ref = no children)	3.49 **	.17	0.05 – 0.30	.006	.007
Household income (log)	-2.54	-.17	-0.37 – 0.02	.070	.079
Work-Life-Balance	-0.35 ***	-.39	-0.44 – -0.33	<.001	<.001
Strain: internet use	1.66 **	.08	0.02 – 0.14	.006	.006
E-Mails during work time	0.09	.05	-0.01 – 0.10	.112	.112
E-Mails during leisure time	0.08	.02	-0.03 – 0.08	.462	.461
Social pressure	0.06 **	.10	0.04 – 0.15	.001	.001
Observations	1,065				
R^2 / R^2 adjusted	.262 / .253				

Note. std. = standardized; CI = confidence interval; ref = reference; log = natural logarithm; [V-4-1]std. p < .05, ** std. p < .01, *** std. p < .001.

6.4.3 Predictors in East and West Germany

Figure VI-1 shows the predictors of the exhaustion factor score, differentiating between East and West Germany. Adding an interaction term between the regions to the full model above, two of the predictors were significantly lower in the East: the number of e-mails received during leisure time (std. β = −0.142, std. p < 0.01, not displayed in figure) and the social pressure to be constantly available within the occupational environment (std. β = −0.054, std. p < 0.05, not displayed in figure). Because of the small sample size of East Germans, several of the predictors' variances were higher. Thus, it is plausible that larger samples could indicate further significant differences between the two regions.

Figure VI-1. Predictors of Exhaustion in East and West Germany



Note. * p < .05, ** p < .01, *** p < .001. Standardized β coefficients, using two ordinary least squares regressions differing by region, are presented. East Germany: N = 169. West Germany: N = 896. HH = household.

Among the sociodemographic variables, several predictors were higher in the East, although the interaction term between the two regions was insignificant. For instance, the difference between men and women was larger in the East than in the West (E.: std. β = 0.184 vs. W.: std. β = 0.108). This can be seen in Table IV-3 as well; East German men had the lowest exhaustion scores. The coefficients of having a part-time job (W.: std. β = 0.158 vs. E.: std. β = 0.266), age (W.: std. β = 0.148 vs. E.: std. β = 0.242), and being without a partner in the same household (W.: std. β = 0.087 vs. E.: std. β = 0.161) were also larger in East Germany. The directions of the associations of household income differed between the two regions, with a negative relation in the West (std. β = −0.229, std. p < 0.05), and a positive one in the East (std. β = 0.179, std. p = 0.470).

Some variables hardly exhibited any regional difference. The coefficients of having children were almost the same in the two regions, whereas for East Germans, it was not significant (std. β = 0.060, std. p = 0.482). The negative association with work–life balance difference was higher in the East, though the difference was comparably small (E.: std. β = −0.412 vs. W.: −0.380).

All variables regarding technostress, with the exception of the number of e-mails during work time, showed higher coefficients in the former western states. Being strained because of one's own Internet use had a lower and insignificant association in East Germany (E.: std. β = 0.049, std. p = 0.505 vs. W.: std. β = 0.093, std. p < 0.01). Although the coefficients were insignificant, the number of e-mails received during work time were more linked with the exhaustion score in East Germany (E.: std. β = 0.119 vs. W.: 0.046).

However, both receiving e-mails during work and leisure time were positively related to exhaustion in West Germany (leisure time: std. β = 0.032, p = 0.299); in contrast to work hours, e-mails during leisure time were significantly linked to a decreased exhaustion in the East (std.

$\beta = -0.167$, $p < 0.05$). Finally, social pressure was only significantly associated with exhaustion in the former western regions (W.: std. $\beta = 0.113$, $p < 0.001$ vs. E.: std. $\beta = -0.011$, $p = 0.890$).

6.5 Discussion

Living in East Germany, being male, working full-time, having no children, and having a partner in the household were significantly negatively associated with exhaustion and might thus buffer it. Therefore, individual factors present important protective aspects regarding exhaustion. Having no children and having a partner in the household might contribute to a better work–life balance, which is still the largest protective factor for exhaustion. The variables related to the participants' technostress only partially reached significance. Being strained because of one's Internet use and the social pressure to be constantly available were related to exhaustion. The number of e-mails during leisure time was negatively associated with exhaustion only in East Germany, whereas a positive tendency was present in the West.

The coefficients of technostress indicators especially differed between East and West Germany. In the West, a higher number of e-mails received during leisure time and the social pressure to be constantly available indicated technostress, which was related to exhaustion. In the East, sociodemographic aspects such as sex, working hours, age, or the partnership status tended to have higher associations with exhaustion. Thus, we assume that West Germans are especially affected by the social pressure to be available at all times, which is applicable to Shoman's et al. (2021) situational and work-related factors, while in East Germany, individual factors play a more important role than the occupational environment. Due to the significantly higher exhaustion rates as well as the larger coefficients of technostress regarding exhaustion in the West, it is possible that burnout is also more prevalent there.

Because of the constant access, independent from the workplace, due to ICT use, many employees are perpetually available during their work and leisure time. The work–life balance might suffer from this condition. Thus, stress and eventually exhaustion might be the consequence of a prolonged period of poor work-life-balance (Ninaus et al., 2021). Besides exhaustion, a mental distance from the job and the feelings of ineffectiveness related to one's work are indicators of burnout (WHO, 2022). We confirmed the correlation between exhaustion and a lower job satisfaction as well as perceived self-efficacy and perceived helplessness. Situational and work-related, as well as individual, or work–individual factors, and perceived intermediate work consequences predict burnout (Shoman et al., 2021) and thus also foster exhaustion.

ICT use in the private sphere significantly predicts perceived stress (Berg-Beckhoff et al., 2017) with age as a moderator (Reinecke et al., 2017) and leads to demands that benefit burnout, a detrimental work– family balance and a worse job satisfaction (Ninaus et al., 2021). Techno-overload, as a part of technostress, harms well-being (Misra & Stokols, 2012) and fosters burnout, while a smaller amount of technoinvasion buffers this effect (Mahapatra et al., 2018). We confirmed the association between ICT use and exhaustion for West Germany.

Whether respondents were from East or West Germany was dependent on their current living situation. Because of the still remaining structural, socioeconomic, and historic borders, differences regarding the occupational environment were expected to primarily depend on the current location, while the location of socialization, which is important for the individual factors, could not be considered due to a lack of data. However, as the place of work might be in another location than the household, this aspect needs to be kept in mind. Researchers on this topic should thus conduct questionnaires with full information on the location of socialization as well as the place of work.

With different occupational environments in East and West Germany, several health- related forms of behavior as well as illness behaviors also differ between the two regions. West Germans call in sick more often (K. Becker et al., 2010), which might lead to the assumption that sickness presenteeism is more common in the East. Still, we found that work-related exhaustion was less common in the former eastern states of Germany, especially regarding

men. Although our descriptive results show that East Germans exhibit a higher social pressure to be permanently available, which is consistent with the finding that they work on call more often (K. Becker et al., 2010), their exhaustion scores ranked lower. Possibly, their occupational environment has a protective impact on their health. Another explanation derives from the question about social pressure to be constantly available. Future research may need to differentiate between these forms. It is possible that the availability related to on-call duty has a different impact than the availability related to e-mails or calls with other intentions. Further, it should be asked if the participants have the freedom of choosing whether they act on the message or not, as in the case of on-call duty. Thus, the effect of the occupational environment could be broken down in a better way.

6.6 Conclusions

In conclusion, we could show that the predictors of exhaustion might differ on a regional level. Former West German states revealed higher exhaustion rates than formerly East German states. The predictors also partially varied between the two regions, with aspects of technostress exhibiting stronger associations with exhaustion in the West and the tendency of stronger relations between individual factors and exhaustion in the East. The current and past occupational environment of the two regions should thus be highlighted when looking at burnout, its indicators, such as exhaustion, and mediators. Because of the differing indicators and outcomes of exhaustion in East and West Germany, varying effects between urban or rural regions are possible as well. At any rate, the results of this study can explain why outcomes are not consistent for different countries or groups in past studies, which was shown in the meta-analyses on exhaustion referenced in this paper.

6.7 Limitations

Several limitations should be considered when interpreting the results of this study. First, due to the focus on the working population, some sociodemographic groups in the East were of rather small numbers. Replications could benefit from larger samples. Second, the questionnaire contained only the personal burnout questions of the CBI. The work-related burnout items might have been a better indicator for job-related exhaustion. Furthermore, the duration of the feelings of exhaustion was not specified. To determine if a participant is afflicted by clinical burnout, the participant should exhibit the feelings of exhaustion for a longer period of time (van Dam, 2021), in addition to the mental distance from the job and the feeling of ineffectiveness and lacking accomplishments (WHO, 2022). Third, we did not have information on the participants' previous history of mental health problems. Using a longitudinal design could improve these limitations and consider causality of the predictors. Fourth, we were not able to assess in which fields the participants of this study were employed. It is said that people who work with clients, in the role of human caring, suffer from burnout more often; it was not clear how the occupational positions were distributed in East and West Germany.

7 Study 2: The Effects of Effort-Reward Imbalance on the Job, Overcommitment, and Income on Life Satisfaction in Germany From a Longitudinal Perspective[2]

7.1 Introduction

As an indicator of subjective well-being (Diener et al., 1999; Fergusson et al., 2015), life satisfaction is associated with a broad range of aspects in life. For instance, mental health and life satisfaction are related reciprocally: Not only do common mental health problems, such as

[2] Braunheim, L., Dragano, N., Khachatryan, K., Brähler, E., & Beutel, M. E. (2024). The Effects of Effort-Reward Imbalance on the Job, Overcommitment, and Income on Life Satisfaction in Germany From a Longitudinal Perspective. Social Science & Medicine, 341, 116523. https://doi.org/10.1016/j.socscimed.2023.116523

depression or anxiety, decrease life satisfaction, the increase of the latter also attenuates mental health problems (Fergusson et al., 2015). Further, life satisfaction is related to physical health and longevity (Diener & Chan, 2011), as well as career satisfaction (Hagmaier et al., 2018) and distress (Hamarat et al., 2001). The relation between distress and life satisfaction will be further assessed in this article.

The focal indicator of distress and adverse health in this article is displayed by deleterious working conditions. Individual distress can be caused by them (Karasek & Theorell, 1990; Siegrist, 1996). In general, life satisfaction is oftentimes associated with job-related aspects as job-related tension (Erdogan et al., 2012), perceived meaningfulness of work (Allan et al., 2019), or work engagement (De Simone et al., 2014). A model that is often used to illuminate job-related health problems and which will be focused in this article is Siegrist's (1996) effort-reward imbalance (ERI) at work model. It hypothesizes that distress is triggered by a mismatch of efforts made by the employees and the perceived rewards they receive in return. Income is a form of reward employees receive for their efforts. The ERI questionnaire contains the subjective adequacy of one's pay. This might be similar to financial satisfaction, which is positively related to a higher level of life satisfaction (Pawsey et al., 2023). However, since increasing incomes are also positively related to a rising life satisfaction (Salinas-Jimenez et al., 2011; Schöllgen et al., 2019), low incomes might cause low life satisfaction despite the subjective adequacy of one's pay. Thus, including the absolute income level in our analyses is crucial to account for instances of simultaneous financial dissatisfaction and adequacy.

This article aims at contributing to research in occupational health in a multifaceted way. In contrast to the many previous researchers who mostly used cross-sectional data on ERI, by using longitudinal data, the link between ERI and life satisfaction can be examined. Moreover, to the authors' knowledge, associations between overcommitment and life satisfaction have rarely been studied.

Another contribution to previous research stems from its regional focus. The relationships between ERI, overcommitment, personal income, and life satisfaction were tested under two different regional sets of working conditions, which have evolved due to the separation and more recent unification of the former West Germany, the Federal Republic of Germany (FRG) including West Berlin, and the former East Germany, the German Democratic Republic (GDR) including East Berlin. The different regional sets of working conditions will later be discussed more thoroughly; for example, perceived quality of employment relationships (i.e., psychological contracts as mutual obligations between employer and employee; Rigotti et al., 2007) as well as the overall income level (Kasinger et al., 2023) are lower in East Germany compared to the West. Moreover, work centrality is higher in the East (Jaufmann, 1995, 2000). Thus, economic as well as cultural aspects, and quality of work differ between East and West Germany. An association between socialization in East or West Germany and the influences of working conditions on well-being can thus be assumed. Therefore, this article portrays the results separately for respondents from East and West Germany. To the authors' knowledge, no previous research has tested work stress consisting of ERI and overcommitment for East and West Germany.

Overall, the analyses aim at answering the question how imbalances between subjective job-related efforts and rewards, overcommitment at the job, as well as personal income impact life satisfaction of employees in Germany. To address the research question, effort-reward imbalance and overcommitment as the concepts depicting work stress will first be introduced. Differences in meaning and gratifications of work between East and West Germany will further be described afterwards. Results of the within-between model which includes fixed and random effects separately will be presented thereafter. At last, the results will be discussed.

7.2 Work stress: Effort-reward imbalance at work and overcommitment

ERI explains the disparate exchange of the employee's job-related efforts and rewards (Siegrist, 1996). While efforts are represented by time pressure, frequent interruptions, or extra hours worked, rewards include esteem and recognition, career promotion and job security, as

well as a subjectively adequate pay. A ratio portraying the (im-)balance between efforts and rewards is computed using the indicators (Siegrist et al., 2004). Moreover, to further indicate work stress, Siegrist et al. (2004) integrated the concept of overcommitment to the work stress model, which contains time pressure at the job, ruminating, or career sacrifices. Overcommitted employees exhibit certain attitudes, behaviors, and emotions promoting excessive attempts and desires to be approved and esteemed (Siegrist, 2001). These attempts lead to taking up too many demanding tasks with exaggerated efforts to solve them (Siegrist et al., 2004). Moreover, they might perceive demands and resources in an inappropriate way (Siegrist, 2000). This can result in frustrations because overcommitted employees are more likely to be affected by subjectively low rewards, as their efforts are disproportionately high (Siegrist et al., 2004). Nevertheless, Siegrist et al. (2004) deem overcommitment an independent predictor of adverse health, as it goes beyond mere efforts. While ERI is considered an extrinsic component, overcommitment is viewed as intrinsic (Steptoe et al., 2004).

ERI was theorized to interact with overcommitment (Siegrist et al., 2004). This was supported by the finding that ERI's negative association with mental health is intensified by higher levels of overcommitment (Kunz, 2019). Siegrist (2001) further deems overcommitment one of the reasons why employees remain in jobs that are associated with ERI. Therefore, many researchers included overcommitment in analyses related to ERI and confirmed their important interplay (e.g., Hinsch et al., 2019; Kudielka et al., 2004; Siegrist et al., 2004). Since these studies found that higher overcommitment is related to adverse health, we hypothesize:

H1. *Increasing levels of overcommitment reduce life satisfaction.*

Several researchers have confirmed significant associations between the occurrence of ERI and health problems. For example, ERI is associated with biological pathways as well as biomarkers able to explain pathogenesis due to chronic work stress (Siegrist & Li, 2017). From a longitudinal perspective, ERI is associated with psychological distress and physical complaints after a 1-year time-lag (Shimazu & de Jonge, 2009). These findings highlight that ERI causes distress, which in turn can decrease life satisfaction.

Meta-analyses showed that ERI as well as job strain are strong predictors of common mental health problems, like depressive disorders (Rugulies et al., 2017; Stansfeld & Candy, 2006) and suicide (Stansfeld & Candy, 2006). Job strain comprises psychological strain leading to fatigue, anxiety, depression, and physical illness, induced by high job demands and low control over decisions within this job (Karasek & Theorell, 1990). The frequency of suffering from migraine increases with a rising imbalance between efforts and rewards (Leineweber et al., 2020). In one longitudinal study, exhaustion cannot be predicted by ERI in its combined form, but the separate versions of efforts and rewards are associated with it (Gorgievski et al., 2019). Finally, outcomes regarding physical health are also associated with ERI: cardiovascular problems (Siegrist, 1996; van Vegchel, de Jonge, Bosma, et al., 2005), coronary heart disease (Dragano et al., 2017), and musculoskeletal problems (Dragano et al., 2003).

Longitudinal analyses including ERI and overcommitment in their influence on life satisfaction are rather scarce. One exception found that employees with a higher imbalance leaning towards higher efforts exhibit poorer life satisfaction, lower anxiety, depression, physical and mental well-being as well as higher levels of overcommitment over several time points (Buddeberg-Fischer et al., 2008). Considering all these findings, we hypothesize that:

H2. *Rising levels of ERI decrease life satisfaction.*

Total personal income serves as an additional criterion for reward in addition to subjective adequacy. Previous research showed that an increasing personal income ameliorates life satisfaction (Salinas-Jimenez et al., 2011; Schöllgen et al., 2019). To test if this finding can be replicated, we hypothesize:

H3. *An increasing personal income improves life satisfaction.*

7.3 The meaning and gratifications of work in former Eastern and Western German states

German data provide the unique opportunity to compare two different regions with different conditions and meanings of employment. Deduced from political and economic disparities between the East and West of Germany during division, unification, and subsequent political and economic transformation of the former GDR, it can be stated that employment and its meaning differ between the two regions.

First, in the GDR, work was seen as both right and a duty (Schmidt, 2003). This was upheld by the socialist GDR's constant unemployment rate of 0% (Diewald et al., 1999), whereas proportions ranged between 0.7 and 9.5% in the FRG over time (destatis, 2022). While the GDR reinforced female full-time employment, the FRG relied on the male breadwinner-model (Nickel, 2011). Therefore, unlike the East, many Western women were not part of the workforce. Shortly after unification, the unemployment rate in the East reached an unprecedented high (Ketzmerick, 2016), with 10.2% already being unemployed in 1991 (destatis, 2022). Mass sectoral layoffs were the consequence of a failed economic integration of East German structures into West German standards (Ketzmerick, 2016). Further, work experiences of former GDR citizens were perceived as degraded (Peters, 2021).

Labor market structures have been differing between East and West until today. Despite higher mean educational and occupational qualifications, East Germans acquired jobs with lower ISCO (International Standard Classification of Occupations) skill levels and prestige (Granato, 2011). This is partially explained by the lower share of East Germans in the more prestigious service sector and the surplus of workforce in the formerly Eastern states (Granato, 2011). These findings go along with the persistent higher unemployment share (destatis, 2022) as well as the lower financial gratification (Kasinger et al., 2023) in the East. As one of the reasons for maintaining a straining job is the lack of alternative jobs (Siegrist, 2001), it can be assumed that East Germans are more likely to experience ERI at work as they are less likely to change jobs:

H4. *Compared to West Germans, East Germans exhibit higher levels of ERI.*

To test this assumption, the prevalence of exhibiting an imbalance was observed in this article for East and West Germans. Moreover, if East Germans abided situations of ERI longer than West Germans who might more easily change jobs, region could moderate the association between ERI and life satisfaction:

H5. *Higher levels of ERI diminish life satisfaction more strongly in the East than in the West.*

Socialization and region-specific experiences have led to ongoing differences in the meaning of work between East and West Germany. Empirically, East Germans are more committed to their work (Otto & Dalbert, 2012; Rigotti et al., 2007a) which is not correlated to the unemployment rate, but can rather be ascribed to cultural differences between East and West (Rigotti et al., 2007a). Work commitment was, for example, indicated by loyalty to one's job (Otto & Dalbert, 2012) or pride in working for one's company (Rigotti et al., 2007a). Due to these findings, we hypothesize that:

H6. *Compared to West Germans, East Germans exhibit higher levels of overcommitment.*

Furthermore, Andolšek and Štebe (2004) already showed that East and West Germans' levels of commitment differ in their associations with occupational aspects: West Germans' commitment levels are associated with a broader set of job aspects (e.g., job quality, organizational efficiency) compared to East Germans. Therefore, West Germans might be more likely to link their commitment at the job to a positive workspace, whereas East Germans tend to be committed independently from job quality. Higher job quality is related to increased life satisfaction (Grün et al., 2010) and it is also assumed that subjective well-being is related

to organizational efficiency (Taheri et al., 2019). As the probability of a deleterious job is higher for overcommitted East Germans compared to West Germans who rather reduce their commitment upon bad working conditions, we hypothesize:

H7. *Compared to West Germans, East Germans' life satisfaction diminishes more with increasing levels of overcommitment.*

Besides commitment, work centrality and work values differ between East and West, as well. As mentioned above, work centrality is higher among East Germans (Jaufmann, 1995, 2000). This is again corroborated by the finding that more East Germans than West Germans would still pursue their jobs despite having enough money to quit (Arnhold, 2009). Looking at work values, East Germans deem a high pay as well as healthy working conditions more important compared to West Germans (Borg & Braun, 1996b; M. Braun & Borg, 2004), whereas intrinsic values to work do not differ between regions (M. Braun & Borg, 2004).

Personal income might moderate the association between region and life satisfaction as it can be assumed that getting closer to or even achieving one's goal of having a large income increases one's satisfaction with life. As economic deprivation in the East is higher than in the West, Eastern employees might be more dependent on financial rewards of their jobs than the immaterial aspects which again highlights the need of integrating the current place of residence as a moderator of the association between income and life satisfaction. Therefore, including personal income is important for the analyses. In conclusion, we deduce:

H8. *East Germans' life satisfaction benefits more from rising incomes compared to West Germans.*

7.4 **Methods**

7.4.1 Sample

Data of the German Socio-Economic Panel (GSOEP) were used for this study. Since 1984, the GSOEP has been conducting annual panel surveys in households in Germany. All respondents gave their informed consent before participation. Two waves – 2006 and 2011– contained data on ERI and were used in the following analyses. Unfortunately, the 2016 wave could not be compared as another version of the questionnaire was used. Only participants who attended both waves were integrated which excluded 7,649 cases. To obtain a more homogeneous sample, additional inclusion criteria were set. Due to job changes between 2006 and 2011, 2,156 cases were excluded. Job changes needed to be excluded as otherwise, inherently differing working conditions would have biased the results. Additionally, 24,882 cases with participants who did not work in full-time or part-time and 1,162 more cases with participants who worked less than 15 hours per week at either time point were excluded in order to make sure that their job experiences affected their everyday lives. Moreover, 2,467 self-employed were excluded as for them the interpretation of ERI would be inherently different. Top and bottom coding was used in the case of personal net income in order to exclude outliers (Gottschalk & Smeeding, 1997; Smeeding, 1997): This is why 102 cases with respondents who stated that their income was more than ten times the median of personal income or gained less than 1% of its mean were excluded. Further, 30 cases with participants who moved their location between East and West Germany during the observation period were excluded. Finally, 4,852 cases with missing data on used variables were omitted. One exception was income, as the dataset offered an imputed version of it which will be explained further below. Thus, the final sample contained N = 3,848 participants of both waves, leading to 7,896 observations.

7.4.2 Variables

Effort-reward imbalance at work. To estimate the time-variant ERI, its validated short form containing 10 items (Siegrist et al., 2009) was used. For items on efforts (e.g., "Because of the high volume of work, there is often high time pressure.") and rewards (e.g., "I receive the

recognition I deserve from my superiors."), respondents first agreed or disagreed whether the statement applied to them. As a second step, after an affirmative answer, they rated their perceived burden between 1 'Not at all' and 4 'Very heavily'. Afterwards, the answers of the two steps were transformed to 1 indicating the statement did not apply, 2 it applied 'without a burden', 3 it applied with 'not much of a burden', 4 it applied with 'a bit of a burden', and 5 it applied with 'a heavy burden'. Negatively phrased items regarding rewards were reversed; thus, a high reward or a low perceived burden of a missing reward were ranked higher. Internal consistency of both efforts (2006: Cronbach's α = .69, McDonald's Ω = .70, 2011: Cronbach's α = .70, McDonald's Ω = .70) and rewards was acceptable (2006: Cronbach's α = .71, McDonald's Ω = .71, 2011: Cronbach's α = .73, McDonald's Ω = .72).

As a next step, ERI was measured with the formula (D. Richter et al., 2017; Siegrist et al., 2004):

$$ERR = e / (r * c).$$

e described the sum of the answers regarding effort, while r was indicated by the sum of the answers regarding reward. c corrected the ratio between the two constructs as the number of respective items differed. In this case, effort consisted of three items, whereas reward was answered using seven statements. Thus, c was 3/7. An ERI level close to 0 indicated low perceived effort accompanied by high rewards. Mathematically, a value of 1 indicated a perfect balance, while an imbalance was found at results above one. Furthermore, values between 0.2 and 5 (range) could theoretically be reached.

Some researchers use the dichotomous version of ERI, with the ratio's value >1 indicating an imbalance and <=1 no imbalance that is possibly detrimental for the employee (Siegrist, 2011; Siegrist et al., 2004). However, it was shown that the type of transformation of the measurement scale (dichotomous ERI, continuous effort-reward ratio, or efforts and rewards as separate constructs) has an impact on the strength of the association between ERI and the respective health outcome (Gorgievski et al., 2019; Kunz, 2019; Niedhammer et al., 2004). Moreover, regarding the binary approach, it was criticized that information is lost and a cut-off at 1 leads to overestimating work stress within a population with means above 1 (Montano et al., 2016). In this article, the continuous form of ERI was used as it can be assumed that health suffers more from a higher imbalance (Niedhammer et al., 2004).

Overcommitment. As part of Siegrist's et al. (2004) model on work stress, the time-variant overcommitment was integrated into the analyses. The validated questionnaire contained six items (e.g., "Work seldom lets go of me, it stays in my head all evening."); respondents could choose between 1 'strongly disagree', 2 'disagree', 3 'agree', and 4 'strongly agree' (Siegrist et al., 2004). A sum scale was built, ranging between 6 and 24 which was transformed to vary between 0 and 18; high values indicated a stronger overcommitment. This is why one item needed to be reversed. Internal consistency was acceptable in both years (2006: Cronbach's α = .79, McDonald's Ω = .78, 2011: Cronbach's α = .80, McDonald's Ω = .80).

Life satisfaction. Life satisfaction as the dependent variable was assessed by the following question: 'In conclusion, we would like to ask you about your satisfaction with your life in general. How satisfied are you with your life, all things considered?' ranging between 1 'completely dissatisfied' and 11 'completely satisfied'. To achieve an easier interpretation, the range was changed so that life satisfaction varied between 0 and 10.

Income. Even while controlling for education, unemployment, health, and other variables, larger personal income is related to higher levels of life satisfaction (Salinas-Jimenez et al., 2011; Schöllgen et al., 2019). Income was included in the analyses as the time-variant personal net income of the previous month and was later transformed into its logarithmized form because of its broad range. The dataset offered an imputed net labor income (Frick & Grabka, 2014), summing possibly multiple streams of income. Further, the imputation of item nonresponse followed the Row- and Column method (Little & Su, 1989) relying both on

individual longitudinal and cross-sectional trend data. In the case of missing longitudinal data, gross labor income was imputed.

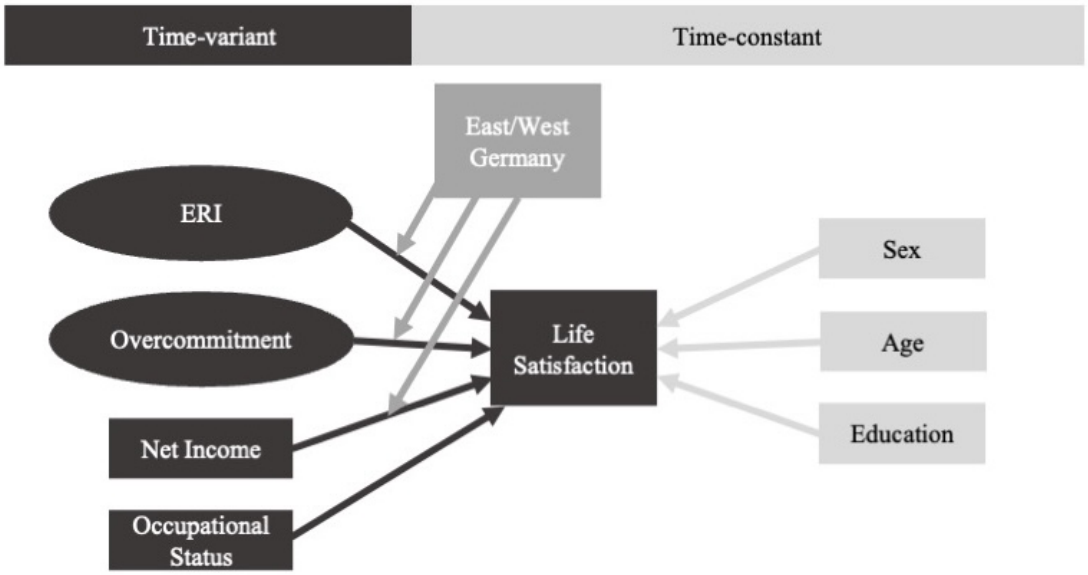
Region. Region was a time-constant variable as those who moved between East and West Germany during the time of observation were excluded. It differed between the current residence in the former Western (0) or Eastern (1) states of Germany. Previous research consistently concludes that life satisfaction is lower in East Germany compared to West Germany (Easterlin & Plagnol, 2008; Kasinger et al., 2022; Petrunyk & Pfeifer, 2016b).

Covariates. Sex, age, education, and work hours were included as covariates. While work hours were considered time-variant, the other variables were considered time-constant (e.g., marginal change of education, homogeneous change of age). Previous research showed that the regionally aggregated composition regarding sex is influential in workplace settings: If employment grade, job control, job demands, and work hours differ between men and women, health differs between them, as well (Sekine et al., 2011). Therefore, sex needed to be considered in our analyses. As in West Germany, work hours of women are lower compared to men (Nickel, 2011), health might differ between sexes, too. Age was centered for the analyses. Life satisfaction varies over the life course with decreasing levels over the working age (de Ree & Alessie, 2011; Salinas-Jimenez et al., 2011). As in this study only employed respondents who were predominantly of regular working ages were included, a negative linear association between age and life satisfaction could be assumed. Education was implemented using the generated version of CASMIN (Comparative Analysis of Social Mobility in Industrial Nations; Brauns & Steinmann, 1999). It asked for the highest degree or diploma and exhibited a fitting scale for potential international comparisons. The item varied between 1 ‘inadequately completed’ and 9 ‘higher tertiary education’. Apart from their direct association, higher levels of education are indirectly positively associated with life satisfaction via accompanied higher monetary returns and a lower probability of becoming unemployed (Salinas-Jimenez et al., 2011). Satisfaction with specific life domains as well as both levels of eudaimonic (fulfillment of psychological needs) and hedonic (balance between positive and negative emotions) subjective well-being are higher when people have higher education levels (Nikolaev, 2018). Finally, work hours portrayed the actual work time per week as they accounted for overtime which was an additional job-related effort. Longer work hours indirectly diminish life satisfaction via end-of-work strain (Matthews et al., 2012). The occupational status was implemented to integrate another workplace factor which could be related to ERI, overcommitment, income, and life satisfaction. Therefore, the metric International Socio-Economic Index (ISCO-88) was used. In general, these covariates might explain how respondents exhibited individual resources in their distinct reaction to the stressors (Lazarus & Folkman, 1984) given by ERI and overcommitment.

7.4.3 Methods

All analyses were estimated with Rstudio (Version 2022.07.1) and its package panelr to estimate within-between models with the command wbm. To display distinct coefficients of both time-constant and time-varying variables, a within-between model was used. It combined random as well as fixed effects and therefore included changes within a person as well as differences between the means of participants (Brüderl, 2010). Further, the Hausman test (Hausman, 1978) showed that the within and between effects of ERI on life satisfaction ($p < .01$) and overcommitment and life satisfaction ($p < .001$) differed significantly (Bell et al., 2019) which rendered it preferable to observe both fixed and random effects. One advantage of using fixed effects is that the problem of unobserved heterogeneity is reduced, since all time-constant variables are accounted for in the analysis (Brüderl, 2010). As in this case, the association between time-constant variables and life satisfaction was of interest, random effects were estimated in addition. Compared to pooled ordinary least squares regression, random effects account for variation on the individual and time levels (Bell et al., 2019) which was preferable in the case of panel data. Furthermore, interactions between region and personal net income, region and ERI, as well as region and overcommitment were estimated to account for random slopes. For these analyses, income, ERI, and overcommitment were z-standardized. Figure VII-1 portrays the estimated model.

Figure VII-1. Model specification of the used variables.



Note. The Pearson correlation coefficients indicated weak linear associations between the metric variables and life satisfaction.

7.5 **Results**

7.5.1 Descriptive Results

Table VII-1 shows the descriptive results of the final sample for both survey waves. The distribution of all variables was comparable in 2006 and 2011. The proportion of women was significantly higher in the East, which was to be expected due to a higher female labor market participation rate in East Germany. All covariates differed significantly between East and West at both time points. While in the East, the level of education and the amount of actual work hours were higher, West Germans exhibited higher levels of life satisfaction, personal income, and occupational status.

Table VI-I. Descriptive results of the used variables.

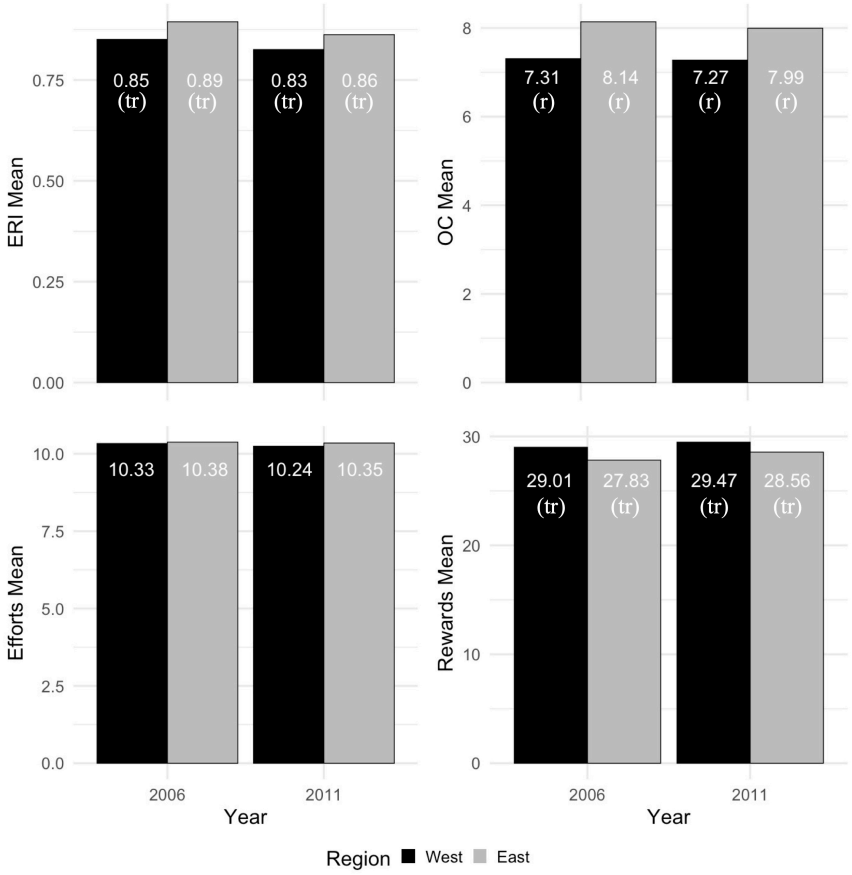
	Total (N = 3,848)		West (N = 2,912)		East (N =936)	
Variable	Mean (SD)/ N (%)	Range	Mean (SD) / N (%)	Range	Mean (SD) / N (%)	Range
2006						
Female	1,671 (43%)	0 - 1	1,208 (42%***)	0 - 1	463 (50%***)	0 - 1
Age	42.62 (8.92)	19 - 68	42.62 (8.89)	19 - 68	42.64 (9.01)	20 - 63
Education	5.75 (2.23)	1 - 9	5.56*** (2.3)	1 - 9	6.32*** (1.86)	1 - 9
LS	7.10 (1.55)	0-10	7.21*** (1.54)	0-10	6.76*** (1.52)	0-10
Net income (Euro)	1,829.20*** (1,027.99)	200 - 15,000	1,940.95*** (1,082.85)	200 - 15,000	1,481.52*** (733.14)	00 - 6,000
Work hours	40.94 (9.43)	15 - 80	40.47*** (9.73)	15 - 80	42.40*** (8.27)	18 - 80

Occupational Status	48.35 (15.81)	16 - 90	48.79** (15.66)	16 - 90	46.97** (16.20)	1 - 90
2011						
Age	47.62 (8.92)	24 - 73	47.62 (8.89)	24 -73	47.64 (9.01)	25 - 68
Education	5.77 (2.23)	1 - 9	5.58*** (2.31)	1 - 9	6.33*** (1.87)	1 - 9
LS	7.08 (1.52)	0 – 10	7.14*** (1.53)	0 -10	6.89*** (1.47)	1 – 10
Net income (Euro)	2,108.02*** (1,152.25)	240 – 12,000	2,234.59*** (1,192.35)	240 – 12,000	1,714.24*** (911.76)	300 – 9,030
Work hours	41.25 (8.98)	15 - 80	40.95*** (9.18)	15 - 80	42.21*** (8.23)	15 - 80
Occupational Status	48.95 (15.98)	16 - 90	49.39** (15.84)	16 - 90	47.59** (16.24)	16 - 90

Note. Sex is not portrayed in 2011 as the same participants were included in both surveys. Stars in the Total column indicate a significant difference between 2006 and 2011, whereas stars in the East and West columns indicate significant differences between regions in the respective year according to the TukeyHSD post-hoc test (* p < .05, ** p < .01, *** p < .001). SD = standard deviation; LS = life satisfaction.

Figure VII-2 portrays the mean values of ERI, overcommitment, and the single components efforts and rewards. Mean values of all indicators of the ERI and overcommitment constructs can be taken from Supplement A. The higher mean values of ERI and overcommitment among East Germans hint at the assumed associations hypothesized in H4 and H6. Moreover, the levels of imbalance between efforts and rewards diminished in both regions significantly over time, because rewards increased, in general. While there were no regional differences in the prevalence and burden severity of efforts, disparities could be found in the cases of rewards and overcommitment, disadvantaging East Germans (see Supplement A).

Figure VII-2. Mean values of work stress indicators.



Note. Letters in brackets indicate significant group comparisons. t = significant difference ($p < .05$) between 2006 and 2011 as showed by a TukeyHSD post hoc-test. r = significant difference ($p < .05$) between East and West Germany as showed by a TukeyHSD post hoc-test.

7.5.2 Fixed Effects Regression Results

Table VII-2 first portrays the results of the central predictors in their distinct effects on life satisfaction, only containing fixed and random effects without integrating covariates. Results for all covariates can be taken from the note or Supplement B. In a second step, all covariates were added. Increasing overcommitment led to lower life satisfaction, thereby confirming H1. While the result of the model without the integration of control variables shows that rising ERI levels diminished life satisfaction, this relation became stronger upon integrating all covariates. Since rising levels of ERI diminish life satisfaction, H2 was confirmed, as well. The tested work stress indicators consequently decrease life satisfaction, confirming previous assumptions and findings. In contrast, rising logarithmized personal net income was not associated with a change in life satisfaction. H3 was thus rejected. As without the inclusion of control variables, income significantly ameliorated life satisfaction, this effect could better be explained by the other variables such as ERI or overcommitment. A stepwise approach showed that how ERI affected life satisfaction only increased upon the inclusion of overcommitment and decreased slightly when including the occupational status. However, the effect increased again by including age and level of education. In the case of overcommitment, the effect was only increased by the inclusion of ERI.

Table VII-2. Full model including the results of the within-between model predicting life satisfaction.

	Without control variables			Including control variables		
	Est.	LB 95% CI	UB 95% CI	Est.	LB 95% CI	UB 95% CI
ERI fixed effects	-0.26**	-0.41	-0.10	-0.38***	-0.55	-0.22
ERI random effects	-0.53***	-0.71	-0.35	-.21***	-.25	-.17
Overcommitment fixed effects	-0.05***	-0.06	-0.04	-0.06***	-0.07	-0.04
Overcommitment random effects	-0.10***	-0.11	-0.08	-.41***	-.46	-.37
Personal Net Income (log.) fixed effects	0.35***	0.27	0.43	0.11	-0.08	0.29
Personal Net Income (log.) random effects	.18***	.14	.22	.21***	.15	.28
East Germany random effects	-.09	-.12	-.07	-.12*	-.22	-.02

Note. Number of observations = 3,848; data from 2006 and 2011 were used; stars indicate significance levels (* p < .05, ** p < .01, *** p < .001); unstandardized results are presented for fixed effects, standardized results are presented for random effects; results of covariates: work hours (fixed: Est. = -0.00, LB = -0.02, UB = -0.00, random: Est. = -.00, LB = -.03, UB = .02), occupational status (ISEI-88) (fixed: Est. = -0.00, LB = 0.00, UB = 0.01, random: Est. = .06, LB = -.03, UB = .02), female sex (random: Est. = .13, LB = .03, UB = .22), centered age (random: Est. = -.11, LB = -.15, UB = -.07), education (CASMIN (random: Est. = .06, LB = .01, UB = .12); Pseudo-R^2 (fixed effects) = .10, Pseudo-R^2 (total) = .49; Est. = estimation, LB = lower bound, UB = upper bound, CI = confidence interval, ERI = effort-reward imbalance, log. = natural logarithm.

7.5.3 Random Effects Regression Results

Table VII-2 also contains both the results of the random effects without covariates and including them. Additional to the within effect of ERI, its increasing value was also associated with lower life satisfaction using the between estimator. Moreover, respondents with higher levels of overcommitment exhibited a lower life satisfaction. A higher personal net income was significantly related to high levels of life satisfaction. Therefore, respondents who gained more money were more satisfied with their lives, but an increasing income did not lead to higher life satisfaction on the individual level, indicating that fixed and random effects of income on life satisfaction differed. While the standardized coefficients of personal net income and ERI exhibited similar effect sizes only with differing directions, overcommitment was a stronger predictor of life satisfaction. Supplement C includes fixed and random effects of efforts and rewards separately.

The stepwise approach illustrated a decreasing association between ERI and life satisfaction upon integrating overcommitment. Income as well as occupational status diminished the effect slightly. For overcommitment, the association with life satisfaction became stronger upon including ERI, income, the occupational status, and sex. It reduced when integrating work hours, East Germany, and age. In the case of income, integrating work hours, sex, and age enhanced its association with life satisfaction. Including the occupational status, region, or education attenuated the association between income and life satisfaction.

7.5.4 Regression results of interaction terms

Table VII-3 portrays the results of four different models which distinctly included interaction terms to predict life satisfaction. Despite previous findings and the theoretical background which consider ERI and overcommitment to constitute work stress, their interaction term did not reach a sufficient significance level. Moreover, region did not moderate the effects of ERI or overcommitment which is why H5 as well as H7 were rejected.

Table VII-3. Results of the interaction terms predicting life satisfaction.

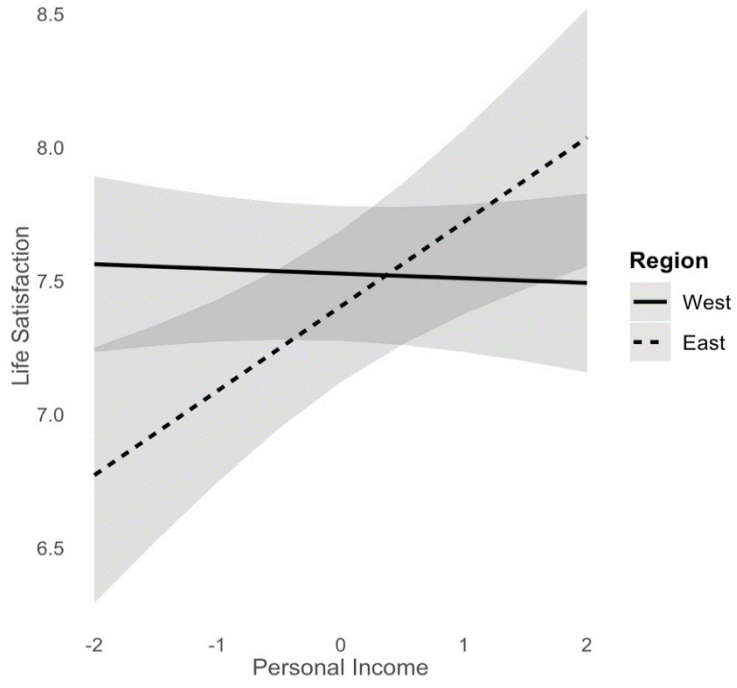
	Est.	LB 95% CI	UB 95% CI
ERI*Overcommitment	0.00	-0.00	0.00
ERI*East Germany	-0.08	-0.17	0.02
Overcommitment*East Germany	0.06	-0.07	0.18
Personal Net Income (log.)*East Germany	0.35**	0.13	0.56

Note. Number of observations = 3,848; data from 2006 and 2011 were used; stars indicate significance levels (* p < .05, ** p < .01, *** p < .001); four different models are portrayed; all models: Pseudo-R^2 (fixed effects) = .10, Pseudo-R^2 (total) = .49; ERI, overcommitment, and income were z-standardized; models include ERI, overcommitment, personal net income, actual work hours, occupational status, region, sex, age, and level of education; Est. = estimation, LB = lower bound, UB = upper bound, CI = confidence interval, ERI = effort-reward imbalance, log. = natural logarithm.

Solely, personal net income was moderated by region in East Germany, indicating that East German's life satisfaction experienced a steeper increase upon their rising income. This finding supported H8. Figure VII-3 illustrates this result graphically. The coefficients did not change markedly when all interaction terms were included in one model. Supplement D presents the results of interactions between region and both efforts and rewards separately.

Comparing models including interaction terms with the model without them, the likelihood ratio test showed that a model which integrates the interaction between personal income and region was more suited to predict life satisfaction. Further, the AIC was also lower than that of the model without interaction terms. Thus, the interaction between region and net income benefitted the analysis.

Figure VII-3. Significant interaction with region.



Note. The solid line portrays the association between personal income (z-standardized) and life satisfaction among West Germans, while the dashed line accounts for East Germans.

7.6 Discussion

The aims of this study were to first unfold levels of ERI and overcommitment in Germany. The effects of ERI, overcommitment, and income on life satisfaction were estimated, using location in East and West Germany as a moderator in order to account for their differing labor structures. Further, associations between life satisfaction and time-constant variables (region, sex, age, education) were tested. To estimate the effects of ERI, overcommitment, and income on life satisfaction, a within-between-model was used to include both fixed and random effects.

Descriptively, in line with our hypothesis, East Germans exhibited higher levels of ERI and overcommitment. Thus, East Germans are disadvantaged due to their working conditions regarding their well-being and health. This could be one reason why East Germans reported higher levels of depression and anxiety (Beutel et al., 2022). Moreover, East Germans were not only more committed to their work than West Germans, they tended to exhibit overcommitment. As work centrality is higher in the East, it should be tested if East Germans' overcommitment is unhealthy or if they differ from West Germans in their view of job commitment. A psychometric validation of overcommitment which accounts for the regional difference between East and West should be targeted. Rigotti et al. (2007) found cultural differences between East and West describe their disparities in job commitment. Another indication that overcommitment might inherently differ between East and West Germans is the finding that while higher levels of overcommitment were associated with a lower probability of changing one's job, region did not predict job changes. This might either be caused by the problematic labor market in the East, confirming Siegrist's (2001) assumption that a lack of alternative jobs prevents job changes despite bad working conditions, or by their higher resilience (Beutel et al., 2022).

However, ERI values decreased between 2006 and 2011 in both parts of Germany, pointing towards improving working conditions over time. In accordance with our hypothesis, an increasing ERI significantly lowered life satisfaction. By implementing interaction terms between region and ERI or overcommitment, it could be shown that contrary to our hypotheses, life satisfaction was similarly affected by work stress in East and West Germany. Yet, the beneficial impact of income on life satisfaction was stronger in East Germany, a region that is more economically deprived and disadvantaged regarding labor opportunities than former West Germany. Comparing between participants, higher levels of ERI and overcommitment were also related to lower levels of life satisfaction. As opposed to that, an increased life satisfaction was associated with higher personal net income between respondents. Therefore, benefitting from the within-between model, it could be analyzed that 1) increasing levels of ERI and overcommitment lowered life satisfaction over time and 2) participants with higher work stress levels were less satisfied with their lives than those with lower levels. This finding highlights the importance of adequate working situations regarding well-being of employees.

As ERI and overcommitment as indicators of work stress were related to life satisfaction, good working conditions need to be further promoted. Future research should focus on the distinct effects of material and nonmaterial rewards on employee well-being and health. Moreover, supervisors should concentrate on the working atmosphere and foster recognition of their employees' efforts and companies should increase job security. In the case of advancement opportunities, the possibilities are limited. However, in agreement with previous research, our findings could show that the working atmosphere is of great importance when it comes to life satisfaction.

Andolšek and Štebe (2004) found that East Germans suffered less from bad working conditions which could not be replicated in this study. Nevertheless, East Germans received fewer rewards, additional to their relatively lower pay, leading to imbalanced reciprocities with their supervisors. Thus, working conditions could be improved in East Germany by enhancing job-related rewards. Previous research has shown that interventions to improve employees' well-being by providing more work-related resources and reducing job demands increase productivity (Roczniewska et al., 2022). Moreover, transformational leadership providing

inspiration and care for employees boosts the engagement of employees even while demands are high (Breevaart & Bakker, 2018). Therefore, the relationship between supervisors and employees is an important aspect of the ERI questionnaire with the potential of attenuating the employees' productivity.

Further, there was a regional difference regarding the impact of income on life satisfaction. This might be explained by the finding that East Germans have a higher mean level of education than West Germans, while pursuing jobs with lower ISCO and prestige values (Granato, 2011), and thus, gaining less money. Therefore, their level of education would actually qualify them for both a better pay and higher prestige. Thus, apart from their lower income levels compared to the West (Kasinger et al., 2023), their higher impact of increasing income on life satisfaction could be attributed to the effect of a diminishing status inconsistency. The finding that East Germans have been significantly less satisfied with their economic situation between 1991 and 2020 compared to West Germans (Kasinger et al., 2022) supports this assumption. This should be tested in future research on ERI: Though it asks for adequate pay for the participants in regards of their accomplishments and efforts, the questionnaire could gain knowledge from distinctly asking for an adequate pay in terms of education and work experience as well. However, East Germans are not the only group that receive a beneficial effect on life satisfaction by increasing incomes. Millennials deem extrinsic material means of pay and job security the second most influential aspect of their work motivation, whereas the same means were one of the least important motivators for older generations (Mahmoud et al., 2020). Generally, Germans are extrinsically motivated to work due to financial rewards, though their intrinsic motivation to perceive their work tasks as important is stronger (Kuchinke et al., 2011). Potentially, immaterial working conditions that are integrated in the ERI questionnaire are also strong motivators.

Rather than using smaller groups of specific occupation or restricted age subgroups, this article's analyses included a sizeable sample of the German working population. Thus, the present study could show that a general population is affected by ERI.

Some limitations need to be mentioned. Levels of ERI decreased between 2006 and 2011. We cannot preclude that further shifts have occurred since the time of the survey which may have also affected differences between former East and West German states. Further problems could have occurred due to the rather wide gap between panel years of 2006 and 2011. This gap also led to a marked reduction in sample size, as a large number of respondents did not attend both waves. Due to that and the sample restriction criteria, a selectivity bias cannot be ruled out. As overcommitment is considered a dynamic, and not stable, characteristic (Siegrist, 2001), it remains uncertain how long respondents have exhibited it until the survey in 2011. The same holds true for the duration of ERI. A selection bias was possible due to excluding those who changed jobs, which is likely if ERI occurs and persists (Siegrist, 2001). Thus, in this sample, respondents might have either been experiencing ERI for a rather short time or are affected by the three reasons to maintain in jobs associated with ERI which Siegrist (2001) mentions: 1) the labor market does not offer enough alternative jobs, 2) employees endure the situation because they work towards a promotion or another benefit, and 3) they are overcommitted. Moreover, an omitted variable bias should be considered (Bell et al., 2019), as additional unobserved time-varying variables affect life satisfaction and unobserved heterogeneity regarding time-constant aspects are related to random effects. In addition, unobserved random slopes might be beneficial to further predict life satisfaction. Moreover, though the sample of the GSOEP is quite large, as with any other analysis, adding more covariates leads to the question if the power is high enough to detect smaller effects. Finally, previous research called for the revision of how ERI or overcommitment are indicated (Kunz, 2019; Sonnentag, 2012; Sonnentag & Fritz, 2007). While the variation inflation factors of the models within this article were all below 10 (not displayed), thus not detecting multicollinearity, indicators of efforts ("Because of the high volume of work, there is often high time pressure") and overcommitment ("At work, I easily get into time pressure") are somewhat similar. As Kunz (2019) points out that four out of six overcommitment indicators account for the ability of

detachment from work, the conceptualization of overcommitment could be revisited to both generate a more distinct and simultaneously broader concept.

Conclusion

Whereas changing personal net income did not affect life satisfaction within employees, both rising ERI and overcommitment diminished it. Still, higher income was a protective factor for the life satisfaction of East Germans. As their levels of ERI and overcommitment were higher compared to West Germans, it is plausible that their well-being and health is more impaired due to their more detrimental working conditions. Since rewards were less frequent in East Germany and they profited more from increasing incomes, region-specific working conditions and job-related needs should be revisited.

8 Discussion

The question which underlies this dissertation was in which way the associations and effects related to job demands as well as other workplace characteristics and employee health differ between East and West Germany. To answer this question, deleterious working conditions such as constant availability, low job-related rewards, and high efforts for the job were highlighted. Exhaustion as well as life satisfaction of employees were estimated to observe the associations between disadvantageous working conditions and health in former Eastern and Western German states. The regional differentiation goes back to historically established disparities between East and West Germany which are related to differing work structures, values, and opportunities. Previous research on regionally disparate job demands is very scarce. Similarly, research on regional differences in individual and environmental resources is insufficient, as well. The articles within this dissertation aimed at filling this gap and thereby encouraging other researchers to acknowledge regional differences and ultimately a macro level to their analyses on work stress.

Two papers were included within this dissertation to emphasize the differing workplace characteristics between East and West Germany in their associations with employee health. The first paper concentrated on work-related as well as individual predictors of exhaustion. On the micro level, personality aspects were thereby acknowledged, while on the meso level, environmental resources and demands were integrated. Associations were tested for potential differences between East and West Germany integrating OLS-regressions and interaction terms to compare regions. Thus, the macro level was added. Work-related predictors comprised work-life balance, work hours, perceived strain due to Internet use at the job, received number of e-mails during work and leisure time, as well as the social pressure to be constantly online. Individual covariates included region, sex, age, having a partner within the same household, children, as well as household income.

The second paper focused on the question of how imbalances between employees' efforts and received rewards from their employers and colleagues, employees' job-related overcommitment, as well as personal income affected employees' life satisfaction in East and West Germany. Thus, the interplay between individual and environmental resources was acknowledged, alongside demands on the meso level and further resources on the micro level. The macro level was integrated again by adding regional stratification. In the analyses, the predictor variables were estimated for the two regions and observed over two time points using longitudinal data. A within-between model was used to account for fixed effects for time-variant items (ERI, overcommitment, net income, work hours, occupational status) as well as random effects covering time-constant variables (region, sex, age, education). Interaction terms between region and ERI, overcommitment, as well as income were added to observe potential regional disparities.

8.1 Summary of the main findings

The first article depicted that despite their descriptively higher subjective social pressure of constant connectivity, East Germans exhibited lower levels of exhaustion than West Germans.

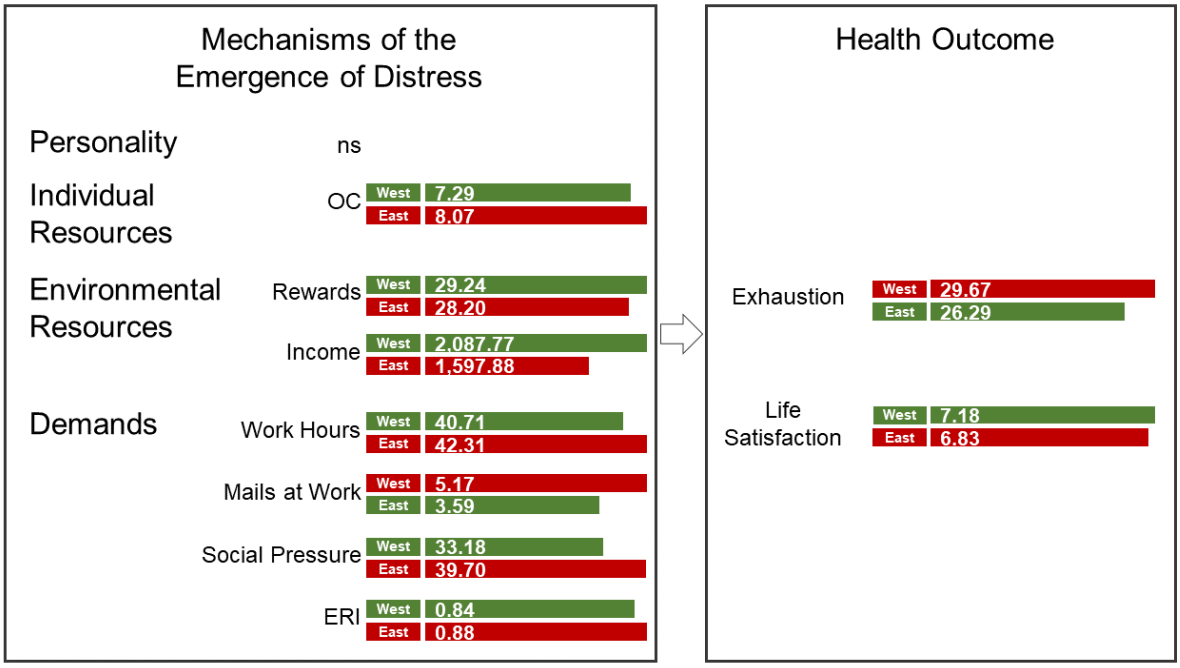
Individual factors such as the female sex, working part-time, increasing age, not having a partner within the same household, having children, and a lower household income were related to higher levels of exhaustion. Job-related covariates such as lower work-life balance, higher strain due to Internet use at the job, as well as increased social pressure to be constantly available were also associated with higher levels of exhaustion. East Germans were less afflicted by an increasing number of e-mails received during leisure time as well as the social pressure of constant connectivity.

The second article observed that West Germans reported lower levels of effort-reward imbalances as well as overcommitment. Moreover, higher levels of effort-reward imbalance or overcommitment diminished life satisfaction. A lower net income and increasing work hours also lowered life satisfaction. Region in East Germany, increasing age, and lower education were additionally related to lower levels of life satisfaction. The positive effect of personal income on life satisfaction was even stronger in East Germany compared to the West. Thus, material occupational rewards might be more important in the East.

The initial assumption that overburdening job demands are deleterious for employee health (Semmer & Mohr, 2001) was confirmed by the findings. Overall, the analyses within this dissertation showed that East Germans experience worse working conditions compared to West Germans. First, they received fewer immaterial job-related rewards (i.e., recognition, career advancement opportunities, and job security) and a lower income. Therefore, the environmental resources East German employees received from their employers were lower compared to the West. Moreover, the environmental demands turned out to be higher in the East, as well: they were more inclined to perceive the social pressure to be constantly online, they work longer hours, and their efforts were greater than the rewards they received at the job in return. These findings are of great importance since regional differences in job demands have been neglected by previous research. Additionally, on the individual level, East Germans were more overcommitted to their jobs than West Germans. This indicates that overcommitment was a detrimental resource. All of these findings undergirded the exchange-stress model to explain health outcomes of employees in East and West Germany: apart from personality, all components of the model were related to place of residence. This confirms the importance of integrating the macro level to the work stress model, as the meso and micro levels are related to cultural, socioeconomic, or historical aspects of the macro level. The job-related aspects exhibiting significantly ($p < .05$) differing mean values between East and West Germany are portrayed in Figure VIII-1.

The model further indicates higher distress as well as poorer mental and physical health in East Germany due to their worse working conditions and higher overcommitment as a potentially detrimental part of their individual resources. This goes along with the examples mentioned in the theory section as well as additional findings: East German managers considered their locus of control external, were less satisfied with their jobs, exhibited a worse state of mind, were more impatient, and had a worse work-life-balance (Kirkcaldy et al., 2002). In contrast, Kirchner (2020) found indications that employment conditions of East and West Germans in terms of job security, advancement opportunities, and job design (i.e., interesting work, independent work) have converged between 1997 and 2015. Still, Kirchner (2020) also confirmed that there is no convergence regarding income. Therefore, the distinct differentiation between aspects of working conditions is beneficial in comparative studies. It still needs to be pointed out that despite their worse working conditions, East Germans were less exhausted than West Germans. Therefore, both resources and evaluations of stressors should be highlighted more thoroughly in future research regarding regional job-related stressors and their outcomes. Since the first article could not integrate many resources due to missing data, further protective factors should be observed to explain if East Germans exhibited more resources to protect themselves from emotional exhaustion or if West Germans experienced higher burdens that caused emotional exhaustion (e.g., technostress). How this may be achieved will be discussed further below in section 8.3.

Figure VIII-1. Summary of the Descriptive Regional Disparities in Job-Related Aspects.



Note. Results of two different articles are portrayed in this figure. Only significant disparities ($p < .05$) between East and West Germany are presented. Red bars display disadvantageous distributions for the respective region, while green bars portray advantageous distributions. Mean values are provided within the bars. Length of bars signal mean levels compared to the other region. For longitudinal data, means over time were estimated. East Germans' life satisfaction was more affected by income compared to West Germans. West Germans' emotional exhaustion was more strongly associated with the number of e-mails during leisure time and the perceived social pressure to be constantly available compared to East Germans. ns = not significant; OC = overcommitment; ERI = effort-reward imbalance.

8.2 Health-related implications

Previous research shows that intricate mechanisms explain how stressors affect mental health. The articles within this dissertation could confirm this complexity for the cases of East and West Germany. Distinct stressors, protective or risk factors, and stress responses are common topics in research on work stress. In this dissertation, it was attempted to gain a clearer overview how job-related stressors along with individual and environmental resources as well as the individual context are related to mental health. Regarding the intermediate physiological proceedings, only assumptions could be made.

In this dissertation, *stressors or demands* were indicated by working conditions. In the two articles, technostress as well as ERI served as focal job demands. It was shown that they were related to emotional exhaustion and life satisfaction, respectively. However, other potential consequences can be deduced from the findings. As discussed throughout this dissertation, detrimental working conditions are associated with a broad range of adverse health outcomes (Kivimaki & Kawachi, 2015; Nixon et al., 2011; Semmer & Mohr, 2001; van Vegchel, de Jonge, Bosma, et al., 2005; van Vegchel, de Jonge, & Landsbergis, 2005). Moreover, physical functioning at a later point in life is negatively affected by preceding high psychological as well as physical demands (Wahrendorf et al., 2012). The second study within this dissertation showed that life satisfaction was negatively affected by a rising ERI and that those with higher ERI levels were also less satisfied with their lives than those with lower ERI levels. The within effects show that reducing the imbalance also benefitted employee well-being. It was discussed that ERI and job strain foster depressive disorders (Rugulies et al., 2017; Stansfeld

& Candy, 2006), exhaustion (Kozusznik et al., 2015; Kunzelmann & Rigotti, 2021; Schilbach et al., 2022), migraine frequency (Leineweber et al., 2020), cardiovascular diseases (Dragano et al., 2017; Siegrist, 1996; van Vegchel, de Jonge, & Landsbergis, 2005), musculoskeletal problems (Dragano et al., 2003), diminish self-esteem (Schilbach et al., 2022), predict suicide (Stansfeld & Candy, 2006), and enhance adverse health behavior such as smoking or alcohol consumption (van Vegchel, de Jonge, & Landsbergis, 2005). Men who experience an imbalance between their job efforts and received rewards are more likely to exhibit reduced lung functioning (Siegrist et al., 2019). Therefore, besides life satisfaction, ERI serves as a risk factor for mental and physical health as well as health behavior. The second article within this dissertation showed that East Germans exhibited higher levels of ERI. Therefore, they are more at risk regarding their health compared to West Germans. Moreover, since the worksite is more often responsible for rising exhaustion levels than the family domain (Persson and Osterberg, 2020), it is crucial to reduce stressors at the job that foster exhaustion. In the first study within this dissertation, technostress as well as an inadequate work-life balance proved to be associated to higher exhaustion levels, suggesting that these are stressors which need to be minimized. Alternatively, it should be studied which environmental or individual resources sufficiently buffer effects of technostress. Since West Germans' emotional exhaustion was more strongly related to the number of received e-mails during leisure time, two possibilities present themselves: Demands can be reduced by disabling the possibility to be reached during leisure time; alternatively, resources can be enhanced in such a way that employees prioritize tasks to postpone looking at incoming messages and detach mentally from their job.

As those with lower occupational status work in more straining jobs (Lunau et al., 2018; Siegrist et al., 2019), social inequality in health is fostered. The articles within this dissertation showed that there was a tendency among East Germans to pursue jobs with worse working conditions. Since They perceived a higher social pressure to be constantly available and higher ERI levels. Therefore, their health should be more impaired as well. While the analyses within this dissertation showed that East Germans were less satisfied with their lives, they were also less exhausted compared to West Germans. Previous research also offers inconsistent directions in regional health disparities. On the one hand, East Germans have exhibited higher total symptom load because of higher musculoskeletal problems, exhaustion, cardiovascular complaints, and gastrointestinal complaints (Beutel et al., 2021), higher anxiety (Beutel et al., 2022), and more loneliness (Buecker et al., 2021) as well as depressive symptoms for years (Beutel et al., 2022; Otten et al., 2023). On the other hand, health problems between East and West Germans have converged and are partially less frequent in the East in 2019 (Beutel et al., 2021; Otten et al., 2023). Despite these inconsistencies, improving working conditions in the former Eastern regions of Germany might contribute to a further enhancement of health in the East, and thus to more social equality regarding health. With that East and West Germans should be granted more equal opportunities.

Further *protective and risk factors* related to health and working conditions were uncovered by several researchers in the past. For example, depressive symptoms are influenced by low internal (i.e., sense of control) and external resources (i.e., social support; Lunau et al., 2018). Physical health is affected by resources, as well. For instance, higher job-related resources reduce premature death of women and control over the work content lowers the risk of functional dependence after retirement (Machler et al., 2001). Mental health functioning at retirement age also suffers from high job-related demands (i.e., psychological demands, physical demands, efforts) and low resources (i.e., decision latitude, social support at work, rewards, high overcommitment) ten years before (Wahrendorf et al., 2012). Efforts and rewards could also separately predict life satisfaction which is shown in Supplement C. The results show that efforts and rewards both contributed to higher life satisfaction. Therefore, they might be protective factors for employee well-being. This finding also highlights that only the imbalance between efforts and rewards was detrimental to employee health. Similarly, overcommitment diminished life satisfaction suggesting that it might be a risk factor for employees. The conceptualization of overcommitment conveyed that employees were unable to detach themselves from their jobs after work. Detachment is a coping technique that is associated with better self-reported positive affect, job satisfaction (A. Schulz et al., 2018),

mental as well as physical health - and especially lower exhaustion; contextual performance and creativity decrease with higher detachment (Wendsche & Lohmann-Haislah, 2017). However, with increasing workload, psychological detachment decreases (A. Schulz et al., 2018). This underlines the intricate mechanisms of work stress and its outcomes. To the author's knowledge, regionally differing coping mechanisms have not been studied by previous researchers. However, the findings within this dissertation emphasize the need to tackle this line of research: the higher overcommitment levels among East Germans indicated that they were less likely to use detachment as coping mechanism.

Protective individual resources and how they differ regionally should be further observed in future research. In study 1, work-life balance was slightly higher among East Germans compared to West Germans, though the difference was insignificant. The results of study 2 showed that East Germans made more efforts at the job, whereas the rewards - material and immaterial - were higher for West Germans. Nevertheless, East Germans reached higher overcommitment levels than West Germans. These findings indicated regionally differing proceedings of stressors, resources, and health outcomes. Previous research also hints in this direction. It was shown that East Germans are more resilient than West Germans (Beutel et al., 2022). Therefore, on the one hand, Easterners might endure deleterious working situations with less harmful effects, but on the other hand, these working conditions might be more persistent due to missing grievances. This reasoning is associated with one of the various interpretations of the concept of resilience. It was stated that "[r]esilience has an implicit tendency toward normalization by applying normative standards (for example, social desirability) which are not explicitly stated and are rather hidden in value-ladden [sic] terms like 'functioning'" (Münch et al., 2021, p. 56). As a consequence, stress-related mental health problems are assumed to emerge from following such understandings (Münch et al., 2021). Moreover, as Siegrist (2001) claimed that overcommitted employees tend to keep straining jobs, this endurance could be mistaken for resilience. Therefore, for both resilience and commitment, there are healthy and detrimental levels. Further following this definition of resilience, the reason for health problems is searched in missing individual resources rather than in higher contextual problems such as the workplace or the economically deprived place of residence. Thus, as psychosomatic symptoms due to distress are not always attributed to workplace conditions, the origin of adverse health symptoms might be overlooked. A full assessment of individual and environmental resources as well as environmental demands should always be attempted.

In addition to a more distinct focus on personal or environmental resources, future research could further concentrate on *personal characteristics* which are protective factors for individuals to a) observe if they differ between East and West Germany at all and b) to assess if their influences on the evaluation of stressors differ between East and West. However, it seems that previous researchers mostly combined personality aspects and resources which is why their differentiation becomes difficult. Following the reasoning of Antonovsky's (1997) general resistance resources or Hobfoll's (1989) COR-theory, certain resources should help individuals in handling stressors. Hobfoll (1989) determines four kinds of resources: objects (e.g., status indicators), conditions (e.g., marriage, tenure), personal characteristics (e.g., traits, skills), and energies (e.g., time, money, knowledge). He also highlights the importance of social support which fits neither of the categories but facilitates the preservation of them. More social support within the work domain is associated with lower levels of exhaustion (Halbesleben, 2006). Karasek and Theorell (1990) also highlighted the pervasiveness of social support in its protective influences on health and buffering effects on stressors which is why they integrated it into their job demands-control-support model. Nevertheless, the social support model has not received as many confirmations (Häusser et al., 2010) which is why other resources might be of higher importance. As also shown by the results within this dissertation, East Germans both gain less money via their jobs and are less wealthy (Kasinger et al., 2023), which is why it can be assumed that they also own fewer status indicating objects. However, the extent of social support does not differ between East and West Germany (Fydrich et al., 2009). How conditions, personal characteristics, and energies are distributed regionally should be analyzed in the future to gain insight into region-specific resources. Previous

research has already found that personal resources as well as perceived self-efficacy have converged over time between East and West German adolescents, previously disadvantagig East Germans (Schmidtke et al., 2022). This gives a positive outlook for future generations.

Health and well-being implications due to deleterious working conditions can become risk factors, as well. Above, it was explained that deleterious working conditions such as high ERI levels can foster depression. Depressive symptoms, in turn, can foster cardiovascular disease, chronic obstructive pulmonary disease, diabetes, and migraine (Otten et al., 2022). Moreover, higher life satisfaction as an indicator of subjective well-being (Diener et al., 1999; Fergusson et al., 2015) diminishes mental health problems (Fergusson et al., 2015), benefits physical health and longevity (Diener & Chan, 2011), and lowers distress (Hamarat et al., 2001). Due to the fact that life satisfaction is lower in the former Eastern states of Germany, another health risk factor becomes evident for their citizens. In contrast, the higher levels of emotional exhaustion in West Germany could be detrimental for employees there. Previous research has found that high exhaustion leads to mental and general health problems (Kristensen et al., 2005), for example disengagement at work via lower self-efficacy (Rogala et al., 2016), foster behavioral health risk factors (Ahola et al., 2012; Rose et al., 2017), morbidity risk (van Dam, 2021), negativity, and low energy (Malakh-Pines, 1981). Disengagement conveys not only the withdrawal from work, but also a negative perception of one's job (Demerouti et al., 2001; Rogala et al., 2016). In this case, West Germans are more at risk. Since, as presented above however, health of West Germans tends to be better compared to East Germans, the former might exhibit resources that protect them from some consequences of emotional exhaustion.

In the intermediate step of the exchange-stress model to explain health outcomes of employees in East and West Germany, employees appraise their stressors while being influenced by personality, personal and environmental resources, as well as environmental demands. The theory section covered parts of the physiological process of distress and how it benefits pathogenesis. Physiologically, *stress responses* rely on an intricate network of regulation, containing both protective and damaging hormones (McEwen, 2006): the interplay of this regulation network is responsible for the function of the central nervous system, metabolism, cardiovascular function, and immune function. Even though the brain decides which stressor is a threat (McEwen, 2006), this evaluation depends on different situational conditions, individual characteristics, and experiences (Lazarus & Folkman, 1984). Since this could not be implemented in the two studies within this dissertation, future research could take a further look at the whole process to gain a clearer insight into work stress of East and West Germans.

8.3 Research implications

Through the analyses in the two articles within this dissertation, the proposed exchange-stress model to explain health outcomes of employees in East and West Germany could highlight important mechanisms to predict employee health. However, only aspects of a fuller picture could be implemented due to the used data sets. A more extensive integration of the model would be advantageous to test its reliability. This way, job demands, a coherent set of environmental and individual resources, as well as important personal characteristics could be used to conceptualize work stress under the influence of region. A structural equation model could be estimated to test the assumed pathways of the theoretical model. Thereby, effect sizes of all predictors could also be compared.

While the papers included in this dissertation focused on resources, demands, and individual sociodemographic aspects, the actual evaluative appraisal could not be measured. Moreover, outcomes of employee well-being oftentimes happen shortly after a specific stimulus (or stressor) which is why short interval periods of surveys might be preferable for analyzing some work-related outcomes (Bakker & Oerlemans, 2012; Xanthopoulou et al., 2012). For example, a construct for experiencing daily stressors has been developed in the past: regarding the work domain, work overload, technical breakdowns, mistakes, job security, schedules, job structure,

other work events, and starting a job have been acknowledged as daily stressors (Almeida et al., 2002). These short interval periods could be used in future research to approach employees' evaluative appraisal of stressors as well as immediate distress or eustress. Diary surveys might be a good way to account for both of these aspects. Another option would be to integrate other qualitative methods to acquire information on the evaluative process employees experience during their everyday work lives. By accounting for the evaluation of stressors, the theoretical exchange-stress model to explain health outcomes of employees in East and West Germany could be further tested. However, immediate outcomes should be less pervasive, as pathogenesis and chronification take longer time. Therefore, the amount and severity of stressors should be acknowledged. Though increasing cumulative distress heightens severity of physical symptoms (e.g., headache, fatigue), daily stressors increase such symptoms even when cumulative distress levels are low (Haight et al., 2023). Therefore, their effect on health should not be underestimated.

Moreover, regional workplace characteristics should be further focused on in future research. The papers included in this dissertation showed that East and West Germans exhibit differing levels of technostress at work, job-related rewards, and effort-reward imbalance at the job. Other forms of regional disparities seem plausible. Especially regional disparities in job demands should receive further consideration by future researchers. Further, alternative region-specific stratifications are also conceivable. For instance, potential differences between rural and urban areas should be assessed as both of them offer varying external environmental resources such as outdoors relaxation possibilities in rural locations or a larger number of opportunities regarding leisure activities in urban areas. The urban-rural comparison could also benefit an additional stratification observing differences between former East and West German states. For example, it was found that the development of employment dynamics in rural areas differ profoundly between East and West German states (Margarian & Hundt, 2023). Therefore, gaps in working conditions might be even wider between East or West German rural areas compared to urban areas. Further, different countries exhibit diverging labor structures or attitudes towards work. Additional comparative studies could thus benefit research on employee health. With this knowledge, the health of immigrant employees could also be highlighted in future research. Moreover, comparative studies should advance insights on health inequalities.

The theory section covered that women are more inclined to exhibit psychological distress than men (Matud et al., 2015, 2023; McDonough & Strohschein, 2003). Further, women pursued jobs with lower decision latitude, though these older findings would need to be replicated with newer data (Karasek and Theorell, 1990). The analyses within this dissertation showed that women were more emotionally exhausted, whereas they were also more satisfied with their lives. The first finding may be correlated with the dual burden mothers experience when combining employment and child rearing, since parents were also more emotionally exhausted. Moreover, it was already stressed that labor structures have been differing between East and West Germany, especially regarding women. The GDR has promoted female full-time employment during German division, whereas the FRG reinforced the male breadwinner-model with legislation and welfare (Nickel, 2011; Peuckert, 2008; Pfau-Effinger, 2004). Today, the differentiation mainly applies to mothers. The employment rate among East German women is higher than among West German women (Hobler, Lott, et al., 2020), implying a higher rate of homemakers among the latter. Moreover, in the East, fewer women work part-time (Hobler, Pfahl, et al., 2020). Thus, the gender pay gap is narrower in the East and West German women are more afflicted by atypical work. Analyses on working conditions and their regional disparities should thus be further stratified by sex. It is conceivable that West German women experience worse working conditions than West German men. Similar to the first article within this dissertation, variables such as work-life balance should be integrated to include the home domain because of possible conflicts with the work domain in work stress models.

Further, previous research showed that East German companies owned by West Germans fared better regarding work complexity as well as problems in work organization than East

German companies owned by East Germans (Fay & Lange, 1997). This study could be replicated to observe if the differences are remaining. In general, additional multilevel analyses should be conducted by researchers in the future to observe the importance of such and other contextual variables, such as company size, salary structures, or annual company revenue. This way, a broader picture can be achieved to assess workplace conditions and their effects on individuals. Moreover, with three levels within the multilevel analysis, the micro, meso, and macro levels could all be implemented. Gaining a clearer picture of company structures also offers the possibility to better observe the person-environment fit. It is conceivable that by assessing the company structures individuals work in, it could be measured which structures fit which individual characteristics of employees. This way, more sound suggestions could be made for those looking for a new job.

Though workplace characteristics in their effects on employee health have been widely used to observe specific occupational groups, research comparing these groups is scarce. One of the exceptions is a study by Rigó et al. (2021) which integrated the International Standard Classification of Occupations (ISCO) and economic sectors in their analyses on work stress and found that lower occupations are related to higher work stress and higher increases of work stressors over time. Transferring this approach to comparative studies on work stress can help to further assess origins of social inequality in health. The improvement of working conditions should therefore especially be targeted in disadvantaged jobs.

Previous research found that work centrality is higher in East Germany than in West Germany (Jaufmann, 1995, 2000). Since the GDR fostered the ideal of working and its central importance in everyone's life, it is not surprising that East Germans reach higher levels of work centrality. This might be related to higher vulnerability towards stressors at the workplace, following the association in regard to commitment and vulnerability explained by Lazarus and Folkman (1984). Nevertheless, this socialization does not account for younger cohorts that were born shortly before or after unification. Research on work centrality should therefore be replicated to integrate younger cohorts. The finding that Millennials value a higher pay and job security more than older cohorts (Mahmoud et al., 2020) corroborates that differing work values can be found for different generations. It should be tested if discrepancies between East and West Germany converge for Millennials or if attitudes and values are intergenerationally transferred. At any length, following the exchange-stress model to explain health outcomes of employees in East and West Germany, individual aspects regarding personality should be further tested regarding age cohorts. Moreover, if younger cohorts value higher wages more than previous cohorts, the former should be more inclined to leave jobs with low financial rewards or advancement opportunities and should tend less to take up jobs with such conditions. The former assumption accounts for the so-called job-hopping which describes frequent job changes to either achieve advancement or leave unattractive work environments (Lake et al., 2018). Annual job change rates and levels of agreeing to job-hopping for advancement opportunities are significantly higher in younger age (Lake et al., 2018). Since job-hopping is more probable if the individuals perceive the person-environment fit as less ideal (Hall et al., 2022), employers, especially in East Germany, should consider altering their workplace environment to increase employee loyalty by accounting for younger cohorts' needs and values.

It was found that compared to West Germans, Easterners take up jobs with skill levels and prestige that are too low relative to their occupational achievements (Granato, 2011). On the one hand, this is why it is not surprising that the second article found East Germans' life satisfactions to be impacted more strongly by an increasing income. On the other hand, this is why it should be tested how status inconsistency affects the well-being of East Germans as it can be assumed that also more East Germans are afflicted by status inconsistency than West Germans. Another indicator for the possibly more frequent status inconsistency could be provided by the findings of the analyses performed for this dissertation. Though East Germans exhibited higher educational levels, West Germans gained higher wages. Status inconsistency indicates overqualified employees who do not receive the appropriate recognition proportional to the efforts they made for their education, who lack appropriate career advancement

opportunities because of the shortage of job opportunities, in general, and who are not paid proportionally to their educational degree. Overall, relatively low rewards accompany status inconsistency. However, this goes beyond mere working conditions as job opportunities are scarcer in the East than in the West, which is why in the former Eastern states, status inconsistency might occur more frequently.

Finally, both articles included data from at least ten years in the past. Working conditions might have changed in the meantime. Due to the fact that research found job-related psychological demands in terms of tight deadlines and necessary high speed at work to have risen over time (Rigó et al., 2021), there might be an ongoing shift towards worse working conditions. However, the second article within this dissertation showed improved ERI levels over time as well as ameliorated rewards. However, due to the accelerated pervasiveness of digital solutions in workplaces in course of the COVID-19 pandemic, ICT demands and technostress might have enhanced abruptly. ICT demands impact employee health by fostering exhaustion, burnout, and other adverse health outcomes (Misra & Stokols, 2012; Nastjuk et al., 2023; Ninaus et al., 2021; Shoman et al., 2021). Therefore, it is questionable how the fast digitalization of work structures has impacted employees. Future research should thus aim at integrating questionnaires on working conditions and job-related stressors more frequently.

8.4 General discussion

The literature discussion highlighted that environmental demands as well as resources impact the evaluative appraisal of stressors. Meanwhile, the afflicted employees exhibit distinct individual resources and display certain characteristics which additionally alter this evaluation. The region where those employees live influences all of these components due to different structures, history, and socialization. The findings of the two implemented studies within this dissertation supported this model. First, environmental demands such as technostress at work or poor work-life balance were confirmed to be associated with worse health. Second, the interplay between environmental and individual resources in the form of ERI decreased life satisfaction of employees. Third, environmental resources in terms of high rewards ameliorated well-being of employees. Fourth, the individual resource overcommitment attenuated well-being, whereas efforts at the job increased life satisfaction. Fifth, personality aspects or other attributes like sociodemographic variables were also associated with employee health. Sixth, several demands and resources differed between East and West Germany, explaining the lower life satisfaction in the former Eastern states of Germany and the higher emotional exhaustion levels among West Germans. Increases in income benefitted East Germans' life satisfaction more than that of West Germans. This might be another indicator that East Germans exhibit different work values due to their relative deprivation which is corroborated by the older finding that East Germans value higher wages more than Westerners (Borg & Braun, 1996b). Nevertheless, emotional exhaustion levels were lower in the East. There might be several explanations for this. First, technostress might be less prevalent in the East than in the West. Though the social pressure to be constantly available was perceived higher in the East, this might not be due to constant digital connectivity, but due to contact by phone for on-call duty or changing shifts. Since the other indicators of ICT use did not differ significantly between regions, except for West Germans receiving more e-mails during work time, technostress should be assessed in Germany again, guaranteeing a larger sample. Second, additional demands and resources could explain why emotional exhaustion was lower in East. After confirming these influences, further health outcomes can be tested.

While evaluative appraisals might follow the same mechanisms, this dissertation could confirm that the components of these mechanisms vary individually. The exchange-stress model to explain health outcomes of employees in East and West Germany portrayed an adequate model to observe the relationship between regional disparities in working conditions and individual aspects to predict health outcomes. However, the simplification of the model does not integrate consequences of poor health. As was discussed above and also implemented in the theory section, health broadly affects overall aspects in life. On the macro level, if poor working conditions lead to adverse health, social inequality is granted. A lower socioeconomic

status is related to poorer physical as well as psychosocial working conditions (Bauer et al., 2009) and more work stress (Rigó et al., 2021). Moreover, sick leaves of employees of lower social statuses take longer compared to employees of higher status (Hofreuter et al., 2008). In turn, detrimental working conditions can explain the social gradient of self-reported health in men and women in Switzerland which is why the authors suggest altering working conditions to reduce social inequality in health (Bauer et al., 2009). This is also corroborated by the finding that among 72,705 Danish employees suffering from diabetes mellitus, its pathogenesis could have been reduced by more than 33% through better working conditions (Cleal et al., 2014). When only focusing on precarious work, health implications of deleterious working conditions become even more apparent. Among other indicators, precarious work constitutes non-standard employment, incomplete unemployment, poor working conditions, low income, and social insecurity (Popov & Solov'eva, 2019). Health, social security, and material well-being diminish when entering precarious labor, while on the meso level, turnovers are more frequent, productivity is reduced, and health and safety of employees become more expensive (Popov & Solov'eva, 2019). Thus, not only individuals, but also society as a whole suffer from precarious work. It was observed that precarious work is more frequent among West Germans than East Germans (Seils & Baumann, 2019). This might be associated with the longer labor market withdrawals and reentries of mothers in West Germany compared to the East (Drahs et al., 2015) or the higher share of immigrants in the West (A. Heller et al., 2023). In the West, mothers, and especially those with multiple children, pursue precarious work more often than in the East (Schuth, 2019). Crises and challenges which entail social insecurity, such as the COVID-19 pandemic, digitalization, or climate change, also affect the labor market (Ertel et al., 2022). During the pandemic, more employees in precarious work relations have been affected by unemployment, short-time work, or loss of income (Wahrendorf et al., 2020). Therefore, observing working conditions and health inequality during crises is crucial. Since the prerequisites for health, as stated by the Ottawa Charter of 1986, are "peace, shelter, education, food, income, a stable ecosystem, sustainable resources, social justice and equity" (WHO, 1986), it becomes again apparent how important the necessary improvement and convergence of working conditions are: the analyses within this dissertation showed that social equity between East and West Germany is not given, since the East turned out to be disadvantaged regarding working conditions and economic situations. As precarious work is more frequent in West Germany and their job-related exhaustion levels were higher, the multifaceted mechanisms which are portrayed in the exchange-stress model to explain health outcomes of employees in East and West Germany should be further observed to determine influences. If a broader range of variables was implemented in one data set, a structural equation model would be a fitting approach to get a fuller picture of working conditions and their impact on employee health.

Using ERI should be of advantage over some of the other mentioned theories on work stress. While the ERI model integrates personal and environmental variables, the job demand-control(-support) model as well as the job demand-resources model only include environmental resources. Further, Siegrist (2001, p.61) claims that the ERI model and the job demand-control model exhibit diverging policy implications: "whereas the control paradigm points to the structure of power, division of labour and democracy at work, the reward paradigm addresses the issue of distributive justice and fairness". Following this stance, support and resources both account for another dimension which can hardly be altered by employers, but rather by employees themselves. However, resources in the sense of coping techniques could be fostered by employers through interventions or training. Another advantage of ERI is given by the reasoning of Hobfoll (1989) who claimed that a prerequisite for integrating demands as well as resources into a model is to also account for their balance. Following this logic, the same should be true for both integrating individual and environmental resources. The ERI model is successful at measuring this balance, yielding an advantage over other theories on work stress which do not integrate balances. Further, ERI accounts for psychological stress as defined in the COR-theory:

> "*Psychological stress* is defined as a reaction to the environment in which there is a) the threat of a net loss of resources, b) the net loss of resources, or c) a lack of resource

> gain following the investment of resources. Both perceived and actual loss of gain are envisaged as sufficient for producing stress." (Hobfoll, 1989, p. 516)

Moreover, ERI also accounts for the discrepancy models of stress, which is why it should be less conflicting. Both the job demand-control(-support) model and the job demand-resources model follow the response concept of stress. This concept has two shortcomings. First, it does not account for different stressors causing the same outcome, and second, coping efforts are not acknowledged (Sonnentag & Frese, 2012). While the two models integrate resources, their relation to job demands are not fully clear. In contrast, in the ERI model, it is possible to decrease one's efforts to achieve a fit with the rewards one receives.

Since rewards turned out to be significantly lower in East Germany compared to West Germany, there is a risk of emigration of highly qualified employees. Therefore, it is worth looking at the motives of migration in Germany. In a synthesis paper, German migrational flows between former Eastern and Western states and reasons thereof were collected (Rosenbaum-Feldbrügge et al., 2022). The higher West German wages motivated East Germans to migrate to the West from the 1990s until the early 2000s (Alecke et al., 2009; Burda & Hunt, 2001). Labor market reasons were the most frequently stated motive for East Germans in the 2000s to move to West Germany (Schultz 2009). This emigration was accompanied by highly educated people moving to the West for vocational training and attending university (Glorius, 2010). Moreover, especially labor market entrants aged 18 to 29 years migrate from East to West Germany (Stawarz et al., 2020). Thus, economic rewards in terms of pay or advancement opportunities pull East Germans to the West. Additionally, East Germans who have moved to West Germany become less inclined to return to the East with increasing time spent in the West, accompanied by occupational success and income gains (Fuchs-Schündeln & Schündeln, 2005). Therefore, East Germans move to the West to improve their labor market opportunities and tend to stay there in the long term. However, those who move to the West form a selective group. The probability of moving to the West is five times bigger for East Germans with a university degree compared to East Germans without one (Fuchs-Schündeln & Schündeln, 2005). Under this circumstance, the economic discrepancy between East and West Germany increases and the shortage of skilled labor rises in the East. In addition, social mobility is also more easily attainable in West Germany (Dodin et al., 2021) which is another reason why East Germans are economically disadvantaged if they do not move to the West. For Germany, it was estimated that 60% of the social status is transmitted intergenerationally (S. T. Braun & Stuhler, 2018). It was further found that between 1976 and 2016, the importance of one's social background in regards to social mobility has decreased, whereas it has increased in East Germany, attenuating equal opportunities (Destatis & WZB, 2018). Prospectively, economic situations would worsen in the East if labor structures and working conditions did not become more attractive. However, some East German districts have experienced more immigration than emigration in 2017, among them Leipzig and large parts of Brandenburg or Mecklenburg-Western Pomerania (Stawarz & Rosenbaum-Feldbrügge, 2020). Since the data used in the analyses within this dissertation are older than 2017, research on regional disparities regarding working conditions would benefit from more current data sets. Moreover, working conditions could be integrated in analyses on push and pull factors of internal migration. With this knowledge, it can be assessed specifically what is missing in the places of origin of qualified employees.

8.5 Possible interventions

Since the papers included in this dissertation showed that working conditions can be deleterious for employee health, interventions should focus on either helping the afflicted to cope with their distress or changing their working situation more profoundly at the meso level. Referring to the exchange-stress model to explain health outcomes of employees in East and West Germany, three different approaches could be used to reduce adverse effects of job-related stressors:

1) environmental resources could be enhanced,
2) environmental stressors (demands) could be reduced,
3) individual resources could be enhanced.

All of these steps can alter how employees evaluate stressors, possibly leading to eustress rather than distress. Some interventions to enhance environmental or individual resources will be introduced at this point as they were found to mediate effects of working conditions on health. At the beginning of this dissertation, it was mentioned that a focus on individuals can only explain acute distress, because chronic states of it originate from inferred environmental stressors (Karasek & Theorell, 1990). At this point, it can be highlighted that stressors on the meso level of companies can be reduced more easily than stressors on the macro level. However, the latter, which are formed by relative deprivation in the East, for example, keep burdening individuals even if changes on the meso level occur. Thus, following the exchange-stress model to explain health outcomes of employees in East and West Germany, economic situations in East Germany in general should be enhanced to reduce the probability of East German employees evaluating stressors as distressing. These changes need to take place, on a higher contextual level, probably through political pursuits on the macro level which later enable companies on the meso level. Nevertheless, companies could start improving their working conditions to benefit employee health. The analyses within this dissertation showed that a better work-life balance was a protective factor for exhaustion, while the social pressure to be constantly available increased exhaustion levels. In East Germany, a higher number of received e-mails during leisure time was associated with higher exhaustion. Therefore, companies could aim at reducing invasion into their employees' leisure time which should also directly improve work-life balance. Further attempts to improve work-life balance should be taken, as well. Moreover, increasing ERI and overcommitment levels diminished life satisfaction of employees. Supervisors could recognize this to raise awareness or act upon it. Since rewards also comprised immaterial recognition, supervisors could easily enhance their employees' well-being. Moreover, overcommitted employees should learn how to set healthy boundaries between their private and working lives. Besides interventions directly deduced from the findings within this dissertation, the next sections make further suggestions on why and how to account for the list above.

8.5.1 Interventions Regarding Environmental Resources

It is not only in the employees' interest to maintain good health. Employers also rely on their employees' well-being. Due to the fact that work performance suffers from poor psychological health (Ford et al., 2011), working conditions need to be acceptable from a company-oriented view, as well. Therefore, employers should be interested in offering environmental resources beneficial for their employees. Employees can be offered resources or training to change how they evaluate or act on stressors. For instance, preventive stress management enjoys wide popularity; however, the effectiveness of certain related approaches depends on committed leadership (Hargrove et al., 2011). Similar to the ERI construct, this signals the important interplay between environmental and individual resources. Stress management training can enhance psychological health and increase job satisfaction as was shown by a meta-analysis (Kroll et al., 2017). Ultimately, this environmental resource might be internalized by employees so that it becomes an individual resource.

Workplace structures also depict an environmental resource. A meta-analysis showed that flexible work arrangements proved to benefit employee psychological health and job satisfaction (Kroll et al., 2017). Further, flexible work practices boost employee well-being while attenuating turnover intentions (Ferdous et al., 2021). Moreover, flexible work hours ameliorate work-to-leisure conflict which, in turn, increases leisure satisfaction (Lin et al., 2015). In conclusion, flexible work arrangements benefit work-life-balance of employees which not only they profit from but also their employers as they do not lose as many employees to sick days or turnover. However, this model is not applicable to all kinds of jobs.

Karasek and Theorell (1990) suggest redesigning job structures to foster employee health: monitoring psychosocial factors, retrieving feedback from employees organized by health-care

professionals, or raising awareness have proved to be effective on a long-term basis. This signals that highlighting the centrality of employee health is an important environmental resource to reduce distress. The proportion of health-promoting companies is above average in former East German states (Hollederer, 2007). Therefore, it can be assumed that health awareness is better in the East compared to the West. This might be another reason why, despite their worse working conditions, East German employees are less emotionally exhausted. They might exhibit better coping mechanisms due to lived health awareness in companies.

Also referring to the environment of employees, supervisors, managers, and leaders can be sources of distress. The indicators of job-related rewards within the ERI model also refer to supervisors acknowledging their employees' efforts. Since East Germans perceived both their recognition from superiors and their recognition proportional to their efforts as lower and more burdening, especially supervisors in East Germany should work towards creating a healthy environment. As further introduced below, healthy leadership comes in many facets but is crucial for employee health. O'Neil (2001) stated that the five key elements of healthy leadership are self-knowledge, strategic action, communication, creativity, and managing change. In a meta-analysis, the core processes of healthy leadership were made out to be leaders' attitudes, behaviors, and values (Rudolph et al., 2020). Overall, healthy leadership is associated with better subjective health and job satisfaction of both leaders and employees (Lutz et al., 2023). Again, the advantage of a multilevel analysis is underlined by this finding as the association between leaders' characteristics and their employees' attributes could be measured to assess employee health. Leaders might profit from being aware of that and signaling these characteristics to their employees. Despite their relation to employee health, healthy leadership as well as health promotion in workplaces are still scarce (Koinig & Diehl, 2021) though health-oriented leadership can distinctly buffer detrimental effects of crises, such as the COVID-19 pandemic, on employee health (Klebe et al., 2021). Besides globalized employee well-being, healthy leadership is related to more distinct indicators of well-being and mental health. For example, a people-oriented leadership reduces job dissatisfaction (Størseth, 2006). Further, employees' burnout risk is lowered by leaders who encourage their followers to take care of their own health (Horstmann, 2018). Moreover, supervisor support decreases the effect of social stressors on depressive symptoms (Dormann & Zapf, 1999). However, not only mental health profits from healthy leadership, but also physical health. For example, supervisor behavior in terms of work-planning ability, conflict solving skills, and a participative leadership style benefits health by reducing the odds of musculoskeletal as well as psychosomatic symptoms (Montano, 2016). Ultimately, task performance and innovative work behavior of employees are fostered by healthy leadership (Zhang & Liu, 2022). As a study indicates that leadership style also affects the health of the leaders themselves (Erschens et al., 2022), organizations should encourage beneficial leadership styles to improve both leaders' and non-leaders well-being. Several distinct leadership styles are oftentimes discussed when it comes to healthy leadership: servant leadership (Greenleaf, 1977), transformational leadership (Burns, 1978), and authentic leadership style (George, 2003) are prominent examples. People who want to lead because of their wish to serve others' highest priority needs and not because of their wish to rule can be called servant leaders; they listen and try to understand the motives of their followers while exhibiting acceptance and empathy (Greenleaf, 1977). Transformational leaders inspire their followers to set and achieve ambitious aims, while transactional leaders base their leadership style on the reciprocal transaction between employees' performances and employers' rewards (Burns, 1978). Authentic leaders focus on moral and ethical purposes, rely on long-term relationships, and are genuine persons (George, 2003). Moreover, authentic leadership style is accompanied by higher emotional intelligence (Miao et al., 2018) and is predicted by leaders' higher well-being (Bolschakow et al., 2023). Positive leadership practices such as servant leadership, transformational leadership, and transactional leadership benefit employee productivity (Roczniewska et al., 2022; Zhou et al., 2022), work-related well-being and health (Roczniewska et al., 2022). Employees led by transformational leaders are less distressed and more satisfied with their jobs because their trust in their supervisors is higher (Perilla-Toro &

Gomez-Ortiz, 2017). In a multilevel model, it was shown that supervisors' health awareness moderates the relation between transformational leadership and employees' exhaustion as well as cynicism (Kranabetter & Niessen, 2017). The authors claim that role modeling (Bandura, 1986) of the supervisors explains the mechanism between their own health awareness and their employees' health (Kranabetter & Niessen, 2017). Comparing transformational and transactional leadership styles, the former is advantageous when it comes to employee health. Compared to transactional leadership, transformational leaders communicate better with their employees which is why the affected employees are sick less often (Elshout et al., 2013). Further, neck pain and headaches are more frequent with employees led by transactional leaders compared to transformational leaders (Christensen et al., 2021). In conclusion, organizations have the options of guiding their supervisors in terms of raising their awareness of health, leadership styles, and how they influence employee health. Another option is to select individuals to be supervisors who already exhibit characteristics beneficial for employee health or to not promote or choose those with attributes detrimental to employee well-being.

Besides the organization and leader units, the team health climate is also associated with the individual employee's health: with better team health, individual employees exhibit better physical and mental health, higher work ability, and less presenteeism (H. Schulz et al., 2017). Therefore, health awareness has overarching protective effects for employees. Moreover, H. Schulz et al. (2017) found that older employees in teams with better health showed higher work abilities than older employees in teams with worse health climates. Health awareness is thus beneficial in the long term, again being profiting for employees as well as employers. In addition to that, it can be mentioned again that team stress climate can affect the evaluative process in guiding stressors towards eustress which benefits psychological health (Kozusznik et al., 2012).

Restructuring can also be implied in a spatial way to improve employee health. For example, office designs can be observed as pathogenic or salutogenic. Light, noise, or air quality are examples of pathogenic influences on employees (Bergefurt et al., 2022). Salutogenic workplace designs have been introduced to research to create a healthy environment for employees. For example, a clear set of rules can foster comprehensibility, while specific design solutions boost manageability, social cohesion, and physical activity (Roskams & Haynes, 2019). In turn, sense of coherence promotes one's physical and mental health (Broetje et al., 2020; Roskams & Haynes, 2019). However, it was found that employees' perceptions of office designs do not always align with their intended salutogenic purpose (Forooraghi et al., 2021). Companies should thus focus on individually relevant aspects regarding sense of coherence which should be fostered by healthy designs (Forooraghi et al., 2021). Alternatively, a sense of coherence can be fostered by higher control, role clarity, and social support (Broetje et al., 2020). Moreover, when personal identity expression is emphasized, job meaningfulness increases (Roskams & Haynes, 2019). Thus, integrating employees' individual visions of a salutogenic workplace might be preferable to enforcing potentially incoherent office designs with a well-intended reason.

8.5.2 Interventions Regarding Environmental Demands

It may be difficult to reduce some job-related demands. Further, research on effects of reduced demands on employee health is scarce. One example showed that a reduced workload decreases the frequency of work-to-leisure conflicts (Lin et al., 2015). Another, and currently very prominent, approach to reduce job demands is the four-day work week. Essentially, it aims at reducing work hours that are considered full-time. Previous research found that longer work hours increase end-of-work strain which in turn diminishes life satisfaction (Matthews et al., 2012). An early experiment of the four-day week resulted in an increased amount of sick leaves, but reduced costs for employees' childcare (Catlin, 1997). Similarly, parents could spend more time with their children (Delaney & Casey, 2022). A more recent study found that even the preparation for and planning of a four-day week enhances employee engagement (Delaney & Casey, 2022). To solve tasks within a shorter time frame, employees optimized their work practices which partially led to higher distress (Delaney & Casey, 2022). As the

analysis of the second article within this dissertation showed, East Germans work significantly longer hours and are therefore disadvantaged regarding health-related consequences of longer work hours. Previous researchers found that even a few work hours per week, i.e. between one and eight hours, profit mental health and well-being for those who have not been working before, whereas they found no association between mental health or well-being and working hours above zero (Kamerade et al., 2019). Since the latter finding might be associated with the lower financial gratification of a part-time job, further experiments on reduced hours with full-time wages are needed to observe the decreased demand of working hours. Besides health, previous research also showed that the reduction of job demands is beneficial for employee productivity (Roczniewska et al., 2022). This research desideratum highlights the need to focus on job demands in future research. Not only regional disparities should be acknowledged but also which changes are beneficial for employees. Experiments are commonly used with such research questions but take time to decrease the risk of a Hawthorne effect.

8.5.3 Interventions Regarding Individual Resources

Apart from environmental resources, individual resources such as employees' efforts can be restructured to cope with stressors. If demands are evaluated as being too high, actions of the employees could be redirected to prevent them from overly suffering from their distressed situation. For instance, specific strategies can buffer the adverse effects of demands on employee health: selection, optimization, and compensation mediate the negative impact of demands on well-being (Diestel, 2022). These strategies can be defined as follows (Diestel, 2022):

1) selection: choosing and prioritizing goals,
2) optimization: allocating resources to achieve these goals,
3) compensation: generating new resources or using unused ones.

The first point was confirmed by the finding that detrimental effects of information overload are reduced by clear boundaries during leisure time and prioritizing how to handle incoming information (Arnold et al., 2023). However, most interventions focused on individuals aim at enhancing resources which accounts for the second and third point. Certain coping techniques can be learned by employees to be able to deal with distressing times by maintaining homeostasis of the system (Lazarus and Folkman, 1984). As was mentioned in the theory section, there is a distinction between emotion-focused and problem-focused coping with the first concentrating on forming a new evaluation of the stressors and the latter on resolving them (Lazarus and Folkman, 1980). In one study, it was shown that coping techniques do not lower overcommitment or distress, but only improve mental health, in general (Stauder et al., 2018). This might be an indication that emotion-focused techniques were part of the intervention. Interventions should therefore be aware of the two disparate approaches. Apart from individual strategies, psychological resources are protective factors regarding distress at the workplace. For example, the effects of external pressure are buffered by higher levels of self-compassion (Ren et al., 2021). Previous research showed that self-compassion can be enhanced in group therapies as seeing that one's problems are not unique is effective in accepting one's self (Arimitsu, 2016; Hamedani et al., 2023). Workplace interventions that increased employees' self-compassion comprise trainings on enhancing mindfulness or empathetic leadership (Lefebvre et al., 2020). Moreover, communication competence enhances self-compassion which in turn increases job satisfaction among managers (Salazar, 2022). Self-compassion helps people to better cope with illness or injuries and exhibit more resources for self-care (M. Terry & Leary, 2011). A meta-analysis confirmed that higher self-compassion is also related to higher life satisfaction (H. Wang & Lou, 2022). Future research could further focus on the role of self-compassion as a mediator of the effect of working conditions on health-related outcomes. Additionally, employees' self-compassion could be promoted via training or driven by themselves. Another protective factor is self-efficacy which boosts the effects of work control on health and job satisfaction (Jimmieson, 2000). Self-efficacy also directly increases job satisfaction as well as problem-focused coping while reducing emotion-focused coping (Chang & Edwards, 2015). Moreover, self-efficacy as well as mindfulness is associated with lower

levels of distress in employees (Yagil et al., 2023). Therefore, they have more resources to appraise stressors as less demanding. Self-efficacy can already be enhanced by physical activities such as yoga (Hewett et al., 2018) or tai chi (F. Li et al., 2001). A qualitative study also concludes that actively doing sport is associated with higher resilience to cope with distress (Götuna et al., 2021). Physical exercises turned out to be beneficial for the reduction of inflammation-related plasma molecules (Kaltenegger et al., 2021). Employers can also encourage employees to craft their tasks and reflect their work which results in increased self-efficacy (van den Heuvel et al., 2015).

Deleterious working conditions not only affect individuals but also their households. Due to spillover and crossover effects, mothers' work engagement and recovery from work are related to their children's life satisfaction via their own life satisfaction and closeness to their children (Mauno et al., 2018). On the other side, previous research has found indications for resource crossovers in the cases of self-efficacy and self-esteem (Neff et al., 2012, 2013, 2015). Both are related to problem-focused coping and attenuate distress (Terry et al., 1995). Therefore, people in close relationships support each other by offering their resources to the other part of the dyad. Thus, improving environmental or individual resources to reduce the probability of evaluating stressors negatively is crucial for the self and immediate peers. Further, interventions aiming at enhancing self-efficacy or self-esteem not only help the direct participants of the intervention but also their partners. Conflicts between work and family could be attenuated which should benefit a range of well-being indicators, such as life satisfaction, health in general (Mesmer-Magnus and Viswesvaran, 2005; Mitra et al., 2021), low exhaustion levels, as well as cynicism (Reichl et al., 2014), while increasing organizational support (French et al., 2018) and reducing organizational withdrawal behavior (Mesmer-Magnus and Viswesvaran, 2005).

Previous research also tested the effects of an online tool which uses gamification to enhance the well-being of employees ('the Wellbeing Game'; Mental Health Foundation, 2016): by incentivizing employees to connect with others, be physically active, to increase their awareness, learn new things, and give to others, the game was successful in increasing well-being of employees and in decreasing their distress levels (Keeman et al., 2017). This game is based on a report in which the five ways to well-being are presented (Aked et al., 2009). Another instance which proved that it is beneficial to base interventions on theoretical models was provided by Aust et al. (1997): relying on the ERI model, a stress management program for bus drivers was conceptualized to improve employee health. The program was successful in reducing the need for control and approval, competitiveness, and the inability to withdraw from the job. This also highlights that it is advantageous to view work stress as multifaceted mechanism in practical interventions.

8.6 **Strengths**

One strength of this dissertation lied in the critical scrutiny of the widespread usage of concepts and terms. Wording was handled mindfully to avoid using ambiguous or oversimplified terms such as 'stress' or 'burnout'. To this end, these concepts were discussed to give an overview of more correct usage. Literature reviews have shown that many researchers are using these and other ambiguous or oversimplified terms negligently.

Moreover, the analyses performed for this dissertation added to the field of work stress, especially being beneficial due to their stratification between East and West Germany to account for their differing work structures. Research that concentrates on persistent remnants of the GDR's and FRG's political systems is too scarce, as became apparent during the literature review for this dissertation. Therefore, research that attends to this desideratum should be enhanced. The two articles integrated in this dissertation should exhibit a steppingstone for future works which is why Section 8.3 on research implications was able to give a broad range of suggestions.

Further, to the author's knowledge, several analyses included in this dissertation have not been conducted before or have rarely been performed: First, emotional exhaustion levels of

employees have not been compared between former East and West German states. Second, technostress indicators have not been tested while differentiating between regions, either. Third, the association between life satisfaction and overcommitment has rarely been tested before. Fourth, the prevalence of ERI has not been estimated while discriminating between East and West beforehand. Fifth, the same holds true for overcommitment. Sixth, longitudinal analyses integrating ERI and overcommitment in their effects on life satisfaction have been rather rare. Thus, the added value does not only lie in the stratification of region, but also in methodological advancements. However, this dissertation should give an overview of missing data of regionally differing job demands to encourage others to further observe work stress models that integrate the micro, meso, and macro level.

8.7 Limitations

Since work stressors take center stage in the analyses within this dissertation, one limitation that needs to be mentioned is the subjective nature of the used methods. Respondents have provided their perceptions of stressors as well as their health and well-being. While biomarkers would be more objective measures of distress, they were not integrated in the data. However, subjective demands, efforts, and resources are adequate indicators of subjectively experienced distress. This could be expressed by the portrayed associations with health and well-being. In addition, though the measure of emotional exhaustion was correlated with the work-related burnout measure as well as job satisfaction, perceived self-efficacy, and perceived helplessness, the component personal burnout might be a less ideal indicator of employees' exhaustion than the subgroup work-related burnout. Unfortunately, the data set did not include this questionnaire. Additionally, in both articles, the duration of the observed conditions (e.g., exhaustion or ERI) was unknown. Integrating the duration of both demands and health outcomes would be beneficial for future research, as first, adverse health exhibits an additional stressor and second, the duration of stressors is an important part of the evaluative process (Lazarus & Folkman, 1984).

Moreover, since the first article within this dissertation used cross-sectional data and the second article could only integrate two time points that were five years apart, deductions on causality can only be assumed with great caution. Replications would profit from more time points. Larger sample sizes would be beneficial, as well. The first article also suffered from partially low numbers of observations due to the stratification of East and West. The power of tests might be too low which can be seen in multiple insignificant findings in the East group.

Further, selectivity biases cannot be ruled out. First, only employees were implemented in the analyses. Since health restrictions can prevent people from pursuing paid labor, analyses on job-related health problems might be underutilized. Moreover, the sample in the second article was reduced to gain a more homogeneous sample that participated in both survey waves and did not change jobs between them. In both articles, respondents with missing values were omitted.

As in any other analysis, an omitted variable bias should be mentioned as certain variables were not observed. While the second article accounted for a lower unobserved heterogeneity due to the fixed effects approach, potentially important time-varying predictors could further change the results. Further, this is also related to the missing integration of other stressors, especially potential major cataclysms and major changes, as the current model specifications only included daily hassles (Lazarus & Folkman, 1984). Major cataclysms, such as the COVID-19 pandemic, should have great influences on working situations which is why during crises, employee health should be observed. Even additional daily hassles could not be implemented in the analyses. Therefore, future research on working conditions could profit from a broader focus on stressors.

The analyses within this dissertation showed that while efforts of East Germans did not exceed those of West Germans, overcommitment levels of the former were higher. Looking at the

respective indicators is therefore appropriate. Efforts were indicated by the frequency of perceived time pressure at the job, the frequency of being interrupted during task performance, and a perceived increasing amount of work. In 2006, the amount of work was higher for East Germans compared to the West. Overcommitment was indicated by how easily employees get under time pressure, how often they ruminate about work, how easily they detach after work, how much they sacrifice for their job according to peers, how work does not let go even during leisure time, and that respondents cannot sleep if something was put off at their job. All of those aspects were more frequent in East Germany. Looking at the indicators of overcommitment more closely, four out of six items more or less address thinking about work during leisure time. Further, respondents easily getting under time pressure at the job might also indicate that they have previously procrastinated their tasks or that time-sensitive assignments are parts of their jobs, instead of indicating overcommitment. Nevertheless, making too many sacrifices for one's job inherently addresses overcommitment and is more frequent among East Germans than West Germans. This might also be considered an effort and would be a more apparent indicator of efforts than how frequently employees are interrupted at the job or that they experience an increasing amount of work. The latter only signals an effort if the respective employees in fact increased their efforts in order to handle the amount of work. Efforts might therefore be better indicated by other variables, as they resemble demands more than actual efforts. This is also supported by the finding that employees' life satisfactions did not decrease with increasing efforts although it was integrated how much they suffered from their efforts. In conclusion, an adaptation of the effort indicators might benefit research on effort-reward imbalances.

Measurement invariance of the items, accounting for potentially differing evaluations of East and West Germans, should be attempted, as well. This way it can be observed whether East Germans consider the items indicating overcommitment overburdening. Future research could also go more into depth regarding initiative at work. While the analysis of the second paper within this dissertation showed that East Germans are more overcommitted and two studies observed a higher commitment to the job in the East (Otto & Dalbert, 2012; Rigotti et al., 2007a), it was found that East Germans in 1991 portrayed lower workplace initiative (Frese et al., 1997). A thorough observation of workplace initiative in the East and how overcommitment can be measured there should be beneficial. Since East Germans socialized in the GDR deem working their duty (Schmidt, 2003), workplace initiative and overcommitment should be substantially observed in this region. In the same line, research on motivators to work should be revisited. Despite all these limitations, in contrast to the other prominent theories of work that were thoroughly discussed in the theory section, ERI follows the discrepancy concept of stress which is why it should be preferred. With a critical examination of its indicators and potential adaptations, it should become clear that it appropriately covers a combination of individual and environmental resources and demands to predict adverse health.

9 Abstract

Psychological demands on the job have been on the rise in the last decades (Rigó et al., 2021). It is therefore important to assess which demands distress employees and which resources buffer such detrimental effects. Since labor structures as well as (oftentimes economic) resources differ between the former states of East and West Germany, disparities in the process of work stress could be assumed, as well.

To this end, a theoretical model was built to explain the mechanisms of how job demands, job-related environmental as well as individual resources, and personality affect the evaluative appraisal of stressors. Stressors are then perceived as either overburdening (distress) or positively challenging (eustress) with the first fostering adverse health. All of these components are afflicted on a higher level by the region individuals live in: former Eastern or Western German states. Using this, the question should be answered how associations and effects regarding job demands and other occupational characteristics as well as employee health

differ between the former Eastern and Western states of Germany. Region-specific working conditions as well as health and well-being should thereby be emphasized.

The first article used cross-sectional data from a representative survey from 2014 (N = 1,065). For the specification of emotional exhaustion as outcome variable, the Copenhagen Burnout Inventory (Kristensen et al., 2005) was used. Technostress was indicated by several items regarding strain because of Internet use at the job, the number of received e-mails during work or leisure time, as well as the perceived social pressure to be constantly available. With that and the inclusion of sociodemographic variables, environmental job demands and personality could be observed in their association with mental health. Results were compared between citizens of the former Eastern and Western states of Germany. An ordinary least squares regression was performed to predict emotional exhaustion. Additionally, region in East or West Germany was added as a variable in the next step to observe regional differences of the predictors. In the second article, 3,848 respondents at two time points (2006 and 2011) of the German Socio-Economic Panel were observed. Life satisfaction as a component of subjective well-being (Diener et al., 1999; Fergusson et al., 2015) served as dependent variable. Siegrist's (1996) effort-reward imbalance at work model indicated participants' working conditions. Overcommitment and personal net income served as additional crucial predictors. Besides sociodemographic variables, job-related environmental and individual resources as well as personality could be assessed in their associations with well-being. A within-between model was estimated to include both fixed and random effects separately. Additional interaction terms between region in East or West Germany and ERI, overcommitment, as well as personal income gave insights into further regional differences.

Two studies confirmed the hypothesized mechanisms of the theoretical model, portraying how East and West Germans diverged in job-related demands while exhibiting different levels of resources. Region as macro level impacts the process of job-related stress genesis. While the first article highlighted that the prevalence of observed job demands indicated by technostress was inconsistently distributed between East and West, West Germans exhibited higher levels of emotional exhaustion. This might be a consequence of the finding that West Germans' exhaustion levels showed a stronger association with technostress indicators compared to East Germans. It also signals that East and West Germans appraise stressors differently since the components leading to this appraisal diverge, as well. The second article presented the findings that East Germans received fewer rewards within their work domain, resulting in higher imbalances between such rewards and their accomplished efforts compared to West Germans. Further, East Germans turned out to be more overcommitted to their work, indicating an unhealthy number of sacrifices to their jobs. East Germans thus receive fewer environmental resources and exhibit more detrimental individual resources through overcommitment. This could partially explain the lower life satisfaction in East Germany compared to West Germany. Moreover, compared to West Germans, East Germans' life satisfaction could be more strongly improved by increasing personal incomes. Again, this indicates a differing appraisal of stressors between regions. With an increased environmental resource via personal income, East Germans were less afflicted by job demands. This underlines that job-related rewards (especially in the form of personal income) should be increased to improve East Germans' working conditions, thereby enhancing social and health-related equity between the former states of East and West Germany. In general, the observed job demands as well as low individual or environmental resources and their disparate exchange were associated with adverse health symptoms and lower well-being. Therefore, the importance of both environmental and individual resources for employee health was confirmed. Regional disparities and peculiarities regarding work structures and job characteristics should be further highlighted in future research on occupational health.

10 References

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11 Appendix

Appendix A. ERI and overcommitment in former Western and Eastern states across time.

	West (n = 2,992)		East (n = 968)	
	2006	2011	2006	2011
	N (%)/	N (%)/	N (%)/	N (%)/
Variable	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Experience with Efforts and Rewards (Dummy)				
Efforts				
Frequent time pressure	1,956 (65.37%)	1,927 (64.41%)	654 (67.56%)	624 (64.46%)
Interruptions	1,780[t] (59.49%)	1,892[t] (63.24%)	539 (55.68%)	570 (58.88%)
Increasing amount of work	2,109[r] (70.49%)	2,047 (68.42%)	638[r] (65.91%)	651 (67.25%)
Rewards				
Recognition from superiors	1,979[r] (66.14%)	1,910[r] (63.84%)	560[r] (57.85%)	531[r] (54.86%)
Recognition prop. to efforts	1,920[r] (64.17%)	1,828[r] (61.1%)	557[r] (57.54%)	524[r] (54.13%)
Career advancements prop. to efforts	1,818[r] (60.76%)	1,805 (60.33%)	541[r] (55.89%)	549 (56.71%)
Pay prop. to efforts	1,514[tr] (50.6%)	1,707[tr] (57.05%)	340[tr] (35.12%)	415[tr] (42.87%)
Bad chances of promotion (rev.)	1,061[r] (35.46%)	1,122 (37.50%)	282[r] (29.13%)	332 (33.26%)
Expected worsening (rev.)	2,116[t] (70.72%)	2,317[t] (77.44%)	668[t] (69.01%)	723[t] (74.69%)
Job insecurity (rev.)	2,501[tr] (83.59%)	2,687[tr] (89.81%)	761[tr] (78.62%)	841[tr] (86.88%)
Perceived Burden Regarding Efforts and Rewards (low burden = 0, high burden = 3)				
Efforts				
Frequent time pressure	1.43 (0.68)	1.45 (0.68)	1.47 (0.68)	1.46 (0.65)
Interruptions	1.37 (0.74)	1.39 (0.73)	1.40 (0.71)	1.39 (0.69)
Increasing amount of work	1.37[tr] (0.75)	1.44 (0.74)	1.46[r] (0.74)	1.47[t] (0.71)
Rewards				
Recognition from superiors	1.10[t] (0.75)	1.15[tr] (0.79)	1.14 (0.71)	1.11[r] (0.78)
Recognition prop. to efforts	1.09 (0.71)	1.17 (0.76)	1.16 (0.66)	1.08 (0.67)

Career advancements prop. to efforts	1.10 (0.74)	1.06 (0.77)	1.09 (0.68)	1.02 (0.71)
Pay prop. to efforts	1.34^{r} (0.74)	1.35^{r} (0.75)	1.45^{r} (0.74)	1.47^{r} (0.74)
Bad chances of promotion (rev.)	2.00^{tr} (0.90)	2.09^{tr} (0.88)	2.09^{tr} (0.86)	2.20^{tr} (0.86)
Expected worsening (rev.)	1.28 (0.77)	1.31 (0.75)	1.21 (0.73)	1.31 (0.73)
Job insecurity (rev.)	1.17 (0.83)	1.27 (0.84)	1.07 (0.83)	1.22 (0.81)
Overcommitment				
Easy time pressure	1.45^{t} (0,85)	1.40^{tr} (0.84)	1.49 (0.84)	1.46^{r} (0.80)
Ruminating about work	1.19^{r} (0.94)	1.21^{r} (0.93)	1.36^{r} (0.90)	1.32^{r} (0.88)
Easy to switch off after work (rev.)	1.27^{r} (0.91)	1.230^{r} (0.90)	1.43^{r} (0.85)	1.44^{r} (0.86)
Too many sacrifices	1.27^{r} (0.92)	1.28^{r} (0.93)	1.42^{r} (0.87)	1.39^{r} (0.84)
Work seldom lets go	1.20^{r} (0.90)	1.17^{r} (0.88)	1.34^{r} (0.86)	1.30^{r} (0.86)
No sleep if something was put off	0.28^{r} (0.53)	0.28^{r} (0.54)	0.34^{r} (0.59)	0.33^{r} (0.56)
Sum Scores				
Efforts Sum	7.33 (3.06)	7.24 (3.11)	7.38 (3.17)	7.35 (3.13)
Rewards Sum	22.01^{tr} (5.40)	22.47^{tr} (5.39)	20.83^{tr} (5.42)	21.56^{tr} (5.37)
ERI Sum	0.85^{tr} (0.27)	0.83^{tr} (0.26)	0.89^{tr} (0.31)	0.86^{tr} (0.28)
OC Sum	7.31^{r} (3.71)	7.28^{r} (3.82)	8.14^{r} (3.53)	8.00^{r} (3.60)
Mean Individual Changes between 2006 and 2011				
Δ Efforts		-0.09 (3.18)		-0.03 (3.09)
Δ Rewards		0.46 (5.60)		0.74 (5.84)
Δ ERI		-0.03 (0.31)		-0.03 (0.33)
Δ OC		-0.03 (3.59)		-0.14 (3.26)

Note. Superscript letters indicate significant differences ($p < .05$) between 2006 and 2011 (^{t}) or East and West within the respective year (^{r}) as estimated by a post-hoc χ2-test or TukeyHSD post-hoc test. ERI = effort-reward-imbalance, rev. = reversed, OC = overcommitment, prop. = proportional, Δ = change between 2006 and 2011. Internal consistency: effort: 2006: Cronbach's α = .69, McDonald's Ω = .70, 2011: Cronbach's α = .70, McDonald's Ω = .70; reward: 2006: Cronbach's α = .71, McDonald's Ω = .71, 2011: Cronbach's α = .73, McDonald's Ω = .72; overcommitment: 2006: Cronbach's α = .79, McDonald's Ω = .78, 2011: Cronbach's α = .80, McDonald's Ω = .80.

Appendix B. Full model including the results of the within-between model predicting life satisfaction.

	Est.	LB 95% CI	UB 95% CI
Fixed effects			
ERI fixed effects	-0.38***	-0.55	-0.22
Overcommitment fixed effects	-0.06***	-0.07	-0.04

Personal Net Income (log.) fixed effects	0.11	-0.08	0.29
work hours (fixed, random:),	-0.00	-0.02	-0.00
occupational status (ISEI-88)	-0.00	0.00	0.01
Random effects			
ERI random effects	-.21***	-.25	-.17
Overcommitment random effects	-.41***	-.46	-.37
Personal Net Income (log.) random effects	.21***	.15	.28
East Germany random effects	-.12*	-.22	-.02
Work hours	-.00	-.03	.02
occupational status (ISEI-88)	.06	-.03	.02
Female sex (ref = male)	.13	.03	.22
Age (centered)	-.11	-.15	-.07
Education (CASMIN)	.06	.01	.12

Note. Number of observations = 3,848; data from 2006 and 2011 were used; stars indicate significance levels (* p < .05, ** p < .01, *** p < .001); unstandardized results are presented for fixed effects, standardized results are presented for random effects; Pseudo-R^2 (fixed effects) = .10, Pseudo-R^2 (total) = .49; Est. = estimation, LB = lower bound, UB = upper bound, CI = confidence interval, ERI = effort-reward imbalance, log. = natural logarithm.

Appendix C. Efforts and rewards predicting life satisfaction separately.

	Est.	LB 95% CI	UB 95% CI
Efforts fixed effects	0.02*	0.00	0.04
Efforts random effects	.01	.00	.06
Rewards fixed effects	0.05***	0.04	0.06
Rewards random effects	.45***	.11	.16

Note. Number of observations = 3,848; data from 2006 and 2011 were used; stars indicate significance levels (* p < .05, ** p < .01, *** p < .001); unstandardized results are presented for fixed effects, standardized results are presented for random effects; results of other variables: overcommitment (fixed: Est. = -0.03, LB = -0.04, UB = -0.01, random: Est. = -.18, LB = -0.08, UB = -0.02), logarithmized personal net income (fixed: Est. = 0.06, LB = -0.12, UB = 0.23, random: Est. = .15, LB = -.02, UB = 0.03), work hours (fixed: Est. = 0.00, LB = -0.01, UB = 0.01, random: Est. = -.02, LB = -0.03, UB = 0.03), occupational status (ISEI-88) (fixed: Est. = 0.00, LB = -0.01, UB = 0.01, random: Est. = .07, LB = -0.02, UB = 0.02), East Germany (random: Est. = -.14, LB = -.24, UB = -.05), female sex (random: Est. = .11, LB = 0.01, UB = 0.20), centered age (random: Est. = -.11, LB = -0.14, UB = -0.07), education (CASMIN (random: Est. = .06, LB = 0.00, UB = 0.11); Pseudo-R^2 (fixed effects) = .17, Pseudo-R^2 (total) = .51; Est. = estimation, LB = lower bound, UB = upper bound, CI = confidence interval.

Appendix D. Interaction terms between efforts, rewards, and region predicting life satisfaction.

	Est.	LB 95% CI	UB 95% CI
Efforts* East Germany	-0.00	-0.04	0.04
Rewards*East Germany	0.02	-0.01	0.03

Note. Number of observations = 3,848; data from 2006 and 2011 were used; stars indicate significance levels (* p < .05, ** p < .01, *** p < .001); efforts and rewards were z-standardized; models include efforts, rewards, overcommitment, personal net income, actual work hours, occupational status, region, sex, age, and level of education; Pseudo-R^2 (fixed effects) = .17, Pseudo-R^2 (total) = .51; Est. = estimation, LB = lower bound, UB = upper bound, CI = confidence interval.

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