

**The Mediating Effect of Work-Family Spillover on the Relationship
between Occupational Fatigue and Turnover Intentions: A study of
Norwegian Nurses during the COVID-19 pandemic**

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Abstract

While historically being viewed solely in a context of stress, the last 20 years have seen scholars taking an interest in the positive side of work-family spillover. The present thesis studied both negative and positive work-to-family and family-to-work spillover among Norwegian nurses during the COVID-19 pandemic. As frontline employees, nurses spend more time with patients than any other type of healthcare worker, especially during the pandemic. The purpose of the present thesis was to study relationship between nurses' occupational fatigue and turnover intention during the COVID-19 pandemic, and whether this relationship is mediated by both negative and positive work-to-family and family-to-work spillover. The theoretical framework of this study is the job demands-resources theory, which provides a framework that enables the theorizing of influences on the investigated variables. The study is based on cross-sectional data collected from 937 Norwegian nurses, and the results from the parallel multiple mediation analysis supported the assumption that occupational fatigue has a positive relationship with turnover intention. Furthermore, the results showed that both positive work-to-family spillover and negative work-to-family spillover mediated the relationship between fatigue and turnover intention. Thus, the present study was successful in drawing conclusions that were, to an extent, in agreement with previous studies, as both negative and positive work-to-family spillover was found to influence turnover intentions, while neither negative nor positive family-to-work spillover was found influencing turnover intention. These findings are in line with what is referred to as the “*matching-domain*” hypothesis in work–family research.

Key words: Occupational fatigue, work-to-family spillover, family-to-work spillover, turnover intention, job demands-resources theory, cross-sectional study

Sammendrag

Tidligere har studier på jobb-familie-spillover utelukkende blitt studert i en stresskontekst, men de siste 20 årene sett forskere begynt å interessere seg også for de positive sidene av jobb-familie-spillover. Denne oppgaven studerte både negative og positiv spillover fra arbeid til familie/familie til arbeid blant norske sykepleiere under COVID-19-pandemien. Som frontlinjearbeidere bruker sykepleiere mer tid med pasienter enn noen annen type helsepersonell, spesielt under pandemien. Hensikten med denne studien var å studere forholdet mellom sykepleieres yrkesrelaterte utmattelse og turnoverintensjon under pandemien, og om dette forholdet er mediert av både negativ og positiv spillover fra arbeid til familie og fra familie til arbeid. Det teoretiske rammeverket for denne studien er jobbkrav-ressursteorien, som gir et rammeverk som muliggjør teoretisering av de undersøkte variablene. Studien er basert på tverrsnittsdata samlet inn fra 937 norske sykepleiere, og resultatene fra den parallelle multipelmedieringssanalysen støttet antagelsen om at yrkesrelatert utmattelse har en positiv sammenheng med turnoverintensjon. Videre viste resultatene at både positiv arbeid-til-familie-spillover og negativ arbeid-til-familie-spillover medierte sammenhengen mellom arbeidsrelatert utmattelse og turnoverintensjon. Dermed var denne studien vellykket i å trekke konklusjoner som delvis er i samsvar med tidligere studier, ettersom både negativ og positiv spillover fra arbeid til familie ble funnet å påvirke turnoverintensjoner, mens verken negativ eller positiv familie-til-arbeid-spillover ble funnet å påvirke turnoverintensjon. Disse funnene er i tråd med det som omtales som "*matchende-domene*"-hypotesen i arbeid-familieforskning.

Nøkkelord: Yrkesrelatert utamttelse, spillover fra arbeid til familie, spillover fra familie til arbeid, turnoverintensjoner, jobbkrav-ressursteori, tverrsnittsstudie

Preface

Writing this master's thesis has been a personal journey of discovery, as we delved into the intricacies of occupational fatigue, work-family spillover, and turnover intention. We were motivated to explore this topic due to the recent pandemic, which, in our experience, had left people struggling with balancing work and family responsibilities while coping with job-related stress and fatigue.

As we dove deeper into the literature and conducted our research, we realized the significance of understanding the mediating role of work-family spillover in the relationship between occupational fatigue and turnover intention. We are excited to contribute to the existing body of knowledge on employee well-being, job satisfaction, and organizational behavior.

Throughout the process, our thesis supervisor, Prof. Puneet Kaur, and co-supervisor, Prof. Anette Harris, provided unwavering support and guidance, offering invaluable feedback and expert knowledge that helped us shape our research and thesis into its final form. We are grateful for their mentorship, which not only helped us navigate the research process but also contributed to our personal and professional growth.

We would also like to express our heartfelt appreciations to the participants who generously shared their experiences and perspectives, without whom this study would not have been possible. The current thesis represents the culmination of our efforts, and we hope that it contributes to the ongoing discourse on employee well-being, and helps organizations develop strategies to retain healthcare workers.

We would also like to thank PhD Candidate Ingebjørg Louise Rockwell Djupedal for ideas for the thesis and the data used in the study.

Bergen, April 21th

Olai Hilland and Benjamin Bjørseth

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Abbreviations

OF	Occupational fatigue
TI	Turnover intention
NWFS	Negative work-to-family spillover
PWFS	Positive work-to-family spillover
NFWS	Negative family-to-work spillover
PFWS	Positive family-to-work spillover
JD-R	Job Demands-Resources

1 INTRODUCTION

This section introduces the background, research question, objectives, key concepts, and study design and context of the present thesis.

1.1 Background

The importance of organizations retaining a skilled workforce cannot be understated. Qualified workers bring stability, growth, productivity, and intellectual capital, both in terms of current employees and by creating an attractive workplace for future potential employees (Li & Jones, 2013). This is especially true for nurses, as nurses not only are facing challenging working conditions on a daily basis (e.g., death, trauma, shift work, night work, fear; e.g., Buja et al., 2013; Lee & Jang, 2020; Steege et al., 2015; Stimpfel et al., 2012), but are an essential component in a functioning healthcare system as it is dependent on a qualified and sufficiently staffed (as opposed to under-staffed) nurse workforce (Fosse & Birgit, 2023). Furthermore, nurses comprise the largest constituency of Norway's healthcare system with 96.000 in 2021 (45.000 of these were hospital nurses; Bakke & Hjemås, 2021). Thus, staffing shortages might lead to a severe loss in a given hospital's capacity to care for patients.

The last couple of decades have seen significant problems with nurse shortage, due to high rates of turnover and low retention rates (Aiken et al., 2012). For instance, a recent meta-analysis investigating the global prevalence of turnover intention among intensive care nurses reported a turnover intention rate of 27,7% in the more than 23.000 nurses in the 23 different countries investigated (Xu et al., 2021). Other studies have found turnover intention rates ranging from 15-44% (Alotaibi, 2008; Duffield et al., 2014; Roche et al., 2015), with actual turnover rates in some Western countries ranging from 15-27%% (Kerzman et al., 2020; Nelson-Brantley et al., 2018; Roche et al., 2015). The emphasis on nurse turnover in the literature is further indicated by the vast amount of studies investigating the topic (e.g., Flinkman et al., 2008; Hasselhorn et al., 2008; Heinen et al., 2013; Jourdain & Chênevert, 2010; Lavoie-Tremblay et al., 2011; Li et al., 2011; Liu et al., 2012; Ma et al., 2009; Stordeur & D'Hoore, 2007; van der Heijden et al., 2010; van der Heijden et al., 2009; Yildiz et al., 2021).

Turnover is problematic in several ways. Firstly, turnover in nursing is a substantial economic burden. In her two-part review of the cost of nurse turnover, Jones (2004, 2005) found turnover to cost the organization between 0.3 and 1.6 times a yearly nurse salary, whereas Waldman et al. (2004) found turnover to account for more than 5% of one hospital's operating budget. Furthermore, nations spend a large portion of their budgets on health care, as health care spending makes up between 8-17% of a given country's GDP (Aiken et al., 2014). Thus,

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high rates of turnover leads to high amounts of tax-funded spending, leading to a potentially substantial impact of any excess cost in the sector. Second, turnover has been found to affect patient outcomes. Research on outcomes of turnover and insufficient staffing have found them to impact quality of care (Antwi & Bowblis, 2018; Huang et al., 2021), patient satisfaction (Bae et al., 2010) and patient mortality (Antwi & Bowblis, 2018; Needleman et al., 2011; Needleman et al., 2020). These findings reveal that not only is turnover detrimental to healthcare organizations but can also affect patients negatively.

Third, nurses themselves are negatively affected by turnover. Common antecedents of turnover in nursing (e.g., high work demands, shift work, quick returns, workplace stress, fatigue, burnout) have been linked to negative well-being outcomes (e.g., burnout, fatigue, shift-work disorder; Al Ma'mari et al., 2020; Dall'Ora et al., 2020; Dall'Ora et al., 2015; Flo et al., 2012). This indicates that not only are workplaces experiencing the negative benefit of turnover, but the nurses themselves are experiencing adverse well-being outcomes. Lastly, while a functioning healthcare system, given its current rate of turnover, have the capacity to handle normal everyday demand, extraordinary circumstances such as natural calamities, war, terrorist attacks, and most recently, a global pandemic, put immense pressure on hospitals, with an increase inpatient volume, acute patients, lack of space, degree of severity, and longer and more frequent shifts (Bhatla & Ryskina, 2020; Finkelstein et al., 2021).

In March 2020, the World Health Organization (WHO; World Health Organization, 2020) declared COVID-19 a global pandemic. The virus' rapid spread resulted in an unprecedented crisis and a severe challenge to the international community, including notable deaths, substantial pressure on the healthcare system, and immense social and economic disruptions (Pappa et al., 2020; Wang et al., 2020a). As frontline employees, nurses spend more time with patients than any other type of healthcare worker, leaving them vulnerable to potential adverse health outcomes (Butler et al., 2018). Indeed, research examining the impacts of the COVID-19 pandemic on the nursing profession is fast emerging (e.g., Chung et al., 2022; Djupedal et al., 2022; Labrague & Santos, 2021; Lavoie-Tremblay et al., 2022; Marvaldi et al., 2021; Rodríguez-Rey et al., 2020; Spoorthy et al., 2020; Vanhaecht et al., 2021; Wang et al., 2020a; Wang et al., 2020b).

The emerging research related to nurses during the COVID-19 pandemic reveal an increase in nurses' adverse work-related outcomes (e.g., Labrague & Santos, 2021; Marvaldi et al., 2021; Rodríguez-Rey et al., 2020; Spoorthy et al., 2020; Vanhaecht et al., 2021). For instance, Huang et al. (2020) reported that the stress levels experienced by nurses caring for

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COVID-19 patients were associated with work-to-family spillover and increased workloads due to increased healthcare demands and new policies and procedures to follow. Furthermore, several studies have found an increase in nurses' levels of ill-health during the COVID-19 pandemic, such as occupational fatigue (Abdoli et al., 2021), burnout (Sikaras et al., 2022), stress (Pappa et al., 2020), as well as depression and anxiety (Labrague & Santos, 2021; Pappa et al., 2020; Wang et al., 2020b). Additionally, research on performance indicators have indicated a negative trend during the COVID-19 pandemic, finding a decrease in quality of care (Lavoie-Tremblay et al., 2022), work engagement (Wu et al., 2021), as well as an increase in intention to leave the organization (Lavoie-Tremblay et al., 2022; Mirzaei et al., 2021).

The COVID-19 pandemic has not only affected nurses' work life. As was the case with the public at large, nurses were spending more time at home and with their families, due to society-wide lockdowns, including the closing of bars, concert venues, and other places for social gatherings, coupled with limitations on social contacts (i.e., a limitation of number of people in social gatherings), as well as a massive increase in work- and school-from-home (Biroli et al., 2021; Office for National Statistics, 2022). Prior research on nurses suggests a relationship between different work stressors or demands and work-family spillover, meaning that factors in an individual's work life can affect family- or home life (for a review, see Byron, 2005). Furthermore, the conflict that arises from this spillover have been linked to intentions to quit (see e.g., Blomme et al., 2010; Haar, 2004; Jia & Li, 2022). Additionally, scholars have found that the same is true in the opposite direction, namely that family- or home life can affect work life (see e.g., Bellavia & Frone, 2005; Lim et al., 2021; Macewen & Barling, 1994).

Considering this, the successful management of potential future pandemics seems highly dependent on the retention of nurses. Moreover, this is not only relevant for crises such as pandemics, but it can be any crisis-related situations, such as war, terrorism, or natural calamities such as earthquakes, that will impact the need for healthcare workers and their workload. With more time being spend with the family and at home during the COVID19 pandemic, possibly leading to spillover between work and family as well as family and work, an investigation into the role of work-family spillover on the relationship between strain-related factors at work and nurses' intention to quit, seems warranted. Thus, the present thesis will investigate the relationship between nurses' occupational fatigue and intention to leave the job and how work-to-family and family-to-work spillover mediate this relationship.

1.2 Research Questions and Objectives

The present thesis aims to better understand the relationship between nurses' occupational fatigue and turnover intention during the COVID-19 pandemic through the interaction between the work and the home domain. Previous research has investigated either the negative or the positive aspects of work-family spillover in isolation (e.g., Ilies et al., 2007; Jia & Li, 2022; Kelly et al., 2014; Netemeyer et al., 1996). Furthermore, research indicates that work-family spillover influences the relationship between occupational fatigue and turnover intentions, as studies have found occupational fatigue to predict work-family spillover (see e.g., Ilies et al., 2015; Jansen et al., 2003) and work-to-family spillover to be a predictor of turnover intention (see e.g., Anderson et al., 2002). Thus, to extend the research field, the present thesis will investigate both positive and negative work-to-family and family-to-work spillover.

The main research question of the thesis is to understand the role of work and family spillover between nurses' occupational fatigue and intentions to leave their jobs. Additionally, the present thesis includes two sub-questions to better understand how the different concepts related to each other.

RQ1: *How does positive or negative spillover from work to family affect the relationship between nurses' occupational fatigue and intention to leave the job?*

RQ2: *How does positive or negative spillover from family to work affect the relationship between nurses' occupational fatigue and intention to leave the job?*

1.3 Key Concepts

The key concepts used in the present thesis include (a) occupational fatigue, (b) turnover intention, (c) negative work-to-family spillover, (d) positive work-to-family spillover, (e) negative family-to-work spillover, and (f) positive family-to-work spillover. Definitions of the key concepts are listed in Table 1.

Occupational fatigue occurs when an individual is unable to recover adequately from strain caused by work-related demands (Åhsberg, 2000). Occupational fatigue can be both acute (i.e., short-lived and a signal of need for recovery; Dawson et al., 2011) and chronic, with the latter occurring as a result of consistent and prolonged exposure to work-related stressors without adequate recovery (Winwood et al., 2007). Occupational fatigue has been linked to ill health (Zhan et al., 2020) and turnover among nurses (Kelly et al., 2021). It is closely related to exhaustion (Bakker et al., 2008a), burnout (Maslach et al., 1996), and chronic fatigue syndrome (van Dijk & Swaen, 2003). Occupational and work-related fatigue are used

interchangeably in the literature. In the context of the present thesis, occupational fatigue occurs because of excessive job demands (i.e., an overweight of job demands compared to job resources).

Turnover intention is the conscious intention of an employee to quit their current job. It is often considered a multi-stage process (i.e., thought of quitting, searching for other jobs and intention of quitting; Carmeli & Weisberg, 2006) and has been shown to lead to actual turnover (Kaur et al., 2013). Theoretically, the greater the turnover intention, the greater the likelihood of that person leaving their job. It is usually considered to entail a temporal element where the intention to leave is an intent regarding the near future (Ngo-Henha, 2018). Several types of work-related strains have been linked to an increase in turnover intention, such as fatigue (e.g., Lee & Jang, 2020), burnout (e.g., Poku et al., 2022), shift work (e.g., Blytt et al., 2022), and occupational stress (e.g., Piotrowski et al., 2022), as well as work-to-family spillover (e.g., Na & Kim, 2016). Also referred to as “*intention to quit*” (Firth et al., 2004), “*intention to change job*” (Andresen et al., 2017), or “*intention to leave*” (Chan et al., 2009). In the context of the present thesis, turnover intention is used in its commonly understood form: the conscious intention of an employee to quit their current job.

Negative work-to-family spillover (WFS), a part of the Work-Family Interface (Kinnunen et al., 2006), is a concept regarding the conflict that occurs when role pressures in the work and family domains are incompatible, leading to a spillover effect from one to the other, causing stress in the home, such as marital conflict (Carlson & Frone, 2003). Role stress theory explains these processes and outcomes in the literature (Greenhaus & Beutell, 1985). Also referred to as “*work-home conflict*” (Bedeian et al., 1988), “*work-home stress*” (Burke, 1993), “*work-family interference*” (Donders, 2005), “*negative work-home interference*” (Sok et al., 2014) or “*negative work-to-home spillover*” (Lott, 2020). “*Family*” and “*home*” are used in the literature to entail the same concept and are used interchangeably. Negative work-to-family spillover has been linked to an increase in turnover intention (Huffman et al., 2014; Haar, 2004). Negative work-to-family spillover is shown to affect turnover intention (Boamah & Laschinger, 2016) and to be caused by strain (Bakker et al., 2008a). In the context of the present thesis, negative work-to-family spillover is understood as having to do with stress spilling over from the work to the home domain.

Positive work-to-family spillover, a part of the Work-Family Interface (Kinnunen et al., 2006), refers to the enhancement of one's performance in the home domain due to a spillover effect from the work domain (Carlson & Frone, 2003). These processes are grounded in role

enhancement theory, where the quality of the role in one domain enhances the quality of the role in the other (Greenhaus & Powell, 2006). Also referred to as “*work-home enhancement*” (Gordon et al., 2007), “*work-home enrichment*” (Greenhaus & Powell, 2006), “*work-home facilitation*” (Hill, 2005) or “*positive work-home interference*” (Sok et al., 2014). “*Family*” and “*home*” are used in the literature to entail the same concept and are used interchangeably. Positive work-to-family spillover has been found to influence turnover intention (Aboobaker & Edward, 2020). In the context of the present thesis, positive work-to-family spillover is understood as having to do with a resource surplus in the work domain that spills over to the home domain.

Negative family-to-work spillover (FWS), a part of the Work-Family Interface (Kinnunen et al., 2006), is a concept regarding the conflict that occurs when role pressures in the home domain are incompatible with the work domain, leading to a spillover effect from one to the other, such as lowered job performance (Carlson & Frone, 2003). Role stress theory explains these processes and outcomes in the literature (Greenhaus & Beutell, 1985). They are also referred to as “*negative family interfering with work*”, “*home-work conflict*”, “*home-work stress*”, or “*negative home-work interference*”. As with negative work-to-family spillover, “*family*” and “*home*” are used in the literature to entail the same concept and are used interchangeably. Negative family-to-work spillover has been linked to turnover intention (Huffman et al., 2014; Haar, 2004). In the context of the present thesis, negative family-to-work spillover is understood as having to do with stress spilling over from the home to the work domain.

Positive family-to-work spillover, a part of the Work-Family Interface (Kinnunen et al., 2006), refers to the enhancement of one's performance in the work domain due to a spillover effect from the home domain (Carlson & Frone, 2003). These processes are grounded in role enhancement theory, where the quality of the role in one domain enhances the quality of the role in the other (Greenhaus & Powell, 2006). They are also referred to as “*positive family interfering with work*”, “*home-work enhancement*”, “*home-work enrichment*”, “*home-work facilitation*” or “*positive home-work interference*”. Positive work-to-family spillover has been found to mediate turnover intention and work engagement (Sung & Yoo, 2018). In the context of the present thesis, positive work-to-family spillover is understood as having to do with a resource surplus in the family domain that spills over to the work domain.

1.4 Study Context

The present thesis uses data collected as a part of the HeWoS project (Towards a sustainable workforce in the healthcare sector for the 21st Century: Health-promoting Work Schedules). The need for healthcare workers is expected to increase in the future, yet currently, there is a high degree of absence due to sickness and high turnover rates among healthcare workers (Harris, 2022). The HeWoS project is meant to identify effective and health-promoting work schedules to maintain the health and well-being of healthcare workers and to ensure a sustainable workforce in the healthcare sector for the future (Harris, 2022).

The main goal of the HeWoS project is to see the effect of removing quick returns (i.e., less than 11 hours between work shifts) from nurses' working schedules on a whole host of different outcomes (e.g., turnover intention, job satisfaction, work engagement, occupational fatigue). For the purpose of the present thesis, baseline data collected in January 2021 will be used. The variables include demographic data, data relating to work position and work location, as well as data on turnover intention, occupational fatigue, and work-family spillover.

1.5 Theoretical Framework

The theoretical framework of the present thesis is the Job Demands-Resources (JD-R) theory (Bakker & Demerouti, 2017). The JD-R theory describes how job demands and job resources influence job performance or organizational outcomes, either through a health-impairment process or a motivational process (Bakker & Demerouti, 2017). A relatively recent theory, originating at the turn of the century, its foundation consists of influential organizational models and theories such as the Job-Demands Control model (Karasek, 1979), the Effort-Reward Imbalance model (Siegrist, 1996), the Conservation of Resources theory (Hobfoll & Shirom, 2001), and the Job Characteristics theory (Hackman, 1980). A model of the theory can be found presented in Figure 1.

The reason for choosing JD-R theory as the present thesis' theoretical framework is threefold. Firstly, it is a widely popular and researched theory (its spawning article cited over 3000 times in peer reviewed work) seeking to encapsulate both negative and positive aspects of work-life. Secondly, the present thesis' authors wanted to explore the underlying mechanisms proposed by the theory in more detail. This is to expand knowledge within JD-R's theoretical framework. Bakker and Demerouti (2017) themselves have called for more research on the underlying mechanisms of how demands and resources translate to strain and motivation, encouraging exploration of *how* variables influence each other, rather than *when*.

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Table 1.

Key concepts of this study.

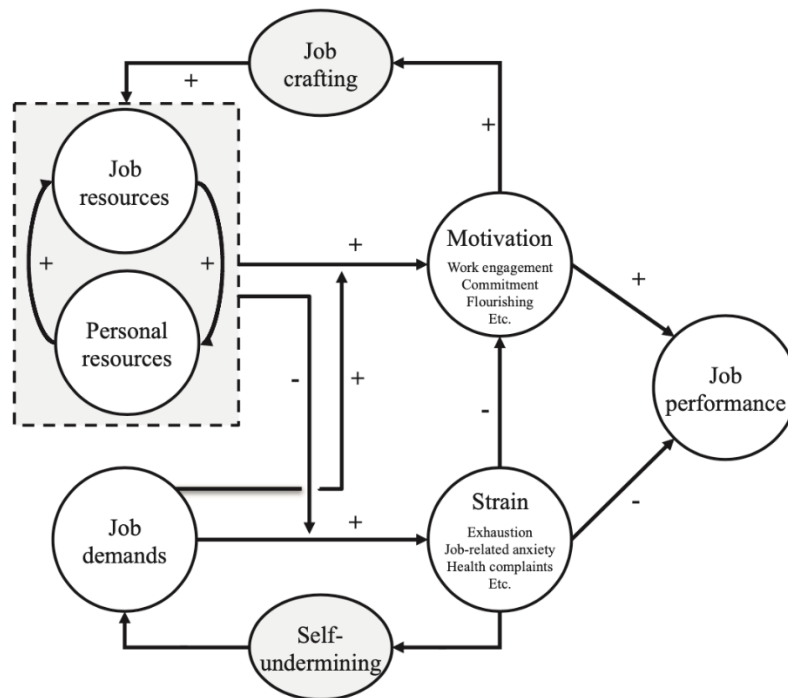
Concepts	Definition	Reference
Occupational fatigue	A perceived state of a lack of one or some combination of sleepiness, lack of energy, strained, weary, caused by exertion due to demands at work, and a subsequent lack of recovery.	Dawson et al. (2011); Phillips (2015); Åhsberg (2000)
Turnover Intention	An individual's subjective estimation of the likelihood of leaving their job.	Carmeli and Weisberg (2006); Ngo-Henha (2018)
Negative work-to-family spillover	A type of negative spillover of stress from work to the home or the family because participation in one role is made more difficult by participation in the other role.	Greenhaus and Beutell (1985); Kinnunen and Mauno (1998)
Positive work-to-family spillover	A positive spillover effect from work to the home or the family explained by role enhancement theory, where the quality of the role in the work domain enhances the quality of the role in the family domain.	Barnett (1998); Greenhaus and Powell (2006); Kelly et al. (2014); Kinnunen et al. (2006)
Negative family-to-work spillover	A type of negative spillover of stress from family or the home to work because participation in one role is made more difficult by participation in the other.	Greenhaus and Beutell (1985); Kinnunen and Mauno (1998)
Positive family-to-work spillover	A type of positive spillover effect from the home or the family to one's work because the quality of the role in the family domain enhances the quality of the role in the work domain.	Barnett (1998); Greenhaus and Powell (2006); (Kinnunen et al., 2006)

Seeing as the strain and motivational process have been vastly researched Bakker and Demerouti (2017); (Bakker et al., 2014; Bakker et al., 2004; Bakker et al., 2008b; Hakanen et al., 2008; Hopstaken et al., 2015; Hopstaken et al., 2016; see e.g., Xanthopoulou et al., 2007; Xanthopoulou et al., 2013), the present thesis aims at investigating the theory's lesser explored relationship, namely the relationship between strain and job performance. On top of this, rather than using the more common approach concerning JD-R theory of testing moderators (the *when* in a given relationship – for whom or under what circumstances does X exert its effect on Y, and when it does not), the present thesis seeks to test mediators (the *how* in a given relationship – pertaining to testing through which mechanisms X exerts its effect on Y) (Hayes, 2022).

Third, the JD-R theory provides a framework that enables the theorizing of influences on the investigated variables. For instance, in the present thesis, occupational fatigue is viewed as strain, while turnover intention is viewed as a job performance indicator. JD-R provides an explanatory framework to account for the antecedents of occupational fatigue experienced by nurses during COVID-19. The present thesis argues that nurses experienced a high than usual load of job demands (i.e., workload) without sufficient resources to buffer the effects of these demands during the pandemic, leading to occupational fatigue (described as strain in Figure 1). The present thesis primary aim is to investigate *how* nurses' occupational fatigue (strain) exerts its effect on turnover intention (Job performance), by testing four types of work-family spillover as mediators on the abovementioned relationship.

Figure 1

The Job Demands-Resources model, retrieved from Bakker and Demerouti (2017).



1.6 Structure of the Thesis

The structure of the present thesis is divided into six sections. The first section is an introduction to the thesis, which states the study's background, motivation, research objectives and questions, key concepts, and theoretical framework. The second section focuses on the thesis' theoretical backgrounds. A review of the relevant literature is presented to provide a deeper understanding of the topic, primarily focusing on prior research on occupational fatigue, turnover intentions, and work-family spillover. The present thesis' hypotheses are then

presented. In the third section, the method of the present thesis is presented, including information on research design, sample, study variables, data collection and planned analyses. The reliability and validity of the study variables are then examined. The fourth section presents the results and subsequent findings of the quantitative analysis. The fifth section contains the discussion, seeking a deeper understanding of the findings and answering the thesis' research questions and hypotheses. Theoretical and practical implications of the thesis' findings are then presented, followed by its limitations, strengths, and future directions. The final section present thesis's conclusion, summarizing the findings.

2 THEORETICAL BACKGROUNDS

The following section introduces the current thesis' theoretical background, key concepts, and hypotheses. The focus of this section is to present previous research and key literature relevant for the thesis. The first part introduces the Job Demands-Resources theory (Bakker & Demerouti, 2017), which is the theoretical framework of the present thesis. A review of the literature of the thesis' key concepts are then presented, including an account of their application in the thesis, followed by the thesis' hypotheses and their rationale.

2.1 Job Demands-Resources Theory (JD-R theory)

The theoretical background of the present thesis is the JD-R theory. A lot of research has been done in the previous 40 years on how the characteristics of one's job influence employee health (Bakker & Demerouti, 2017). The JD-R theory aims to incapsulate this research into one unified theory to explain organizational related outcomes, both positive and negative. This sets the JD-R theory apart from other theories, who's main foci have been on work's negative impact on employee well-being (Van den Broeck et al., 2013).

Healthcare organizations are inherently stressful organizations (Montgomery et al., 2011). Health professionals make critical decisions under time pressure, help patients who may be in life threatening conditions, and face emotionally demanding interactions (Montgomery et al., 2015). For nurses working in hospitals, this is even more demanding as they have less work autonomy, less career development opportunities, and less alternatives for career change (Aiken et al., 2001). The impact of occupational fatigue and job engagement in hospitals and the nursing profession, and how this relates to turnover intention, can be understood through the JD-R model, which posits that every work context can be described in terms of job demands and job resources (Montgomery et al., 2015). At its core, job demands and job resources lead to organizational outcomes through either strain-related factors (e.g., exhaustion or fatigue) or

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factors related to motivation (e.g., job satisfaction or work engagement; Bakker & Demerouti, 2017). Thus, the relationship between the predictor(s) and subsequent outcome(s) are mediated by concepts relating to motivation or strain.

According to JD-R theory, job demands refer to the physical, psychological, social, and organizational factors that are required to perform a job, which can be taxing or challenging for the individual (Bakker & Demerouti, 2007). Examples of job demands are high work pressure or emotionally demanding work (Sonnetag & Zijlstra, 2006). Job resources, on the other hand, refer to the physical, psychological, social, and organizational factors that can help individuals cope with job demands and enhance their well-being outcomes (Bakker & Demerouti, 2017). Examples of job resources are autonomy and social support (Bakker et al., 2005). The relationship between job demands and well-being outcomes is moderated by the availability of job resources. Specifically, when individuals have access to sufficient job resources, they are better able to cope with job demands and, as a result, experience positive well-being outcomes; this is referred to as a motivational process (Bakker & Demerouti, 2017). However, when individuals lack access to sufficient job resources, they may experience negative well-being outcomes such as burnout, job dissatisfaction, and subsequently, turnover intentions. This is referred to as a strain process (Bakker & Demerouti, 2017).

JD-R theory proposes eight distinct features or processes regarding work-life. Firstly, all characteristics of a job can be divided into job demands or job resources. Secondly, job demands and resources initiate two distinctly different processes; a strain process and a motivating process (Bakker & Demerouti, 2014, 2017). Job demands predict exhaustion and burnout, while job resources predict work engagement. The third proposition is that job resources can moderate the effect of job demands on exertion (Bakker & Demerouti, 2017). This means that if employees have enough resources available, they will buffer the impact of job demands on strain (Bakker & Demerouti, 2017). The fourth proposition is that job resources are particularly motivating and effective when combined with high job demands (Bakker & Demerouti, 2017). The motivating effect of job resources thus becomes stronger when job demands are high (Bakker & Demerouti, 2014, 2017). The fifth proposition is that personal resources can play the same role as job resources. Personal resources (e.g., self-efficacy, organizational-based self-esteem, and optimism; Xanthopoulou et al., 2009) deal with the belief employees have in their own control over their work environment, and thus, personal resources will have a direct positive effect on work engagement (Xanthopoulou et al., 2009). The sixth proposition is that motivation has a positive effect on performance, while exertion will have a negative effect on performance.

Motivated employees are goal-oriented and have the energy to carry out their tasks. Exhausted employees, on the other hand, do not have the energy to carry out their tasks and will thus find it more difficult to perform (Bakker & Demerouti, 2014, 2017).

A later edition to JD-R theory – *job crafting* – is the notion that employees might proactively change their jobs in order to make the job more meaningful (Bakker & Demerouti, 2017). The term was first coined by Wrzesniewski and Dutton (2001), and is defined by Tims et al. (2012, p. 174) as “*the changes that employees may make to balance their job demands and job resources with their personal abilities and needs*”. Thus, proposition seven states that motivated employees are likely to utilize job crafting behaviours, leading to an increase in job and personal resources, which in turn lead to increased motivation. This is referred to as a *gain spiral*. The same has been applied to the health-impairment process, where employees who experience a lot of job demands risk creating more job demands over time (Zapf et al., 1996). This is referred to as a *loss spiral*. This type of self-undermining behaviour (stressed employees creating more job demands over time) can create obstacles and might undermine performance (Bakker & Demerouti, 2017). This leads to the JD-R theory’s final proposition: Employees who are strained by their work are more likely to engage in self-undermining behaviours, which can lead to an increase in job demands, and subsequently higher levels of job strain.

2.1.1 Previous Research on JD-R theory

Research has supported the JD-R theory by showing that job demands and job resources are related to well-being outcomes such as burnout (e.g., Rothmann & Joubert, 2007; Van den Broeck et al., 2017), job satisfaction (e.g., Han et al., 2020; Nielsen et al., 2011), and turnover intentions (e.g., Babakus et al., 2008; Scanlan & Still, 2019). Further, JD-R theory has been supported in studies within healthcare environments (Meirun et al., 2020; Montgomery et al., 2015; van der Heijden et al., 2019; Viotti et al., 2015). A meta-analysis of studies examining the relationship between job demands and well-being outcomes found that job demands were positively associated with burnout and negatively associated with job satisfaction and turnover intentions (Bakker et al., 2004). All in all, research have found that most characteristics of one’s job can be categorized as either resources or demands, in that they have a relationship with either strain or motivation, supporting JD-R’s first proposition (for an extensive list of job demands and resources, see Schaufeli & Taris, 2014). Another meta-analysis by Nahrgang et al. (2011) found that job demands and resources related to safety outcomes via a health impairment process and a motivational process, supporting JD-R second proposition. Additionally, a recent meta-analysis

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investigating longitudinal studies found that job resources were positively associated with job satisfaction, organizational commitment, and well-being (Lesener et al., 2019).

Studies have also found job resources to have a buffering effect on the impact of job demands on strain. For instance, Xanthopoulou et al. (2007) found that autonomy, social support, feedback and opportunity for professional development could buffer the relationship between emotional demands, patient harassment, workload, and physical demands and burnout, lending support to JD-R's third proposition. In addition to this, Bakker et al. (2010) found that 88% of interactions between the investigated job demands and resources were statistically significant.

In line with Hobfoll et al. (2018) and JD-R's fourth proposition, it has been found that job resources are particularly effective when needed (i.e., in the face of job demands, job resources are especially potent). Bakker et al. (2007) and Hakanen et al. (2005) found job resources to be more predictive of work engagement when job demands were high compared to when they were not.

However, JD-R's fifth proposition, the notion that personal resources can play a similar role to job resources, have seen limited support by research. For instance, Xanthopoulou et al. (2013) found that self-efficacy related positively to work engagement, especially when emotional demands and emotional dissonance were high. However, the same was not true for optimism, thought of as a personal resource. Bakker and Demerouti (2017) have called for more research to be done on the topic.

The literature furthermore provides ample support for the notion that motivation has a positive effect on job performance, while strain has a negative effect. This is in support of JD-R's sixth proposition. A meta-analysis by Taris (2006) found burnout to be negatively linked to performance. In addition, Bakker et al. (2008b) found that exhaustion negatively predicted objective performance. Regarding the motivational aspect of JD-R, research has shown job resources to positively predict work engagement, finding better financial results on days with access to more job resources (Xanthopoulou et al., 2009) and engaged individuals performing better on demanding tasks (Hopstaken et al., 2015; Hopstaken et al., 2016).

Research has also shown that the availability of job resources can moderate the relationship between job demands and well-being outcomes. Bakker et al. (2014) found that the relationship between job demands and burnout was weaker for individuals with high levels of job resources compared to those with low levels of job resources, suggesting that individuals with high levels of job resources are better able to cope with job demands and experience less burnout. Burnout was found to be negatively related to working safely and that work

engagement related positively to motivation, which in turn related positively to working safely. Furthermore, job crafting have been found to increase work engagement (Vogt et al., 2015), job satisfaction and to decrease level of burnout (Bakker et al., 2012).

On the other hand, work pressure has been found to predict exhaustion, which in turn has been found to predict work pressure (Demerouti et al., 2004). Specifically Demerouti et al. (2009) found that nurses reporting high job demands reported higher levels of burnout. Additionally, Bakker and Wang (2020) found self-undermining to be positively related to emotional demands and work pressure. They also found self-undermining to relate positively to exhaustion as well as negatively predicting supervisor rating and job performance. This indicates that employees who create confusion, conflict and stress subsequently create more job demands, lending support to JD-Rs seventh and eight propositions regarding gain and loss spirals.

2.1.2 Application in Thesis

The application of JD-R theory in the present thesis, is to create a backdrop explaining the theoretical mechanisms underlying occupational fatigue. As well as acting as a template for the proposed research model, while also investigating how job demands and resources affect the relationship between strain and outcome. Whereas JD-R theory's main focus is the causes of strain and motivation, and the interaction effects of job demands and resources, the current thesis proposes that job demands and resources can mediate the relationship between strain (occupational fatigue) and organizational outcomes (turnover intentions). In this context, positive work-family and family-to-work spillover are seen as job resources and negative work-to-family and family-to-work spillover are seen as job demands. To the best of the authors' knowledge, the relationships investigated in the present thesis (how fatigue effects turnover intention, mediated by four types of work-family spillover) are not previously investigated in the context of JD-R theory.

2.2 Key Concepts of this Study

2.2.1 Occupational Fatigue

If an individual is unable to recover adequately, they may experience fatigue. According to Dawson et al. (2011) fatigue is a common, almost universal, feature of modern life. The term “*fatigue*” is used in many different areas, and currently there is no single definition (Phillips, 2015). However, several definitions in the research literature are closely related to dictionary definitions in that fatigue is described as a subjective feeling, experience, sense or awareness that is akin to tiredness (Phillips, 2015). Di Milia et al. (2011) holds that fatigue can be defined as a

feeling or state of weariness, tiredness, or lack of energy. Other scholars holds that fatigue has to do with inadequate recovery, stemming from work-related stressors (see Dawson et al., 2011; Härmä, 2006) or lack of sufficient sleep (Dawson et al., 2011).

According to Åhsberg (2000) fatigue is one of the most common words used to describe negative effects of work. Fatigue has historically been treated as something that can stem from physical (e.g., Åstrand et al., 2003) or mental work (e.g., Reid & Nygren, 1988). However, conditions other than mental and physical can affect an individual's general state, such as sensory load (Grandjean, 1988), time of day (Folklard, 1983), psychological (Eysenck, 1983) and physical environment (Gamberale & Holmér, 1976), and person-related characteristics (Wendt & Palmerton, 1976). To better understand and investigate the antecedents and outcome of fatigue, Åhsberg and Gamberale (1998) developed The Swedish Occupational Fatigue Inventory (SOFI). SOFI is a scale measuring fatigue, consisting of five subscales including (a) lack of energy, (b) lack of motivation, (c) sleepiness, (d) physical exertion and (e) physical discomfort. The SOFI encompasses most of the key elements of fatigue found in the literature (see e.g., Dawson et al., 2011; van Dijk & Swaen, 2003; Åhsberg, 2000; Åhsberg et al., 2000).

Fatigue is considered to be either acute or chronic (see e.g., Mohren et al., 2007). Acute fatigue is short-lived and signals that the individual needs recovery (e.g., the fatigue an individual experiences at the end of their working day; van Dijk & Swaen, 2003). Occupational fatigue occurring over the long term, without sufficient rest or recovery, can lead to chronic fatigue, a severe state of tiredness, and may result in physical problems such as digestive complaints and mental health disorders such as depression, as well as performance problems (van Dijk & Swaen, 2003). Occupational fatigue, then, can be considered a condition stemming from lack of recovery as a result of work-related demands or strains.

Prior Research. Several studies have found that increased levels of fatigue can have adverse consequences on the work environment (Querstret & Cropley, 2012). Previous studies have found that occupational fatigue affects physical and cognitive functions as well as mood and motivation (Williamson et al., 2011), as well as being linked to decreased vigilance, reaction times, memory, decision-making and information processing (Lyznicki et al., 1998). Fatigue in nurses has been linked to medication errors (e.g., administration of the wrong dose of a medication), increase in risk of workplace accidents (Åkerstedt et al., 2004), decreased productivity, cognitive impairment, and increased risk of work-related injuries (Kunert et al., 2007; van Dijk & Swaen, 2003).

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Job demands such as workload and shift work have been found to be important antecedents for fatigue (e.g., Alarcon, 2011; Buja et al., 2013; Dorrian et al., 2011; Grech et al., 2009; Maslach et al., 2001; Moos, 1988; Parhizi et al., 2013; Robert et al., 1990; Steege et al., 2015), with a higher workload leading to greater subjective fatigue (Dorrian et al., 2011; Grech et al., 2009). Workload has been found to be associated with shift work, a very common practice in the health care sector in which nurses typically are involved in rotating shift work and nonstandard work schedules (Moos, 1988; Robert et al., 1990). Fixed day shifts has been defined as work shifts that begin between 7:00 and 9:00 in the morning, while shifts beginning at any other time has been classified as rotating shifts (Chang & Peng, 2021). Studies have also found a positive relationship between workload and occupational fatigue across health-care work environments (Schneider, 2012; Van Bogaert et al., 2013).

Both high workload and fatigue have been found to result in performance impairments in daily work (Fan & Smith, 2017). Baulk et al. (2007) examined the relationship between workload and objective/subjective fatigue among employees work rotating shifts, finding that an increase in fatigue was associated with a higher workload. Shift work characteristics such as the duration of the daily and weekly working hours, quick returns (less than 11 hours between shifts, usually an evening shift followed by a morning shift; Hakola et al., 2010) and the number of consecutive night shifts (Garde et al., 2019) are deemed detrimental to nurses' health (Culpepper, 2010; Dall'Ora et al., 2015; Flo et al., 2012; Ki & Choi-Kwon, 2022; Vedaa et al., 2019; Vedaa et al., 2017a; Vedaa et al., 2017b).

A study among Belgian nurses found that an uneven workload for nurses was an underlying problem during the COVID-19 pandemic and a significant risk factor for burnout (Khan et al., 2022), of which occupational fatigue has been identified as one of the crucial indicators (Rose et al., 2017). A high risk of burnout was found in 70% of respondents. The main risk factors of burnout were lack of personal protective equipment, changes in perceived workload and working with COVID-19 patients (Khan et al., 2022). (Bakke & Hjemås, 2021) found hospital nurses to work more during the pandemic. Similarly, Falatah (2021) found an increase in the demand and workload on nurses during the COVID-19 pandemic. Specifically, the study found that the number of critical cases, the uncertainty about the disease, and the rate of death from the disease imposed increased psychological stress. Considering the issues of stress, fatigue, and turnover among nurses even before the pandemic, the pandemic might have amplified such issues (Falatah, 2021).

Application in this Study. In the present thesis, fatigue is considered a result of lack of recovery from different job demands, and thus represents strain in the JD-R framework.

2.2.2 Turnover Intention

According to Carmeli and Weisberg (2006) turnover intention refers to three elements of a withdrawal cognition process; (i) the thought of quitting the job, (ii) the intention to search for a different job, (iii) the intention to actually quit. The present thesis views turnover as a multi-stage process involving employees' voluntary departure from their current position. According to Takase (2010) the intention to quit can be triggered by negative psychological responses to organisational, work, and external job situations in association with employees' personal dispositions. These psychological responses evolve into withdrawal cognition and behaviours, which eventually can lead to actual turnover or psychological withdrawal from their jobs (Ngo-Henha, 2018). Actual turnover has been classified into three different categories: turnover, desired turnover and unwanted turnover (Ellett et al., 2007). Inevitable turnover might be someone leaving due to old age. Desired turnover may be incompetent employees leaving the organization, and is the opposite of unwanted turnover where competent and talented employees choose to terminate the employment relationship without this being desirable on the part of the employer (Ellett et al., 2007). Unwanted turnover is associated with several negative organizational outcomes, such as the cost of hiring (Bae, 2022), effect on team or group (Hayes et al., 2006), reduction in capacity or decline in performance (Hayes et al., 2006).

The terms turnover intention, turnover intent, intention to leave and intention to quit, are used synonymously to describe the likelihood that an employee will quit his or her job in the near future (Ngo-Henha, 2018). It is further used in connection with an employee's intention to either quit working life (e.g., retirement), switch to another job in the same or different organization or quitting the profession entirely (Ngo-Henha, 2018).

Prior Research. Studies indicate that the COVID-19 pandemic may have led to an increase in the proportion of nurses considering leaving their job (see e.g., Djupedal et al., 2022; Falatah, 2021; Lavoie-Tremblay et al., 2022; Nashwan et al., 2021). For example, a study by Nashwan et al. (2021) found nurses to report significantly higher turnover intention during the COVID-19 pandemic compared to before the pandemic. In accordance with Nashwan and colleagues' findings, Lavoie-Tremblay et al. (2022) found that large proportions of frontline nurses caring for COVID-19 patients reported high intention to leave their current health care setting or even the profession. Furthermore, a study by Djupedal et al. (2022) on Norwegian nurses during the pandemic found that changes in work schedule related to the pandemic was

associated with higher turnover intention. Increase in quick returns and long workdays emerged as especially problematic in terms turnover intention.

Previous studies have identified a variety of variables that influence nurses' turnover intention (see e.g., Brunetto et al., 2016; Labrague et al., 2020; Labrague et al., 2018). Individual factors found to influence turnover intention among nurses include age, education, work experience, gender and marital status (e.g., Chegini et al., 2019; Labrague et al., 2018). Organizational factors found to be related to turnover intention include lack of team support, lack of organizational support, lack of job autonomy, inadequate staffing and a negative work climate (Khan et al., 2019). Furthermore, psychological stress and emotional exhaustion have been found to be precursors of nurses' turnover intention (Labrague et al., 2018; Yang et al., 2017). Stressors commonly identified in the workplace include higher work workloads, a lack of professional competence, complex patient conditions, a lack of resources and personal and professional concerns (Labrague et al., 2018; Zhou & Gong, 2015).

Further, Job satisfaction is identified as one of the most important drivers of nurses' turnover intention and is considered to be one of main predictors of actual turnover (De Simone et al., 2018b; Labrague et al., 2020; Labrague et al., 2018). Previous studies have identified important sources of job satisfaction that affect turnover intention among nurses, including pay, interpersonal relationships, career advancement opportunities, leadership style and job autonomy (De Simone et al., 2018b; Labrague et al., 2020; Labrague et al., 2018).

Whereas research has shown that turnover has negative effects on several organization-level outcomes across the general workforce, there are factors specific to the nursing field that justify the importance of studying the antecedents of nurse turnover specifically (Nei et al., 2015). Firstly, there are certain characteristics of nurses' work that make nursing more exposed to turnover than other occupations (e.g., workload and shift work) (Nei et al., 2015). Labrague et al. (2020) suggest using JD-R theory to understand turnover intention. In particular, the critical role of certain job demands, such as high workload and high levels of work-life spillover, in influencing job attitudes and work outcomes in nurses (Labrague et al., 2020; van der Heijden et al., 2019; Van der Heijden et al., 2018; Wan et al., 2018).

Secondly, nursing already suffers from a high rate of turnover as it is (see e.g., Labrague et al., 2020; Nei et al., 2015). High rates of turnover in nursing does not only affect the nurses themselves, but also colleagues and the quality of care, meaning a potential worsening in patient outcomes. Indeed, turnover among nurses have been found to influence quality of care and several patient outcomes, such as increased patient mortality and increased infection rates

(Aiken et al., 2014; Coomber & Barriball, 2007; Nei et al., 2015). Meanwhile, lower rates of nurse turnover have been associated with positive patient outcomes (Chang et al., 2019). Additionally, nurse turnover has been shown to negatively impact the ability to encounter patients' needs and deliver high standards of care, while also leading to insufficient staffing, increasing the workload and stress on remaining staff (Kaddourah et al., 2018).

Application in this Study. In the present thesis, turnover is seen as avoidable instances of employees quitting their job, meaning, instances where an employee originally wanted to maintain their current position but decided to leave due to negative aspects of their work, work characteristics or work environment.

2.2.3 *Work-Family Spillover (WFS)*

Work-family spillover refers to the interference the work domain can have with the home domain or vice versa (Kinnunen et al., 2006). More specifically, it arises from role stress theory and the idea that role expectations from a set of roles interfere with the other to create negative stress (see e.g., Rothbard, 2001). Research supporting the role stress theory maintain that multiple social roles are most commonly apprehended as a burden on the individual (Nordenmark, 2004). A central assumption within the role-stress theory is that high levels of demands in everyday life create stress (Nordenmark, 2004). While historically being viewed solely in a context of stress, the last 20 years have seen scholars taking an interest in the positive side of Work-Family Interface Kelly et al. (2021), taking inspiration from role enhancement theory (Barnett, 1998). The role enhancement theory states that the quality of one's role in one domain can enhance the quality of one's role in another. The role enhancement theory argues that having multiple roles is beneficial for the individual, where the positive effects of having a strong engagement in both work and family life outweigh the possible stressful effects on well-being (Nordenmark, 2004).

The concept of work-family spillover has changed over time, as researchers have acknowledged the direction of interference. Work-family spillover has increasingly been recognised as consisting of two distinct, though related, concepts: Work-to-family spillover (WFS), which arises when work interferes with family life, and family-to-work spillover (FWS), which occurs when family life interferes with work (De Simone et al., 2018a). Kinnunen et al. (2006) further presents four subsets of work-family spillover: negative work-to-family spillover (NWFS), positive work-to-family spillover (PWFS), negative family-to-work spillover (NFWS) and positive family-to-work spillover (PFWS). Other terms have been used for roughly the same concepts, such as conflict (see e.g., Bacharach et al., 1991; Bellavia & Frone, 2005) and

interference (see e.g., Demerouti et al., 2004) for negative spillover, and enrichment (see e.g., Greenhaus & Powell, 2006; McNall et al., 2010), enhancement (see e.g., Gordon et al., 2007), or facilitation (Tammelin et al., 2017; Vitale et al., 2015) for positive spillover. Kinnunen et al. (2006) uses the term “interference” instead of “spillover”, however in accordance with previous studies the present thesis uses the term “spillover” to describe both positive and negative interference between family and work/work and family (see e.g., Sahay & Wei, 2023; Tsukerman et al., 2020).

Prior Research. Research indicates that work-to-family spillover is more common than family-to-work spillover. Findings have indicated the two concepts to not be highly correlated, and there to be a conceptual difference between the two, as well as a difference in prevalence, predictive power, and outcomes (e.g., Carlson & Frone, 2003). Kinnunen and Mauno (1998) found that FWS was best explained by family domain variables (e.g., number of children living at home) and that WFS was best explained by work domain variables (e.g., shift work). Negative family-to-work spillover was found having negative consequences on family well-being, and negative work-to-family spillover on occupational well-being (Kinnunen & Mauno, 1998). Kinnunen and Mauno’s findings were supported Lidwall et al. (2009) and Väänänen et al. (2008), who found that both men and women in Sweden and Finland respectively, experienced WFS more than FWS. However, these findings were contrary to the results of previous studies from other European countries where women reported more work-to-family spillover than men (e.g., Duxbury et al., 1994; Frone et al., 1992b; Gutek et al., 1991). Strandh and Nordenmark (2006) suggests that this is due to the similar working conditions and family-friendly policies in Sweden and Finland, coupled with the fact that both countries are highly work-oriented societies where both men and women are expected to have professional careers.

With regards to antecedents of work-family spillover, job demands such as workload has been found to positively predict work-family conflict. For instance, Tayfur Ekmekci et al. (2021) found that workload predicted work-family conflict, arguing that Hobfoll et al.’s (2018) COR theory and Edwards and Rothbard’s (2000) resource drain theory accounted for the association between workload and work-family conflict. Resource drain theory refers to the phenomenon that when limited resources (e.g., time and energy) are transferred from one domain to another, available resources in the original domain decrease (Edwards & Rothbard, 2000). Chakravorty and Singh (2020) found that both negative FWS and negative WFS were positively associated with occupational fatigue, with WFS having a stronger association with occupational fatigue than

FWS. Additionally, Innstrand et al. (2008) found both FWS and WFS to have strong associations with fatigue.

Research also suggests work-family spillover to be particularly relevant to nursing. Broetje et al. (2020) found in their review of previous reviews of nursing in a JD-R context, work-family spillover to be one of three key job demands nurses facing. Shift work, scheduling and work hours interfering with non-work life were the biggest contributors to work-family spillover (Broetje et al., 2020). Indeed, the link between shift work and work-family spillover is already well established in the literature (e.g., Keyko et al., 2016; McVicar, 2016). For instance, long work hours have been identified as a risk factor for negative spillover between work and family, especially for negative work-to-family spillover (Grandey & Cropanzano, 1999; Kinnunen & Mauno, 1998; Netemeyer et al., 1996). However, there are also findings indicating that long working hours can relate positively to both positive FWS (Grzywacz & Marks, 2000) and positive WFS (Grzywacz et al., 2002) for women. These relationships leading to positive outcomes has by Kinnunen et al. (2006) been attributed to the quality of one's job, as long working hours may be associated with full-time jobs, and with better job characteristics than part-time jobs.

Application in this Study. The present thesis uses work-family spillover to describe spillover between the work domain and family domain and vice versa. Furthermore, the present thesis studies both negative and positive spillover, by using the Work-Family Interface, consisting of (a) negative work-to-family spillover (NWFS), (b) positive work-to-family spillover (PWFS), (c) negative family-to-work spillover (NFWS) and (d) positive family-to-work spillover (NFWS) (Kinnunen et al., 2006). Work-family spillover denotes all four types of spillover as one concept, whereas work-to-family and family-to-work spillover denotes spillover effects from work to family and family to work respectively. Additionally, negative work-family spillover denotes both types of negative spillover, whereas positive work-family spillover denotes both types of positive spillover.

2.3 Research Hypotheses

2.3.1 The Relationship Between Occupational Fatigue and Turnover Intentions

Several studies have highlighted the relationship between occupational fatigue and turnover, finding that occupational fatigue and burnout can precede turnover (e.g., Dall'Ora et al., 2020; Kelly et al., 2021). For instance, Kelly et al. (2021) found that 54% of the nurses surveyed experienced moderate levels of burnout. The impact of burnout on organizational turnover was significant, with an increase in turnover for each unit's increase on the emotional

exhaustion scale. Burnout, sharing many precedents with occupational fatigue, is characterized by both exhaustion and withdrawal (Schaufeli & Taris, 2005).

Further, occupational fatigue is found to be a predictor of turnover intention in previous studies. For instance, Rutledge et al. (2021) found that chronic occupational fatigue was the strongest predictor of turnover intentions compared to job satisfaction and acute fatigue in a study on hospital nurses. Ki and Choi-Kwon (2022), studying shift-work nurses, found that sleep disturbance and fatigue were associated with both turnover intentions and actual turnover. Furthermore, Lee and Jang (2020) found fatigue to have direct effect on turnover intentions, indicating that if nurses' fatigue increases, their turnover intentions increase as well. Previous literature has also revealed that fatigue affects nurses' physical and mental health, which interferes with their daily and social functioning (Jang, 2013; Yu & Lee, 2018). Additionally, Labrague et al. (2020) found that nurses' accumulated fatigue to causes health problems, decreases job satisfaction and quality of life, and to be an important cause of job turnover. Similarly, in a survey of South Korean nurses about 10% of those working shift work listed health problems as the main cause of turnover (Korea Hospital Nurse Association, 2018).

Although hospitals require services and staffing around the clock, there are differences in workload intensity between day- and night work. To cover the need for staff at all times, work is organized in shifts (i.e., day, evening and night shifts of different durations), which in turn are organized into schedules (Garde et al., 2019). Female nurses often have greater difficulty adapting to rotating shift work, given that they may bear the heavy burden of household chores besides work (Tammelin et al., 2017; Vitale et al., 2015). For this reason, their turnover intention may increase if they cannot smoothly transition between their work and family roles (Yildiz et al., 2021).

Based on the theoretical outline given so far, we have formulated the following hypothesis:

***H₁:** There is a positive relationship between occupational fatigue and turnover intentions among nurses during the COVID-19 pandemic.*

2.3.2 Mediating Influence of Work-family Spillover

The Relationship Between Occupational Fatigue and Work-Family Spillover. Both negative work-to-family spillover (NWFS) and negative family-to-work spillover (NFWS) have been found to be positively associated with fatigue (Allen et al., 2000; Netemeyer et al., 1996; Wang et al., 2012). For instance, Wang et al. (2012) found both NWFS and NFWS to be

positively related to emotional exhaustion and cynicism, which are both indicators of fatigue and burnout.

Several work- and family-related factors have been associated with work-family spillover (Jansen et al., 2003). Examples of work-related factors associated with work-family spillover are having a full-time job, work schedule inflexibility, shift work, a high quantitative workload, and lack of social support (Jansen et al., 2003). Other studies have identified work-family spillover to be associated to fatigue, poor job performance, job dissatisfaction and turnover intentions (Allen et al., 2000; Erdamar & Demirel, 2014; Netemeyer et al., 1996). Because work-family spillover has been linked with insufficient energy, it is likely that work-family spillover is associated with need for recovery and fatigue (Jansen et al., 2003). Need for recovery represents short term effects of work and can be defined as the need to recuperate from work-induced fatigue, primarily experienced after a day of work (Jansen et al., 2003). Need for recovery from work can be recognized in the off-work situation by feelings of "wanting to be left alone" or "having to lie down". Repeated insufficient recovery from work is related to ill-health and also found to be related to fatigue (Jansen et al., 2003).

Whereas there is research to indicate a relationship between occupational fatigue and negative work-family spillover, the authors of the present thesis are not aware of any research on the relationship between occupational fatigue a positive work-family spillover. Thus, the investigation of these a-paths (a2 and a4, see Figure 2) can be considered exploratory and to some extent, novel.

The Relationship Between Work-Family Spillover and Turnover Intentions. Work-family spillover have been shown to have clear links to turnover. A review of 31 publications on nurses' intention to leave the profession found that negative work-family spillover was associated with turnover intentions (Flinkman et al., 2010). Indeed, turnover intention is found to be a outcome of work-family spillover in several studies (e.g., Blomme et al., 2010; Cohen, 1997; Haar, 2004; Shaffer et al., 2001). Haar and Bardoel (2008) suggests that this is due to the fact that employees experiencing greater negative work-family spillover will seek employment elsewhere, perhaps in a potentially "less stressful" place. Furthermore, according to Blomme et al. (2010) the relationship between work-family spillover, is through the lens of occupational stress. Occupational stress is an transactional process in which stressors, events or properties of events encountered by individuals cause strain, which can lead to outcomes at both an individual and organizational level (Cooper et al., 2001). In the present thesis turnover intention among nurses is an outcome at organizational level.

Blomme et al. (2010) postulates that negative work-to-family spillover can explain some of the variance of intention to leave an organization. The study also found that for men, work-family conflict could be explained by lack of organizational support, whereas for women, work-family conflict could be explained both by dissatisfaction with workplace flexibility and lack of organizational support. A study on the mediating and moderating effect of work-family conflict on the relationship between emotional labor, occupational stress, and turnover intentions among South Korean nurses, showed that work-family conflict (negative spillover) plays an important role in the relationship between these variables (Na & Kim, 2016). Additionally, a study by Suifan et al. (2016) investigated the effects of positive work-family spillover practices (schedule flexibility, manager support and job autonomy) on negative work-life spillover and turnover intentions. The mediating effect of negative work-family spillover on the relationship between positive work-life spillover practices and turnover intentions was also investigated. The study found the effect of work-life conflict on turnover intentions to be positive and significant (Suifan et al., 2016).

While work-family spillover has had clear links with turnover, studies exploring family-work experience have been mixed (Haar, 2004). For example, Anderson et al. (2002) found work-family conflict predicted turnover intentions, but not family-work conflict, whereas Shaffer et al. (2001) found both to be related to turnover intentions. The same is true for positive spillover. While negative WFS has received much attention in the literature, there has been a lack of studies about positive WFS (Haar & Bardoel, 2008). From a positive spillover perspective, Haar and Bardoel (2008) suggest that employees with higher positive spillover will buffer and dampen the desire of employees to leave their job.

Based on the theoretical outline given so far, we have formulated the following hypotheses (see figure 2):

H₂: *Negative work-to-family spillover mediates the relationship between occupational fatigue and turnover intention among nurses.*

H₃: *Positive work-to-family spillover mediates the relationship between occupational fatigue and turnover intention among nurses.*

H₄: *Negative family-to-work spillover mediates the relationship between occupational fatigue and turnover intention among nurses.*

H5: Positive family-to-work spillover mediates the relationship between occupational fatigue and turnover intention among nurses.

Comparison of the Mediating Influence of Work-Family Spillover. Findings indicate that spillover have greater influence on outcomes associated with the same domain, indicating that spillover from the workplace has a greater influence on turnover intentions than spillover from the family domain (Haar & Bardoel, 2008). For instance, Haar and Bardoel (2008) found positive work-to-family spillover to be negatively associated with psychological distress and turnover intentions, while positive family-to-work spillover was negatively linked with psychological distress, and positively linked with family satisfaction.

Lim et al. (2021) examined how job satisfaction influenced turnover intention, where the role of work-life balance (positive work-family spillover) was investigated in this relationship by distinguishing between WFS and FWS. WFS was found to partially mediate the effect of job satisfaction on turnover intention. On the other hand, FWS had no significant mediating effect in this relationship. Furthermore, Montgomery et al. (2006) found that WFS partially mediated the relationship between both quantitative/emotional job demands and emotional exhaustion. Additionally, WFS partially mediated the relationship between emotional job demands and depersonalization.

A study on the the mediating and moderating effect of work-family conflict in the relationship between emotional labor, occupational stress, and turnover intentions among South Korean nurses, showed that work-family conflict plays an important role in the relationship between these variables (however, the details of the results remain unknown to the present thesis authors, as all but the abstract of the study was written in Korean; Na & Kim, 2016).

In addition to the positive and negative work-to-family and family-to-work spillover-effects found in the literature, there are other concepts seeking to explain the interaction between work and family. Haar (2013) has suggested work family-balance as a measure to understand the interaction between work and family, and its related predictors and outcomes. Structural equation modeling found support for work-family balance dimension as distinct from other work-life dimensions and outcomes. Overall, work-family balance showed consistent effects toward job and life satisfaction, and psychological outcomes, with work-family conflict being detrimental, work-life enrichment beneficial, and work-life balance providing additional benefits, especially related to life satisfaction. These results were later supported in a study by Taşdelen-Karçkay and Bakalım (2017). Although work-life balance as a concept is beyond the

scope of the present thesis these findings underline the effects of the interaction between the work and family domain, as well as both positive and negative spillover between those domains.

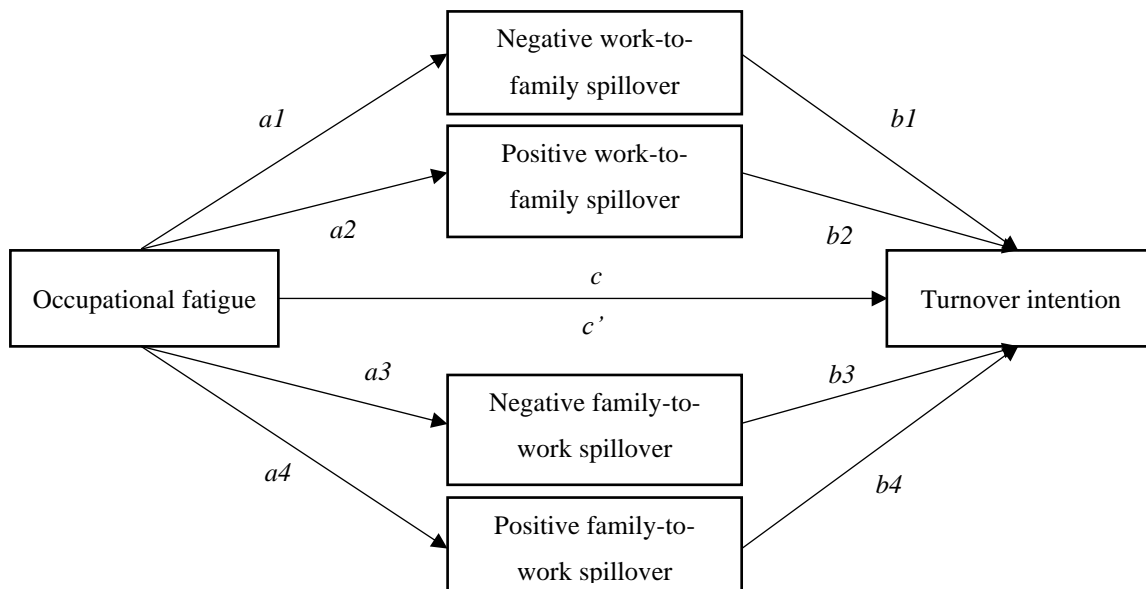
Findings do indicate that spillover have greater influence on outcomes associated with the same domain (see e.g., Haar & Bardoel, 2008; Kinnunen & Mauno, 1998; Lidwall et al., 2009). The findings by Lidwall et al. (2009), supports the findings by Kinnunen and Mauno (1998). In the study by Kinnunen and Mauno (1998) FWS was best explained by family domain variables and WFS was best explained by work domain variables. Based on the theoretical outline given so far we have formulated the following hypotheses:

H6: *Negative work-to-family spillover has a stronger influence on turnover intention than do negative family-to-work spillover among nurses.*

H7: *Positive work-to-family spillover has a stronger influence on turnover intention than do positive family-to-work spillover among nurses.*

Figure 2.

The present thesis' research model.



3 METHODS

This section will present the research design of the present study, descriptions of the sample, measures, as well as the analyses used.

3.1 Procedure and Study Design

The present study used data collected as a part of the HeWoS-project (Health Promoting Work Schedules; Vedaa et al., 2022). The present study used data collected as a part of the HeWoS-project (Health Promoting Work Schedules; Vedaa et al., 2022). The Hewos-study is a randomized controlled trial with a 6-months follow up time that includes health and care workers employed in different Norwegian hospitals and in different departments within these hospitals. For the purpose of the present thesis only data collected from nurses in the first wave (January 2021) were used.

MinGat, a Norwegian resource management program, managed by the hospitals were used to collect the survey data. The survey method is considered a good way to gather data about people's attitudes, because it is relatively easy to administer, time-effective to develop, can be administered remotely, and is easy to scale (i.e., the gathering of data from a large number of people; Rea & Parker, 2014). For an overview of all -instruments included in the Hewos-study, see Appendix A through E.

3.2 Ethics

The study protocol was approved by the Regional Committee for Medical and Health Research Ethics in Western Norway (2020/200386).

3.3 Sample

The sample consisted of nurses (n=937; response rate 49.51%) from 67 different departments in two hospitals. The sex distribution reflect the population with 814 (86.9%) women, , 112 men (12%) and 11 participants (1.2%). who declined to inform about sex. The mean age was xx (SD=XX). Most of the participants (n=589, 62.9%) were nurses without specialization or managerial position), approximately one third (n=326, 34.8%) were specialist nurses ("*spesialsykepleier*") and a few (n=22, 2.3%) worked as deputy department nurses ("*assisterende avdelingssykepleier*"). On average they have been shift workers for 11.8 years (SD = 10.3), with a range from 0 to 45 years.

3.4 Measures

The scales included in the present study were the Swedish Occupational Fatigue Inventory, the Work-Family Interface and the Turnover Intention Scale.

3.4.1 Occupational Fatigue

Occupational fatigue was measured using The Swedish Occupational Fatigue Inventory (SOFI) developed by Åhsberg et al. (1997). The SOFI consists of five factors (lack of energy,

physical exertion, physical discomfort, lack of motivation and sleepiness – four items each) and provides a measure of an individual's perception of fatigue related to work (Sagherian & Brown, 2016). To fit the scope of the present study, occupational fatigue was measured as a single compound factor. Respondents were asked to rate 20 separate items with the question “*Considering the past week: To what degree do the following word describe how you’ve felt?*”. Each item was measured using a 7-point Likert scale with response options ranging from 0 (“*not at all*”) to 6 (“*to a very high degree*”). Examples of items in the scale is “*heart palpitations*”, “*exhaustion*”, “*drowsy*” or “*passive*”. For the complete list of items, see Appendix C. The scale showed acceptable internal consistency ($\alpha = .83$).

3.4.2 *Work-Family Spillover*

Work-family spillover was measured using the 14-item Work-Family Interface scale (De Simone et al., 2018a; Kinnunen et al., 2006), which measure four dimensions of work-family spillover: (a) Negative work-to-family spillover (NWFS; 4 items), (b) negative family-to-work spillover (NFWS; 4 items), (c) positive work-to-family spillover (PWFS; 3 items) and (d) positive family-to-work spillover (PFWS; 3 items). Negative work-to-family spillover contained items 1, 3, 5 and 7; negative family-to-work spillover contained items 8, 10, 12 and 14; positive work-to-family-spillover contained items 2, 4 and 6; positive family-to-work spillover contained items 9, 11 and 13 (the complete scale can be found in Appendix D). Negative work-to-family spillover and family-to-work spillover used items based on work by Frone et al. (1992a) and Netemeyer et al. (1996) while positive work-to-family spillover and family-to-work spillover used items based on the Survey Work-Home Interaction Nijmegen (SWING; Geurts et al., 2005). The complete measurement instrument have been compiled by Kinnunen et al. (2006).

The respondents were asked “*How often do the following happen?*” followed by 14 questions to be answered using a 5-point Likert scale ranging from 1 (“*never*”) to 5 (“*very often*”), yielding a score range of 4-20 (NWFS and PWFS) and 3-15 (NFWS and PFWS), respectively. A high score indicates a high degree of spillover. Examples of NWFS and NFWS items were “*your job or career interferes with your responsibilities at home, such as cooking, shopping, childcare, yard work or house repairs?*” and “*your home life interferes with your responsibilities at work, such as getting to work on time, accomplishing daily tasks or working overtime?*”. Examples of PWFS and PFWS were “*you come home cheerfully after a successful day at work, positively affecting the atmosphere at home?*” and “*after spending time with your spouse/family, you go to work in a good mood, positively affecting the atmosphere at work?*”.

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Previous studies have found support for the four factors included in the scale (De Simone et al., 2018a; Kinnunen et al., 2006). A test of internal consistency yielded alpha values above .8 for negative work-to-family and family-to-work spillover. Alpha values for positive work-to-family and family-to-work spillover yielded scores below 0.7, which, according to Pallant (2020), is considered to be too low. However, scales with few items (i.e., < 4) can yield low α -values, in which case inter-item correlations is preferred for assessing internal consistency (Tabachnick & Fidell, 2013). The scales' inter-item correlations were 0.35 and 0.32 respectively, which is considered satisfactory (Tabachnick & Fidell, 2013).

3.4.3 Turnover Intention

Turnover intention was measured using a 3-item version of the Turnover Intention Scale derived from the Michigan Organizational Assessment Questionnaire (Bowling & Hammond, 2008). The three items used in present thesis were “*I will actively look for a new job in the next year*”, “*I often think about quitting*” and “*I will probably look for a new job by the next year*” (for scale, see Appendix E). Responses were recorded on a 5-point Likert scale from 1 (“*strongly disagree*”) to 5 (“*strongly agree*”), yielding a score range of 3–15. A high score indicates a high degree of turnover intention. The scale showed acceptable internal consistency ($\alpha = .92$).

3.5 Data Analyses

To ensure no violation of the assumption of normality, linearity, multicollinearity and homoscedasticity, preliminary analyses were conducted. A violation of said principles may lead to faulty estimations of the actual data, as parametric statistical testing make certain assumptions about the distribution of the data (Tabachnick & Fidell, 2013).

A parallel multiple mediation analysis was tested to assess the mediating effects of the four subscales of Work family interface (NWFS, NFWS, PWFS, PFWS) on the relationship between occupational fatigue and turnover intention. A mediation analysis is suitable when one wants to answer the “*how*” of a relationship, as it accounts for both direct and indirect effects (Hayes, 2022; Tabachnick & Fidell, 2013). This allows one to understand through which mechanisms a relationship transfers from one variable to the other. IBM's SPSS Version 28 was used for all descriptive analysis, including correlation, as well as regression analysis to obtain VIF-scores, in addition to Hayes' (2022) PROCESS macro for SPSS.

The proposed model is presented in Figure 2 and shows occupational fatigue as the predictor variable (X), NWFS (M_1), PWFS (M_2), NFWS (M_3) and PFWS (M_4) as the mediator variables, and turnover intention (Y) as the outcome variable. Occupational fatigue is proposed

to indirectly affect turnover intention through their influence on the mediators (NWFS, PWFS, NFWS, PFWS) and are known as *a*-paths (Hayes, 2022). The associations between the mediators (M_1 , M_2 , M_3 and M_4) and the outcome variable (Y) are known as *b*-paths. The indirect effect is simply the *a*- and *b*-paths taken together.

4 RESULTS

The current section centers around the findings of the quantitative data analyses. The demographic characteristics of the study sample are presented, as well as descriptive statistics, correlational statistics, statistics on collinearity, and results from the mediation analyses. A model is presented showing the relationships between all study variables.

4.1 Descriptive Statistics

Sample characteristics of participants and descriptive statistics and correlations for all study variables are presented in Tables 1 and 2.

4.1.1 Sample Characteristics

The demographic background of the participants was examined to better understand the profile of the respondents. Table 2 shows the sociodemographic characteristics of the participants in the present study. As shown in Table 2, 334 (35.6%) of the respondents had children living at home, whereas 608 (64.9%) did not. As mentioned in the previous section, nurses without specializations or managerial positions represent the majority of the sample (62.9%). More than half of the sample (65.4%) had obtained a bachelor's degree. Additionally, participants were on average 36.5 years old ($SD = 11.8$) and reported an average of 11.8 years ($SD = 10.3$) of experience in the profession.

4.1.2 Correlations and Collinearity

Table 3 provides the means (M), standard deviations (SD), collinearity statistics and correlation coefficients (r) of the study variables included in the mediation analysis. NWFS correlated with PWFS, NFWS, PFWS, turnover intention, and occupational fatigue. PWFS correlated with NFWS, PFWS, turnover intention and occupational fatigue. NFWS correlated with PFWS, turnover intention and occupational fatigue. Lastly, turnover intention correlated with occupational fatigue. A test of correlation between PFWS and turnover intention and occupational fatigue yielded non-significant results.

Table 2

Sample Characteristics at Baseline

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Baseline Characteristics	<i>n</i>	%
Gender		
Female	814	86.9
Male	112	12
Declined to report gender	11	1.1
Marital status		
Married/Partnered/cohabitating ^a	618	66
Children		
0 ^b	608	64.9
1 ^b	106	11.3
2 ^b	140	14.9
3 ^b	71	7.6
≥ 4 ^b	12	1.2
Living in the household ^a	334	35.6
Position		
Nurse	589	62.9
Specialist nurse	326	34.8
Assistant department nurse	22	2.3
Education		
Specialization	280	29.9
Technical college	4	.4
Bachelor's degree	613	65.4
Master's degree	40	4.3

^a Reflects the number of respondents choosing “yes” to this question.

^b Reflects the number of children reported.

According to Cohen and Holliday (1982), correlations between .40 and .69 are considered to be moderate, whereas correlations exceeding .69 are considered high. Correlations with $r > 0.70$, are at risk of multicollinearity (see e.g., Gordon-Salant & Fitzgibbons, 1993). A test of multicollinearity yielded tolerance levels ranging between 0.626-0.775 and variance inflation factor (VIF) levels ranging between 1.291-1.597, which are all considered acceptable (Pallant, 2020). Tolerance indicates the amount of the variability of an independent variable not explained by the other independent variable(s). VIF is the inverse of the tolerance value. Tolerance levels below 0.10 or VIF levels above 10 suggests the possibility for multicollinearity (Pallant, 2020).

Table 3

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Descriptive statistics for Study Variables.

Factors	<i>M</i>	<i>(SD)</i>	α	Collinearity		Correlations						
				Tol.	VIF	1	2	3	4	5	6	
NWFS	10.72	(3.72)	.83	.626	1.597	—						
PWFS	6.02	(2.53)	.61 ^a	.742	1.347	.42***	—					
NFWS	8.03	(2.20)	.80	.775	1.291	.10**	.09**	—				
PFWS	8.19	(2.37)	.60 ^b	.731	1.368	.16***	.27***	.44***	—			
TI	6.92	(3.41)	.92	—	—	.49***	.18***	-.26***	-.05	—		
OF	29.61	(22.02)	.85	.704	1.421	.40***	.16***	-.23***	-.02	.41***	—	

Notes. NWFS: Negative work-to-family spillover; PWFS: Positive work-to-family spillover; NFWS: Negative family-to-work spillover; PFWS: Positive family-to-work spillover; OF: Occupational fatigue; TI: Turnover intention; VIF: Variance inflation factor.

^a Inter-item correlation: .35.

^b Inter-item correlation: .32.

** $p < 0.01$. *** $p < 0.001$.

Table 3 depicts the variables' Cronbach's α . Cronbach's α is a measure of internal consistency, meaning the degree to which the items that make up a scale measures the same underlying attribute (Pallant, 2020). A Cronbach's α value is considered acceptable when ranging from 0.70 to 0.95 (Tavakol & Dennick, 2011). Cronbach's α s below 0.70 could be due to (a) scales with few items (i.e., four items or less), (b) poor inter-relatedness between items or (c) heterogenous constructs, in which case an assessment of inter-item correlations is preferred for assessing internal consistency (Tabachnick & Fidell, 2013; Tavakol & Dennick, 2011). Inter-item correlations between 0.2-0.4 is considered acceptable (Tabachnick & Fidell, 2013). NWFS, NFWS, occupational fatigue and turnover intention all obtained acceptable α -value, ranging from 0.80 to 0.92. Cronbach's α for PWFS and PFWS were .61 and .60. However, their inter-item correlations were 0.35 and 0.32 respectively, which is considered acceptable.

4.2 Mediation Analyses

A parallel multiple mediation analysis was conducted to investigate the possible mediating effects of work-family spillover on the relationship between occupational fatigue and turnover intention. Model estimates for standardized effects (β) and 95%-percentile confidence intervals of the parallel multiple mediation model are presented in Table 4. Additionally, a visual representation of the estimated effects in the model is represented in Figure 3.

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Table 4

Standardized Indirect, Direct, and Total Effects.

Effect	Variables	β	SE	t	95% CI		p
					LL	UL	
Total indirect	OF → NWFS, PWFS, NFWS, PFWS → TI	.165	.022 ^a	—	.122 ^a	.209 ^a	—
Indirect	OF → NWFS → TI	.123	.021 ^a	—	.080 ^a	.167 ^a	—
	OF → PWFS → TI	.039	.010 ^a	—	.019 ^a	.062 ^a	—
	OF → NFWS → TI	.002	.007 ^a	—	-.011 ^a	.017 ^a	—
	OF → PFWS → TI	.000	.001 ^a	—	-.004 ^a	.003 ^a	—
Component	OF → NWFS	.514	.027	18.94	.461	.568	<.001
	OF → PWFS	-.258	.027	-8.19	-.279	-.171	<.001
	OF → NFWS	.202	.035	6.62	.164	.303	<.001
	OF → PFWS	-.004	.031	-1.38	-.107	.019	<.001
	NWFS → TI	.239	.036	6.52	.168	.312	<.001
	PWFS → TI	-.153	.038	-4.63	-.252	-.102	<.001
	NFWS → TI	.013	.028	0.39	-.045	-.068	.689
	PFWS → TI	.005	.033	0.16	-.061	.072	.867
Direct	OF → TI	.255	.034	7.38	.188	.324	<.001
Total ^b	OF → NWFS, PWFS, NFWS, PFWS → TI	.420	.009	14.19	<.001	.382	.458

Notes. OF: Occupational Fatigue; TI: Turnover Intention; NWFS: Negative work-to-family spillover; PWFS: Positive Negative work-to-family spillover; NFWS; Negative family-to-work spillover; PFWS: Positive Negative family-to-work spillover; LL: Lower-level confidence interval; UL: Upper-level confidence interval. All estimated effects are standardized (β). Confidence intervals 95%.

^a Obtained running 5.000 bootstrap simulations.

^b Sum of all indirect effects + the direct effect.

4.2.1 Total and Direct Effects

The *total effects* (the sum of the direct and indirect effects; $\beta = 0.420$, $p < .001$) on turnover intention were statistically significant. Regarding the *direct effect*, the authors of the present thesis expected there to be a positive relationship between occupational fatigue and turnover intention (H_1). The Analysis revealed positive relationship between occupational fatigue and turnover intention ($\beta = 0.243$, $p < .001$), indicating that the more occupational fatigue an individual experienced, the higher the experience of turnover intention. Thus, H_1 was supported.

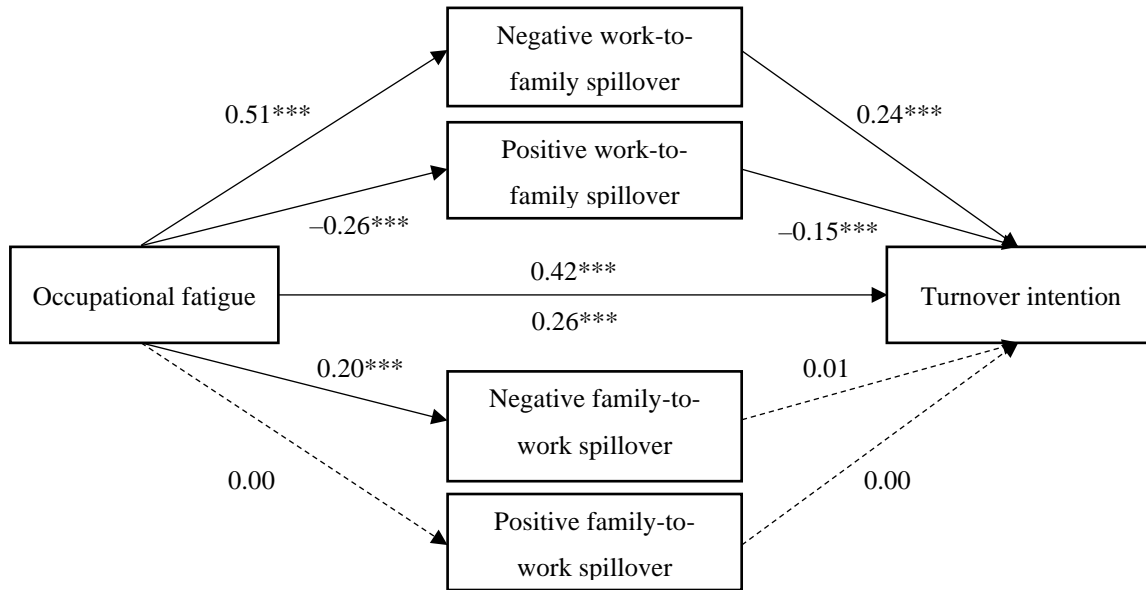
4.2.2 Indirect Effects

Regarding the indirect effects, the authors of the present thesis expected all four types of work-family spillover to mediate the relationship between occupational fatigue and turnover intention. To assess the statistical significance of the indirect effects, 5000 bootstrap simulations were run, yielding bootstrapped confidence intervals. Obtaining bootstrap estimates for confidence intervals is a procedure done automatically with the PROCESS macro in SPSS (Hayes, 2022). The analysis of indirect effects revealed that NWFS ($\beta = .123$, 95% BCI [.080 - .167]) and PWFS ($\beta = .039$, 95% BCI [.019 - .062]) had significant mediating effects on the relationship between occupational fatigue and turnover intention. In contrast, the analysis of the mediating effect of NFWS ($\beta = .002$, 95% BCI [-.011 - .017]) and PFWS ($\beta = .0$, 95% BCI [-.004 - .003]) failed to yield statistically significant results, as shown by the confidence interval crossing 0. When a confidence interval crosses 0 (i.e., the interval ranges from a negative to a positive value, or vice versa), it is considered not to be statistically significant (Hayes, 2022). Taking the direct and indirect effect into consideration, the analysis revealed a partial mediating effect of NWFS and PWFS on the relationship between occupational fatigue and turnover intention. Thus, hypotheses H_2 and H_3 were supported while H_4 and H_5 stand unsupported.

Furthermore, the analysis showed, in line with the thesis' predictions, a larger estimated effect of NWFS ($\beta = .123$, 95% BCI [.080 - .167]) and PWFS ($\beta = .039$, 95% BCI [.019 - .062]) compared to NFWS ($\beta = .002$, 95% BCI [-.011 - .017]) and PFWS ($\beta = .0$, 95% BCI [-.004 - .003]), which was found not to mediate the relationship between occupational fatigue and turnover intention. Thus, H_6 and H_7 were supported.

Figure 3

Relationships of study variables.



Notes. Non-significant effects portrayed as dotted lines.

All estimated effects are standardized (β).

* $p < .05$. ** $p < .01$. *** $p < .001$.

5 DISCUSSION

In the following section the findings, hypotheses, theoretical and practical implications of the present thesis will be discussed. Limitations and strengths of the thesis, and possible future directions in the field of research will also be discussed.

5.1 Summary of findings

The present thesis investigated the direct effect and the mediating effect of work and family spillover on the relationship between occupational fatigue and turnover intention among nurses during the COVID-19 pandemic. The main research question of the thesis was to understand the role of work and family spillover between nurses' occupational fatigue and intentions to leave their jobs, and how the different concepts related to each other. Specifically, the present thesis' research questions asked how positive or negative spillover from work to family affect the relationship between nurses' occupational fatigue and turnover intention. Furthermore, how positive or negative spillover from family to work affect the relationship between nurses' occupational fatigue and turnover intention. The present study hypothesized that there was a positive relationship between occupational fatigue and turnover intentions among nurses during the COVID-19 pandemic (H_1). The present thesis further hypothesized

that work-family spillover mediated the relationship between occupational fatigue and turnover intentions (**H₂**, **H₃**, **H₄** & **H₅**), and work-family spillover to be a predictor of turnover intention. Finally, the present thesis hypothesized a greater influence of work-related variables on turnover intention than family-related variables (**H₆** & **H₇**), as previous studies have suggested (see Kinnunen & Mauno, 1998; Lidwall et al., 2009).

The results showed a positive relationship between occupational fatigue and turnover intention. As well as a partial mediating effect of negative work-to-family spillover and positive work-to-family support on the relationship between occupational fatigue and turnover intention. Furthermore, the results showed, in line with the thesis' hypotheses, a larger estimated effect of negative work-to-family spillover and positive work-to-family spillover compared to negative and positive family-to-work spillover. Negative and positive family-to-work spillover was found not to mediate the relationship between occupational fatigue and turnover intention.

5.2 Occupational Fatigue and Turnover Intentions

In line with **H₁**, we found support for a positive relationship between occupational fatigue and turnover intention. This indicated that the more occupational fatigue nurses experience, the more they intend to leave their current position. This is in line with previous research on the relationship between strain related concepts and turnover, finding occupational or work-related fatigue to be positively related to turnover intention. For instance, Rutledge et al. (2022) found chronic fatigue (a subscale of the Occupational Fatigue Exhaustion Recovery scale; Winwood et al., 2005) to be a strong predictor of nurses' turnover intention. Lee and Jang (2020) found fatigue to have an effect on turnover intentions, indicating that if nurses' fatigue increases, their turnover intentions increase as well. Chang and Wang (2022) found sleep fragmentation (i.e., a lack of continuous sleep throughout the night) to highly correlate to fatigue, which in turn predicted turnover. Additionally, Dall'Ora et al. (2020) conducted a theoretical review on turnover in nursing, and found burnout, a concept related to occupational fatigue and shares many of its antecedents and outcomes, was a predictor of turnover intention. Blomme et al. (2010) found a positive relationship between occupational stress and turnover intention. Employees who are exhausted, which is influencing the balance between the work and family domain, showed higher turnover intention (Blomme et al., 2010). The present thesis echoes these findings, in that nurses who reported occupational fatigue also reported a higher intention to leave their jobs.

An explanation for the positive relationship between occupational fatigue and turnover intention could be provided using the Effort Reward Imbalance (ERI) model (Siegrist, 1996). Nurses could have experienced an imbalance between the efforts put into the job compared to the rewards reaped from it, leading to turnover intention. This is the core argument of the ERI model, po forth that the subjective experience of one's psychosocial work environment is dependent upon the balance between one's sense of effort (e.g., demands, obligations) and subsequent rewards (e.g., wage/salary, esteem, promotion, sense of security). If an imbalance towards effort exists, an increase in negative outcomes (e.g., stress, burnout, fatigue) can occur. The increase in psychological (Lorente et al., 2021; Rodríguez-Rey et al., 2020), physical and emotional (Barello et al., 2021) strain associated with the COVID-19 pandemic could increase nurses' level of occupational fatigue, coupled with an impression of a lack of rewards, which in turn could have made them more susceptible to thoughts of quitting.

The findings supporting the present study's first hypothesis highlights the likely importance of keeping occupational fatigue as low as possible amongst nurses, so as to increase retention and decrease turnover during a global pandemic. The findings of the present thesis are in line with previous research on the topics of occupational fatigue and turnover intention.

5.3 The Mediating Effects of Work-Family Spillover (WFS)

The present thesis found both negative work-to-family spillover and positive work-to-family spillover to mediate the relationship between occupational fatigue and turnover intention. Thus, in accordance with hypotheses H_2 and H_3 , the present study found support for the relationship between occupational fatigue and turnover intention being mediated by both positive and negative work-to-family spillover. These findings suggest that spillover between work and family accounts for some of the processes with which occupational fatigue turns into turnover intention. The results are in accordance with previous studies (Allen et al., 2000; Netemeyer et al., 1996; Wang et al., 2012), who also found that both negative work-to-family spillover and negative family-to-work spillover to be positively associated with occupational fatigue. As nurses experience more occupational fatigue, there is an increase in negative work-to-family spillover, suggesting that areas of work negatively affect their family life.

Interestingly, with regards to H_3 , the present study is, as far as the authors are aware, the first of its kind to investigate and find a relationship between occupational fatigue and positive work-to-family spillover, meaning that an increase in occupational fatigue led to a decrease in positive work-to-family spillover. This suggests that whereas occupational fatigue possibly has a positive effect on negative work-to-family spillover, it can at the same time have a possible

negative effect on positive work-to-family spillover. For instance, not only is a reduction in occupational fatigue linked to a reduction in the negative impact of work on family, but also with an increase in the positive impact of work on family, indicating a bidirectional relationship between the two.

The present thesis also found support for the assumption that there is a relationship between work-family spillover and turnover intention, which means that the more negative work-to-family spillover nurses experience, the higher the turnover intentions. The more positive work-to-family spillover nurses experience, the lower the turnover intentions, which the present thesis found to be negatively related to turnover intentions among Norwegian nurses. This is in line with findings by Blomme et al. (2010), who used the work-family conflict approach to study the turnover intentions of highly educated employees within the hospitality industry. The findings by Blomme et al. (2010) indicated that work-family spillover plays an important role in explaining turnover intentions. Additionally, Ghayyur and Jamal (2013) found that negative work-family has a positive relationship towards turnover intention, where work-family conflicts was found to influence employees' turnover intention in both banking and pharmaceutical organizations. Similar to the present thesis, studies have found positive work-family spillover to be negatively related to turnover intention (e.g., Haar & Bardoel, 2008). Haar and Bardoel (2008) studied positive spillover on Australian public and private sector employees and found positive work-to-family was negatively associated with turnover intentions. The findings in the present thesis are in accordance with Haar and Bardoel (2008), supporting the notion that work-life can positively influence family life.

Another possible explanation for the relationships found in the present thesis is self-efficacy. Self-efficacy is a person's particular set of beliefs in one's capacity to mobilize the necessary physical, intellectual and emotional resources that determine how well one can execute a plan of action in prospective situations (Bandura, 1978). To put it in more simple terms, self-efficacy is a person's belief in their ability to succeed in a particular situation. Self-efficacy can further be divided into two parts. The first is the belief that a specific behavior will result in the desired outcome and the second is the belief that one can carry out this specific behavior to achieve the desired outcome (Bandura, 1978). For instance, studies have found that employees with high self-efficacy will to a greater extent consider job demands as challenging rather than preventing (Ventura et al., 2015). Therefore, regarding the nurses in the present thesis one can argue that nurses having higher self-efficacy will consider their workload as challenging and not preventing. Higher level of job self-efficacy is likely to result in more

desirable work-related attitudes (e.g., job satisfaction) (Wang et al., 2010). Furthermore, in a cross-sectional study conducted among nurses working in emergency departments during the COVID-19 pandemic in China, fatigue was negatively correlated with self-efficacy (Wu et al., 2020). Thus, nurses in the present thesis experiencing less occupational fatigue might also have higher self-efficacy, resulting in positive spillover of self-efficacy from work to family.

A reason for the present thesis' results could be the gender roles and -norms facing women. Moreover, according to Yildiz et al. (2021), about 90% (86.9% in the present study) of nursing professionals consists of women. The expectations connected to female gender roles (e.g., mother, caretaker, housekeeper) have historically been strong (Greenhaus & Powell, 2006). This coupled with full time jobs and professional careers might blur the boundaries between work and home (Gandi et al., 2011). Indeed, the deterioration of the balance between work and family has been suggested to be the root cause of the surge in turnover intention during the COVID-19 pandemic (see e.g., Haddad et al., 2023; Yildiz et al., 2021). Thus, nurses might have experienced a decrease in the ability to function in the home domain due to the occupational fatigue already accumulated at work. For instance, a long and stressful day at work might have led to fatigue and subsequently an inability to complete commitments waiting at home.

Another possible explanation for the present thesis results is the inability to let go of work-related thoughts when not at work (i.e., bringing work home). This is known as “*ruminating*” (i.e., repetitive and unintentional perseverative thoughts without external cues relating to those thoughts; Donahue et al., 2012). Rumination have been found to lead to negative mood (Segerstrom et al., 2000), anxiety and depression (Calmes & Roberts, 2007; Kirkegaard Thomsen, 2006), as well as emotional exhaustion (Donahue et al., 2012), anxiousness (Calmes & Roberts, 2007) and sleep disturbance (Pillai & Drake, 2015). It could thus be the case that nurses have about the occupational fatigue experienced at and as a result of work, indicating a negative spillover from work to home.

A third possible explanation for the relationships found in the present thesis is self-efficacy. Self-efficacy is a person's particular set of beliefs in one's capacity to mobilize the necessary physical, intellectual and emotional resources that determine how well one can execute a plan of action in prospective situations (Bandura, 1978). To put it in more simple terms, self-efficacy is a person's belief in their ability to succeed in a particular situation. Self-efficacy can further be divided into two parts. The first is the belief that a specific behavior will result in the desired outcome and the second is the belief that one can carry out this specific

behavior to achieve the desired outcome (Bandura, 1978). For instance, studies have found that employees with high self-efficacy will to a greater extent consider job demands as challenging rather than preventing (Ventura et al., 2015). Therefore, regarding the nurses in the present thesis one can argue that nurses having higher self-efficacy will consider their workload as challenging and not preventing. Higher level of job self-efficacy is likely to result in more desirable work-related attitudes (e.g., job satisfaction) (Wang et al., 2010). Furthermore, in a cross-sectional study conducted among nurses working in emergency departments during the COVID-19 pandemic in China, fatigue was negatively correlated with self-efficacy (Wu et al., 2020). Thus, nurses in the present thesis experiencing less occupational fatigue might also have higher self-efficacy, resulting in positive spillover of self-efficacy from work to family.

Contrary to *H₄* and *H₅*, the study did not find support for negative and positive family-to-work spillover mediating the relationship between occupational fatigue and turnover intentions, as these indirect paths were found not to be significant. One possible explanation is that negative work-to-family spillover and positive work-to-family spillover are related to the work domain, while negative family-to-work spillover and positive work-to-family spillover are not. Aboobaker and Edward (2020) studied both positive and negative work-to-family and family-to-work spillover. Their results were in line with what they call the “*matching-domain*” hypothesis in work–family research, meaning family to work direction of spillover was not found to be significant predictors of turnover intention (Aboobaker & Edward, 2020). Similarly, Kinnunen et al. (2006) proposed that work-to-family spillover is domain-specific, with both conflict (negative spillover) and facilitation (positive spillover) being associated with outcomes in the originating role. They found that negative work-to-family spillover and positive work-to-family spillover were related to job exhaustion, but in opposite directions (i.e., positive and negative relationship). They also found that negative family-to-work spillover was related to marital dissatisfaction, which stem from the family domain. These findings are in line with other studies (Frone, 2003; Frone et al., 1997), where each direction of work-family spillover (from work to family and from family to work) is related to outcomes in the domain where the conflict occurs. This suggests that since positive and negative family-to-work spillover is not in the work domain, it may not be affected by occupational fatigue, while the relationship between occupational fatigue and positive and negative work-to-family spillover exists because they are in the same domain. This may explain the lack of significant relationship between occupational fatigue and positive family-to-work spillover. These findings are in line with the

present thesis findings, as we found spillover-effects only from work-related variable to work-related variable.

The “*matching-domain*” hypothesis (Aboobaker & Edward, 2020) can also explain why the present thesis found support for the assumption that work-to-family spillover has a stronger influence on turnover intention than family-to-work spillover (**H₆** and **H₇**). The present study found no relationship between positive and negative family-to-work spillover and turnover intention, which is similar to the mentioned findings of Aboobaker and Edward (2020). This is in line with previous studies indicating that spillover have greater influence on outcomes associated with the same domain (e.g., Haar & Bardoel, 2008; Kinnunen & Mauno, 1998; Lidwall et al., 2009).

Research has consistently demonstrated that work-to-family spillover often has a larger mean and explains more of the variance with respect to related antecedents and outcomes as compared to family-to-work spillover (Frone et al., 1992a, 1992b; Haar & Bardoel, 2008; Kinnunen et al., 2006; Kinnunen & Mauno, 1998; Lidwall et al., 2009). It is believed that when employees experience work-to-family spillover, they will likely withdraw from work to eliminate the conflict (e.g., Boyar et al., 2003; Greenhaus et al., 2001). Research has also shown that being dissatisfied with work, family and life lead to turnover intention, and higher levels of stress associated with increased work-to-family spillover may also lead to withdrawal tendencies (Greenhaus et al., 2001). Therefore, it could be the case that employees are more likely to make adjustments in their work lives rather than their home lives. For example, when work interferes with completing family obligations causing work-to-family spillover, quitting may eliminate the occurrence of work interfering with family, meaning, the employee sees work as the proximal cause of his or her thoughts of quitting.

5.4 Theoretical Implications

The present study is a valuable addition to the existing body of research on work-family spillover, occupational fatigue and turnover, as, to the best of our knowledge, this is the first study to investigate the relationship between occupational fatigue and turnover intentions among nurses during the pandemic with four types of work-family spillover as mediators. While negative work-family spillover has received much attention in the literature, there has been a lack of studies about positive work-family spillover (Haar & Bardoel, 2008), the present thesis studied both negative and positive work-to-family and family-to-work spillover. Therefore, the present study adds to the existing literature by also assessing positive spillover between the work and family domain.

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The present thesis applies JD-R theory as a theoretical framework to explain the theoretical mechanisms underlying occupational fatigue. The application of JD-R theory in the present thesis, was to explain the theoretical mechanisms underlying occupational fatigue, while at the same time investigating how job demands and resources affect the relationship between strain and organizational outcomes. JD-R theory describes how job demands and job resources are related to organizational outcomes, in the case of the present thesis, turnover intention. While the JD-R theory's main focus is on the causes of strain and motivation and the effect of job demands and resources, the present thesis proposes that job demands and resources also can function as mediators in the relationship between strain (occupational fatigue), and organizational outcomes (turnover intention). In this context, positive work-to-family and family-to-work spillover were seen as job resources and negative work-to-family and family-to-work spillover were seen as job demands. We additionally theorized that the stressful work-environment nurses experienced during the COVID-19 pandemic could result in occupational fatigue, which the emerging research seem to suggest. To the best of our knowledge, the relationships investigated in the present thesis (how fatigue effects turnover intention, mediated by four types of work-family spillover) are not previously investigated in the context of JD-R theory. The present thesis found support for mediating effects of positive work-to-family spillover on the relationship between occupational fatigue and turnover intention. The mediating effects of the job resource PWFS further strengthens the importance of work-family balance. The results of the present thesis thus adds new avenues to explore within the JD-R theory.

Further, the present thesis' results provide support for role stress theory (Greenhaus & Beutell, 1985). Greenhaus and Beutell (1985) studied Role Stress theory in the context of work-family spillover using work-family conflict, a form of inter-role conflict pertaining to potential incompatibilities between work and family roles. The present thesis' results indicate that nurses who experience occupational fatigue also experience spillover from their work into their family lives, yielding support for Role Stress theory. Thus, Role Stress theory could explain the relationship between occupational fatigue, negative work-to-family spillover and turnover intention.

The results also provide support for Role Enhancement theory (Barnett & Hyde, 2001). As opposed to the Role Stress theory, the Role Enhancement theory suggests that participation in multiple roles provide opportunities and resources to the individual that can be used to promote growth and better functioning in other life domains (Barnett, 1998). Therefore,

positive concepts, such as positive spillover come into central focus, as processes where participation in one role is made better or easier by virtue of participation in the other role (Frone, 2003). The present thesis' findings suggest that nurses who experienced low levels of fatigue experienced positive work-to-family spillover, thus supporting Role Enhancement theory.

Furthermore, as the present thesis' findings found support for the mediating effects of work-to-family spillover, but not family-to-work spillover, it provides support for the emerging “*matching-domain*” hypothesis in work–family research (see e.g., Aboobaker & Edward, 2020; Amstad et al., 2011).

Research on the COVID-19 pandemic's effect on work life is fast emerging (see e.g., Labrague & Santos, 2021; Marvaldi et al., 2021; Rodríguez-Rey et al., 2020; Spoorthy et al., 2020; Vanhaecht et al., 2021). The present thesis adds to the existing literature and provides valuable research on the relationship between nurses' fatigue, work–family spillover and turnover intention during the pandemic. The present study also adds to the existing literature by assessing the effects of work–to-family and family–to-work spillover on turnover intention among Norwegian nurses. Our findings suggest that occupational fatigue is an important indicator of turnover intention as in line with previous research, and that work-family spillover mediates this relationship.

5.5 Practical Implications

Studying how work-family spillover has the potential to benefit both organizations and employees. Work-family conflict has been shown to have a negative impact on both organizational and family outcomes. It is important to understand how fatigue and work-family spillover influence retention in the profession, which ultimately might also affect the quality of care. The present thesis provides insight into the possible risks of occupational fatigue and worsened work-family balance, and where it might be necessary to intervene to mitigate any possible negative effects during a pandemic.

Blomme et al. (2010) found that the less organizational support employees perceived, the more they were inclined to leave the organization, which further strengthens the thought that outcomes are related to variables from the same domain, and the importance of organizations facilitating work-family balance in order to reduce turnover intentions. Therefore, to reduce nurses' turnover intention, it is necessary to have interventions focusing on work-family conflict (see e.g., Na & Kim, 2016), such as establishing supportive systems and programs to relieve nurses from their work-family conflict. Efforts to reduce work-family

conflict through the creation of policies and procedures supporting work-family balance, and minimizing work-family conflict by addressing significant antecedents may be beneficial to organizations. The results of the present study suggest that work stressors, such as occupational fatigue, affect work-to-family spillover, which has the potential to influence turnover intention. Managers can make adjustments to offset occupational fatigue, and therefore reduce WFS and indirectly influence turnover intentions. Kinnunen and Mauno (1998) suggests that by supporting families' (e.g., by family policy and equality measures) work-family conflict with its adverse effects on family well-being could be prevented. Our results emphasize the importance of work-life balance, and helping nurses to manage spillovers from work to family is important. Therefore, to gain work-life balance, organizations could extend work-life policies such as additional health care benefits. Adopting family-friendly policies and implementing programs to reduce work family spillover can also be used to build commitment, which affect employees' turnover intentions (Boyar et al., 2003).

Although there are several remedies to mitigate workplace stress and subsequent occupational fatigue (e.g., improving relationship with management, changing the work environment or reducing workload), these are often times found immutable when it comes to nursing, due to specific factors in nurses' work environment, such as witnessing and supporting patients and families in moments of loss (Zeller & Levin, 2013), possibly leading to rumination. This issue could be addressed using Mindfulness Based Interventions (MBIs). Mindfulness-training is a popular and evidence-based approach aimed at increasing situational awareness, and positive response to stressful situations. Bishop (2002, p. 71) describes mindfulness-training as "a self-regulative approach to stress-reduction and emotional management". MBIs have been found to increase resilience, engagement and sleep quality (Pérez-Fuentes et al., 2020), and to reduce stress (Crowder & Sears, 2017; King, 2019; van der Meulen et al., 2021), and fatigue among nurses (Pérez-Fuentes et al., 2020). An additional benefit of implementing MBIs, is the relative low cost, compared to other work-place interventions, as mindfulness-training could be administered using apps. Indeed, Zeller and Levin (2013) holds that MBIs has the potential to address the unique needs of nurses. Thus, hospital management could introduce MBIs as part of wellness programs at work, to reduce the effect of occupational stress, and subsequent negative outcome.

Furthermore, managers and organizations can provide training to help employees develop strategies for dealing with spillover between the work domain and family domain. Regarding strategies for dealing with spillover, a study by Sirgy et al. (2020) found that the

strength of the negative association between negative work-to-family spillover and well-being is significantly reduced when individuals use problem-focused coping strategies. Problem-focused coping involves direct efforts to modify the problem causing the distress (Lazarus & Folkman, 1984). Examples of problem-focused coping strategies include coping strategies such as positive reinterpretation, active coping, and planning (Sirgy et al., 2020). Positive reinterpretation involves efforts to construe a stressful transaction in positive terms (e.g., seeing something in a different light to make it more positive). Active coping refers to the process of taking active steps to remove stress or to decrease its negative effects (e.g., initiating direct action). Planning refers to thinking about how to cope with the stressor (e.g., making a plan of how to handle the problem) (Sirgy et al., 2020). Research shows that organizations, by providing training and help in handling spillover, can positively affect levels of work-family spillover experienced by employees (e.g., Boyar et al., 2003). Furthermore, by reducing work-family spillover, organizations may be able to positively affect other important organizational outcomes, such as absenteeism, burnout, commitment, and performance (Boyar et al., 2003).

5.6 Limitations, Strengths, and Future Directions

The Present thesis has several limitations that needs to be addressed. Firstly, it is important to be aware of the limited predictability using a cross-sectional design. The primary limitation of a cross-sectional design is the lack of temporal relationship between predictor and outcome(s), due to the fact that exposure and outcome are assessed simultaneously (Carlson & Morrison, 2009). Thus, without longitudinal data (i.e., data gathered at several different points in time), the true cause and effect relationship is difficult to assess (Fowler, 2013). Although the initial study design of the present study was centered around collecting data in waves, thus making it longitudinal, disruptions related to the COVID-19 pandemic combined with time constraints relating to the deadline of the present thesis, only allowed for the use of data collected in the first wave. Whereas the use of mediation analysis with cross-sectional data has been criticized (see e.g., O'Laughlin et al., 2018) for being inferior to longitudinal data, most research in the mediation literature uses a cross-sectional design (Kline, 2015). Thus, whereas cross sectional studies can provide an indication of the relationship between variables, studies using longitudinal data should be conducted to investigate the possible causal links between study variables.

Another – albeit related – limitation regarding the use of cross-sectional data is the possible variability in the studied phenomena. Occupational fatigue, work-family spillover and turnover intention are temporal subjective experiences that can change over time (Lim et al.,

2021). Further still, it can vary within the same day or days. For instance, spillover could be more pronounced on days where nurses experience more occupational fatigue. Indeed, both work-family spillover (Ilies et al., 2007; Maertz & Boyar, 2011) and fatigue have been found to vary during the day, with fatigue peaking during the end of a workday or during night shifts (Baumgartner et al., 2021; Podsakoff et al., 2003). To address this issue, diary studies (i.e., multiple measurements either throughout the day or week), which is able to capture fluctuation within the same day, could be applied (Ohly et al., 2010). Additionally, diary studies also allow for testing of causal relationships (ten Brummelhuis et al., 2010). This could be particularly interesting as the pressure on the healthcare system varied throughout the COVID-19 pandemic, due to, amongst other things, fluctuations in vaccination- and infection rates (Helsedirektoratet, 2022). Therefore, diary studies could measure more precisely how the relationship between occupational fatigue, work-to-family and family-to-work spillover and turnover intentions varies daily.

Additionally, cross-sectional designs cannot rule out reversed causality, meaning the potential influence of the mediator on the predictor (see e.g., Kinnunen et al., 2004). For instance, negative work-to-family spillover could lead to occupational fatigue, rather than the other way around. Therefore, it is possible that occupational fatigue is a consequence rather than predictors of negative and positive spillover, or functions both as a predictor and consequence (Kinnunen et al., 2006). Hence, our findings should be interpreted with caution. To address this issue, longitudinal designs should be applied in future research. This could aid in investigating gain- or loss spirals, as proposed in Hobfoll's (2018) COR theory, as work-family spillover could feasibly act as both an antecedent and precedent of occupational fatigue.

Secondly, the present thesis makes use of self-report questionnaires. Survey data is known to be vulnerable to common method variance (e.g., Baumgartner et al., 2021; Podsakoff et al., 2003), which can lead to spurious results (Blomme et al., 2010). Common method variance is a variance in a variable caused by the measurement method and not the variable itself (Baumgartner et al., 2021). Measurement errors that may be relevant for this study's variables include a desire to appear more satisfied or dissatisfied with one's experiences than one actually is, as well as mood at the time the survey is answered. This can be linked to the concept of social desirability, which is the tendency for people to present themselves in a generally favorable fashion (Holden & Passey, 2009). Among other things, the respondents may have underestimated their own turnover intentions or occupational fatigue to appear more satisfied with the state of their situation. The extensive use of surveys in psychological research,

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have led to some scholars calling for studies investigating behavior directly, criticizing psychology as becoming the science of self-reports and finger movements (Cialdini, 2009; Doliński, 2018). To address this issue, objective measures, such as other-ratings, or proxy variables such as sick leave or frequency of workplace accidents, could be employed.

Third, the present thesis uses turnover intention as a proxy for turnover and not actual turnover itself. It could therefore be the case that participants reporting high turnover intention decides to stay in their position. However, the theory of planned behaviour suggests that behavioural intention is a good predictor of actual behaviour (Ajzen, 1991). Indeed, turnover intention is commonly used as a proxy of actual turnover (e.g., Djupedal et al., 2022; Tett & Meyer, 1993). This, due to ethics and privacy policies (i.e., anonymous survey respondents makes it impossible to connect respondent to actual turnover; Dalton et al., 1999), the relative high cost of longitudinal studies (Lazzari et al., 2022), and difficulty of surveying employees who has quit their place of work (Cohen et al., 2016). Moreover, surveys are typically administered anonymously, making it hard to establish causality between the predictor variable and actual turnover (outcome variable). Furthermore, research do suggest a positive relationship between turnover intention and actual turnover (Byrne, 2005; Hendrix et al., 1998; Steensma et al., 2004). Furthermore, research on nurses' turnover intention specifically, have suggested that their intention to leave predicts actual turnover (Krausz et al., 1995; Morrell, 2005). As turnover intentions is a strong predictor of actual turnover (Djupedal et al., 2022), the correct prediction of turnover intentions enables employers and policy makers to intervene when there are intentions among employees to quit their job, and thus prevent actual turnover (Lazzari et al., 2022).

Further, the participants in the present thesis were nurses from Norway, which might limit the generalizability of the findings to other countries than Norway. Generalizability is a type of external validity that entails the application of results across populations, settings, and times (Campbell et al., 1963). For instance, Aiken et al. (2012) documented the ratio of patient to nurses and patients to hospital staff to be the lowest among the countries investigated. They also found ratings of quality and job satisfaction among nurses in Norway, Ireland and Finland to be higher compared to the rest (Aiken et al., 2012). Hence, further studies are warranted to test the results on a broader population and to explore the tested model on other populations than Norwegian nurses.

However, the generalizability of the study-population of the present thesis can also be considered a strength. A common hindrance to generalizability, is possible sample homogeneity

(Djupedal et al., 2022). The sample of the present thesis consisted of 86.9% women. While high homogeneity in a sample is normally undesirable, the skewness in terms of gender is representative of the study population, therefore the homogeneity of the sample can also be considered a strength of the present thesis (Djupedal et al., 2022).

Another strength of the present study is the fact that respondents were examined during the pandemic (as opposed to before or after). Thus, it can be argued that the study has high ecological validity. Ecological validity is a subtype of external validity, and measures how generalizable findings are to the real-life settings (Andrade, 2018). Ecological validity of a research setting has been described as its representativeness and naturalness (Schmuckler, 2001). Self-reporting in a natural setting (i.e., naturalness), during the pandemic, is particularly beneficial for gaining insight into employees' experiences and actions, and is also considered an important tool for acquiring information about how employees react to various factors in the workplace (Conway & Lance, 2010; Spector, 1994).

However, the influence of the COVID-19 pandemic on the current thesis could make validity of the results to periods of stability difficult. We do not know to what extent the pandemic influenced the findings of the present thesis, exactly how the studied nurses were affected by the pandemic, and how their work changed during the pandemic. However, the intention of the present thesis was to study turnover intentions during the pandemic. Therefore, future studies could compare the findings from the present thesis with findings from other periods to highlight how the pandemic influenced the relationships between the studied variables.

6 CONCLUSIONS

The primary aim of the present study was to test the mediating effects of work-family spillover on the relationship between occupational fatigue and turnover intention during the COVID-19 pandemic. The present thesis found that both negative work-to-family spillover and positive work-to-family spillover had significant mediating effects on the relationship between occupational fatigue and turnover intention. It is important to understand how fatigue and work-family spillover influence retention in the nursing profession, which ultimately might also affect the quality of care. The present thesis provides insight into possible risks of occupational fatigue and work-family spillover, and where it might be necessary to intervene to mitigate any possible negative effects during a pandemic.

The present study was successful in drawing conclusions that were, to an extent, in agreement with previous studies, as both negative and positive work-to-family spillover was

found to influence turnover intentions, while neither negative nor positive family-to-work spillover was found influencing turnover intention (e.g., Kinnunen & Mauno, 1998; Lidwall et al., 2009). Thus, the present thesis' findings were in line with what is referred to as the “*matching-domain*” hypothesis in work–family research (Aboobaker & Edward, 2020), meaning that the family to work direction of spillover was not found to be a significant mediator in the relationship between occupational fatigue and turnover intention. The findings of the present thesis imply that work-family spillover is domain-specific (see e.g., Kinnunen et al., 2006), with both negative work-to-family spillover and positive work-to-family spillover being associated with turnover intention, an outcome from the originating domain.

The present thesis provides insight into the possible risks of occupational fatigue and negative work-to-family spillover, and where it might be necessary to intervene to mitigate any possible negative effects during a pandemic. As a cross sectional study, the present thesis can provide an indication of the relationship between variables, however, future studies using longitudinal data should be conducted to investigate causal links between the variables studied.

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APPENDIX A

Introductory text from questionnaire

Kjære medarbeider.

Du skal nylig ha mottatt en e-post med forespørsel om å delta i en undersøkelse om turnus. Siden du arbeider i 50 % stilling eller mer ved en enhet ved sykehuset som har 24-timers bemanning får du denne forespørselen. Hensikten med undersøkelsen er å studere effekten av en arbeidsplan som sikrer mer hviletid mellom vaktene. Om kort tid vil et nytt turnusår starte. Noen vil da ha en turnus med færre eller ingen seinvakter med påfølgende tidligvakt («quick return» vakter), mens andre vil ha omtrent det samme antall quick return vakter som tidligere. Enten du har en turnus med eller uten quick return vakter, ber vi deg om å svare på dette spørreskjemaet før det nye turnusåret starter, så vil vi igjen be deg om å svare på et tilsvarende skjema etter 6 måneder. Det vil ta 10-15 minutter å svare på spørreskjemaet. Spørreskjemaet vil være tilgjengelig i MinGat i ca. 3 uker. Det er ikke mulig å mellomlagre, så svar på helseundersøkelsen med en gang.

Det er frivillig å delta. Om du velger å delta i forskningsprosjektet samtykker du til at din besvarelse kan kobles til data om turnus og sykefravær hentet fra lønnsregisteret som beskrevet i informasjonsskrivet du fikk på e-post. Du kan også lese informasjonsskrivet til forskningsprosjektet på denne nettsiden <https://www.uib.no/fg/sc/141586/informasjon-til-deltagere>. Det er desverre ikke mulig å klikke på denne lenken i MinGat. I stedet må du kopiere URL-adressen og lime den inn i nettleseren din for å komme til informasjonsskrivet. Dersom du har problemer med dette, eller ønsker å få informasjonsskrivet tilsendt på nytt kan du kontakte prosjektleder Anette Harris (telefon 55 58 32 19; e-post: anette.harris@uib.no) eller arbeidspakkeleder Øystein Vedaa (telefon: 21 07 88 34; e-post: oystein.vedaa@fhi.no). Tusen takk for at du hjelper oss med å identifisere mer helsefremmende arbeidstidsordninger, og for at du deltar i dette forskningsprosjektet.

APPENDIX B

Questions regarding Sex, Marital Status, Children and Number of Children

1. Kjønn (Sex)

1.1. Kryss av for rett kjønn

- Mann
- Kvinne
- Vil ikke svare

2. Sivilstatus (Marital status)

2.1. Er du gift, registrert partner eller samboer?

- Ja
- Nei

3. Barn (Children living at home-1)

3.1. Har du barn som bor hjemme hos deg?

- Ja
- Nei

4. Alder på barn (Children living at home-2)

(Antall barn i de forskjellige aldergrupper (legg inn 0 dersom du ikke har barn i den aktuelle aldersgruppen)).

	0	1	2	3	4	5	Mer enn 5
4.1. Barnehagealder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.2. Barneskolealder (1. – 4. trinn)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.3. Barneskolealder (5. – 7. trinn)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.4. Ungdomsskolealder (8.-10 trinn)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.5. Videregående skolealder	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX C

The Swedish Occupational Fatigue Inventory

34. **Arbeidsrelatert utmattelse** (Swedish Occupational Fatigue Inventory, SIFO)

Ta utgangspunkt i hvordan du har følt deg den siste uken. I hvilken grad beskriver ordene i listen under hvordan du har følt deg? For hver beskrivelse, klikke for, sette kryss eller ring rundt alternativer svar spontant og sett en ring rundt det svaralternativet som passer med hvordan du har følt deg siste uken. Svaralternativene spenner fra 0 (ikke i det hele tatt) til 6 (i veldig høy grad).

	Ikke i det hele tatt 0	1	2	3	4	5	I veldig høy grad 6
35.1. Hjerterbank	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.2. Sløv	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.3. Utslitt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.4. Anspente muskler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.5. Dupper av	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.6. Nummenhet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.7. Svett	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.8. Utkjørt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.9. Døsig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.10. Passiv	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.11. Stive ledd	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.12. Likegyldig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.13. Andpusten	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.14. Gjesper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.15. Utmattet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.16. Søvnig	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.17. Overarbeidet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.18. Smerter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.19. Tungpusten	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35.20. Uinteressert	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX D

Questions from the Work-Family Interface scale

30. **Konflikt arbeid – privatliv** (The Work-family Interface Scale, fire subskalaer)

Hvor ofte skjer det at.... Sett kryss for hver spørsmål for å angi hvor ofte arbeid og familieliv virker inn på hverandre på ulike måter, på en skala fra 1 til 5 der 1 er «Aldri» og 5 er «Veldig ofte».

	Aldri 1	2	3	4	Veldig ofte 5
31.1. Din jobb eller din karriere forstyrrer ansvar hjemme, slik som matlaging, innkjøp, barnepass, hagearbeid eller vedlikehold på boligen?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.2. Du kommer hjem i godt humør etter en vellykket dag på jobben, slik at du påvirker stemningen positivt hjemme?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.3. Kravene på jobben forstyrrer ditt hjemme- og familieliv?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.4. Du oppfyller dine hjemlige forpliktelser bedre på grunn av ting du har lært på jobben?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.5. Din jobb eller din karriere hindrer deg i å tilbringe ønsket tid sammen med din familie?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.6. Du anvender tiden hjemme mer effektivt som et resultat av måten du utfører jobben din på?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.7. Jobben din skaper belastninger som gjør det vanskelig for deg å følge opp dine familieforpliktelser?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.8. Ditt hjemmeliv forstyrrer dine forpliktelser på jobb, slik som å komme på jobb i tide, fullføre daglige oppgaver og jobbe overtid?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.9. Du etter å ha brukt tid sammen med din partner/familie, går på arbeid i godt humør slik at du påvirker stemningen positivt på jobben?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.10. Kravene fra din familie eller ektefelle/partner forstyrrer dine jobbrelevante aktiviteter?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.11. Du tar ansvaret for jobben din mer seriøst fordi det samme forventes av deg hjemme?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.12. Ditt hjemmeliv hindrer deg i å tilbringe ønsket tid på jobb- eller karriererelaterte aktiviteter?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.13. Du bruker tiden på jobb mer effektivt fordi du må gjøre dette på samme måte hjemme?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31.14. Familierelaterte belastninger forstyrrer din evne til å utføre jobbrelevante forpliktelser?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX E

The Turnover Intention scale

1. Jobb vurdering (The Turnover Intention Scale)

	Sterkt uenig	Uenig	Verken/ eller	Enig	Helt enig
16.1. Jeg vil aktivt se etter en ny jobb det neste året	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.2. Jeg tenker ofte på å slutte i jobben	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16.3. Jeg vil sannsynligvis se etter en ny jobb det neste året	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>