



KATHOLISCHE UNIVERSITÄT
EICHSTÄTT-INGOLSTADT

**Das ambulante Assessment als Methode zur realitätsnahen
Erfassung von Belastungsfaktoren und Ressourcen bei der
Arbeit: Überprüfung und Weiterentwicklung
arbeitspsychologischer Modelle**

Inaugural-Dissertation zur Erlangung des Doktorgrades

der Philosophisch-Pädagogischen Fakultät

der Katholischen Universität Eichstätt-Ingolstadt

vorgelegt von

Elisabeth M. Riedl

2020

Referent: Prof. Dr. Joachim Thomas

Koreferent: Prof. DDr. Janusz Surzykiewicz

Datum der mündlichen Prüfung: 18.05.2020

Inhaltsverzeichnis

Einleitung	4
The moderating role of work pressure on the relationships between emotional demands and tension, exhaustion, and work engagement: An experience sampling study among nurses ...	30
Meaning and vigor as mediators within the challenge-hindrane framework.....	85
The spillover-crossover model: An examination of within-couple processes.....	118
Zusammenfassende Diskussion.....	153

Einleitung

1932 veröffentlichte R. B. Hersey einen Artikel über den Zusammenhang zwischen dem affektiven Wohlbefinden und der Produktionsrate von Mechanikern bei der Pennsylvania Railroad Company. Das Design, welches Hersey wählte, war sehr außergewöhnlich: Über ein Jahr lang befragte Hersey zwölf Arbeiter vier Mal täglich und erhob dabei zahlreiche Variablen, darunter Blutdruck, affektive Zustände, Leistungsmaße usw. In einem Review bewertet Myers Herseys Arbeit als “pioneer effort in the technique which he employs” (1933, p. 139). Es vergingen jedoch über 40 Jahre, bis dieses Design u. a. von Csikszentmihalyi und Kollegen wiederaufgegriffen wurde (Csikszentmihalyi, Larson, & Prescott, 1977).

Angesichts der bedeutenden Vorteile des ambulanten Assessments gegenüber anderen Forschungsdesigns wird diese Methode heute als heuristisch wertvoll für eine Vielzahl an Forschungsdomänen eingeschätzt, einschließlich der klinischen Psychologie (Trull, Ebner-Priemer, Brown, Tomko, & Scheiderer, 2012), der Entwicklungspsychologie (Hektner, 2012), der Organisationspsychologie (Beal, 2012) sowie der Persönlichkeitspsychologie (Fleeson & Nofhle, 2012) und der Emotionsforschung (Augustine & Larsen, 2012).

Das ambulante Assessment ist ein Sammelbegriff für verschiedene Methoden der Datenerhebung, welchen gemeinsam ist, dass sie im natürlichen Lebensumfeld stattfinden und situatives Erleben und Verhalten sowie aktuelle Situationsaspekte und physiologische Maße erfassen (Society for Ambulatory Assessment, 2014). Teilnehmern/innen von ambulanten Assessments werden wiederholt kurze Fragen zu ihrem momentanen Befinden und Verhalten sowie Situationsaspekten, z. B. dem Auftreten positiver und negativer Ereignisse, gestellt, während sie das tun, was sie normalerweise auch tun, und während sie sich dort aufhalten, wo sie sich normalerweise auch aufhalten. Aufgrund dieses Merkmals charakterisierten Bolger und Rafaeli ambulante Assessments als “capturing life as it is lived” (2003, p. 597). In Abhängigkeit von der Art der Datenerhebung werden verschiedene

Erhebungsstrategien unterschieden (Conner & Lehmann, 2012): In Zeitstichproben findet die Erhebung signal-basiert statt, was bedeutet, dass die Teilnehmer/innen aufgefordert werden, den Smartphone-Fragebogen immer dann auszufüllen, wenn ihnen das Smartphone das Signal dazu gibt. Dabei können variable oder feste Zeitpunkte gewählt werden.

Beispielsweise könnten in einer Studie, in der es um das Befinden am Arbeitsplatz geht, feste Zeitpunkte um 10, 13 und 15 Uhr oder drei zufällige Zeitpunkte zwischen 8 und 17 Uhr gewählt werden. In Ereignisstichproben wird die Datenerhebung dagegen durch das Auftreten eines Ereignisses getriggert. Ein Beispiel wäre das Wiedereintreffen in der Dienststelle bei Polizeibeamten im Einsatzdienst. Eine dritte Assessment Strategie bezieht sich auf die kontinuierliche Erfassung physiologischer oder technischer Daten mit Hilfe physiologischer Sensoren oder GPS.

Vorteile des ambulanten Assessments

Gegenüber anderen Datenerhebungsmethoden, welche in der Psychologie häufig eingesetzt werden, z. B. Laboruntersuchungen und Einmal-Befragungen, zeichnet sich das ambulante Assessment durch zahlreiche Vorteile aus. Die wichtigsten drei Vorteile werden mit den Schlagworten real-time, real-life und within-person bezeichnet.

Real-time (Schwarz, 2012): Reduktion retrospektiver Verzerrungen

Ambulante Assessments sind weniger anfällig für retrospektive Verzerrungen, da sich die Fragen auf momentane oder sehr kurz zurückliegende Erfahrungen beziehen (Schwarz, 2012). Ein eindrückliches Beispiel für den Unterschied zwischen retrospektiven und Echtzeit-Fragen ist der Rosy View Effekt von Mitchell und Kollegen (Mitchell, Thompson, Peterson, & Cronk, 1997). In mehreren Längsschnittstudien beantworteten die Teilnehmer/innen vor, während und nach ihren Urlaubsreisen Fragen bzgl. ihres erwarteten, tatsächlichen und erinnerten Vergnügens. Das Forschungsteam fand heraus, dass sowohl die Erwartungen der

Teilnehmer/innen als auch ihre retrospektiven Berichte positiver ausfielen als die Echtzeit-Erfahrungen, welche sie tatsächlich gemacht hatten. Die unterschiedlichen Bewertungen ließen sich dabei u. a. über negative Erwartungsverletzungen erklären: Während in der Studie über eine Fahrrad-Tour 61 % der Teilnehmer/innen als Echtzeit-Erfahrung angaben, dass irgendetwas gerade schlechter ist als erwartet, erinnerten sich jedoch nur 11 % an diese Enttäuschungen.

Da alle Schritte im Prozess beginnend vom Verständnis der Frage bis hin zur Antwortabgabe – Frageninterpretation, Abruf und Auswahl relevanter Informationen, Produktion der Antwort und Transfer auf das Antwortformat – für verzerrende Einflüsse anfällig sind, sind auch Daten aus ambulanten Assessment Studien nicht bias-frei. Schwarz (2012) fordert systematische Studien über die kognitiven Prozesse, welche in Echtzeit-Befragungen eine Rolle spielen, denn „without such work, we run the risk of merely replacing known biases with unknown ones“ (p. 38). Ambulante Assessments sollten aber weniger anfällig für solche Verzerrungen sein, welche aus dem Abruf vergangener Ereignisse und ihrer Erfahrung resultieren (Schwarz, 2012).

Real-life (Reis, 2012): Ökologisch valide Forschung

Da die Datenerhebung im natürlichen Lebensumfeld der Teilnehmer/innen stattfindet, weisen ambulante Assessments eine hohe ökologische Validität auf. Ein typisches Beispiel für die Bedeutsamkeit von Kontexteffekten ist das Weißkittelsyndrom: 39 % der Personen, welche im Labor Bluthochdruck aufweisen, haben bei ambulanter Messung Blutdruckwerte im Normalbereich (Martínez et al., 1999). Abgesehen von der Kontrolle von Kontexteffekten ermöglicht ambulantes Assessment die Analyse von Zusammenhängen zwischen Kontextbedingungen und subjektivem Erleben und Verhalten. Beispielsweise könnte im Rahmen eines ambulanten Assessments untersucht werden, welche situativen Arbeitsbedingungen mit einem erhöhten Stresserleben assoziiert sind. Während die

ökologische Validität als zentraler Vorteil ambulanter Assessments gilt, können ambulante Assessments aufgrund der Konfundierung von Personen und ihrer natürlichen Umwelten i. d. R. jedoch nur begrenzt Aufschluss über kausale Zusammenhänge geben (Conner & Lehman, 2012). “As a result, these methods are far better suited for understanding the social or emotional circumstances in which a phenomenon occurs, or the conditional effects of environmental events on psychological processes” (Conner & Lehman, 2012, p. 91). Einige Elemente der Kausalität können über zeitverzögerte Analyse geprüft werden, aber selbst diese geben nur Aufschluss über ein Kausalitäts-Kriterium, nämlich das der zeitlichen Präzedenz (Conner & Lehman, 2012). Nichtsdestotrotz erlauben ambulante Assessments jedoch Einblicke in individuelle Mikro-Zusammenhänge; ein Vorteil, der mit dem Schlüsselwort *within-person* bezeichnet wird.

Within-person (Hamaker, 2012): Individuen im Fokus

Arbeitsbedingungen ebenso wie das Wohlbefinden am Arbeitsplatz weisen eine hohe Variabilität innerhalb von Personen auf. In der Meta-Analyse von Podsakoff, Spoelma, Chawla und Gabriel (2019) zeigten mit einer Ausnahme (i. e. Selbstwertgefühl/Selbstwirksamkeit) alle untersuchten Variablen einen Innersubjekt-Varianzanteil von mindestens .40, viele erreichten sogar einen Wert von knapp .50 (z. B. Merkmale der Arbeitsumgebung und Erschöpfung) und höher (z. B. Stresserleben). Interessanterweise waren unter den Variablen mit einem besonders hohen Innersubjekt-Varianzanteil auch solche, welche traditionell als stabil angenommen werden. Während z. B. Janke, Erdmann, und Kallus (1985) Coping als zeitkonstantes, habituelles Persönlichkeitsmerkmal definieren, wies Coping bei Podsakoff et al. (2019) mit einem Wert von .60 den dritthöchsten Innersubjekt-Varianzanteil der 23 untersuchten Konstrukte auf. Aus der Studie von Podsakoff et al. (2019) folgt, dass die Arbeitsbedingungen ebenso wie das Befinden einer Person von

einem Moment zum anderen ebenso unterschiedlich sind wie die durchschnittlichen Arbeitsbedingungen und Befindenswerte verschiedener Menschen.

Aufgrund der Dominanz von Studien im Zwischensubjekt-Design liegt breites Wissen darüber vor, welche persönlichen Merkmale und Arbeitsbedingungen von Individuen berichtet werden, welche ein chronisch hohes Stresserleben berichten. Und natürlich ist das Wissen aus Zwischensubjekt-Untersuchungen auch von Wert und trägt zu einem besseren Verständnis eines Phänomens wie z. B. dem arbeitsbezogenen Belastungserleben bei (Xanthopoulou & Bakker, 2013). Allerdings wird implizit häufig geschlossen, dass Ergebnisse aus Zwischensubjekt-Forschung auf Innersubjekt-Prozesse übertragen werden können. Beispielsweise untersuchten Jimmieson, Tucker, und Walsh (2017) in zwei querschnittlichen Studien an Angestellten im Gesundheitsbereich stressverstärkende Interaktionen verschiedener Anforderungen. Als praktische Empfehlung leiten die Autoren ab, dass in Situationen hohen quantitativen Arbeitsaufkommens kognitive Anforderungen reduziert werden sollten. Schlussfolgerungen in Bezug auf Arbeitsprozesse können jedoch nur aus Innersubjekt-Studien gezogen werden, da eine Übertragbarkeit von Ergebnissen aus Zwischensubjekt-Forschung auf Innersubjekt-Prozesse nur unter der – in der Psychologie im Allgemeinen nicht gegebenen – Bedingung der Ergodizität möglich ist (Hamaker, 2012): Alle Personen müssen über die Zeit hinweg dieselben Mittelwerte und Varianzen bei allen untersuchten Variablen aufweisen und darüber hinaus müssen die Kovarianzen der Variablen identisch sein – es ist klar, dass für psychologische Phänomene i. d. R. eine Ergodizität nicht angenommen werden kann. Aus diesem Grund fordern Johnston et al. (2016) eine Überprüfung von Modellen aus einer Innersubjekt-Perspektive, um Interventionsansätze ableiten zu können. “Knowledge about the more proximal situational and person-related predictors of JD–R outcomes, such as state-like or daily fluctuating experiences of work

engagement or burnout tendencies, is crucial to create a setting that optimally supports positive states in volatile organisational environments” (Demerouti & Bakker, 2011, p. 5).

Ein weiterer Vorteil des ambulanten Assessments ist die Möglichkeit, zu berechnen, für wie viele Personen ein bestimmter Effekt gültig ist. Hierfür wird die Varianz des Steigungskoeffizienten benötigt, welche beschreibt, wie heterogen oder homogen ein durchschnittlich ermittelter Effekt ist. Beispielsweise zeigten Wimmer und Thomas (2016) in einer Studie an 41 Krankenpflegern/innen, dass situative Autonomie zwar im Durchschnitt einen negativen Zusammenhang mit dem Distress-Erleben aufweist, dieser Effekt aber signifikant zwischen den Befragten variiert. Während für 73 % der Befragten erhöhte Kontrolle einen stress-reduzierenden Effekt hatte, zeigte erhöhte Kontrolle bei den verbleibenden 27 % einen Null-Effekt oder sogar einen stress-verstärkenden Effekt. Für Interventionen ist dieses Wissen sehr nützlich, da es erlaubt, abzuschätzen, für wie viele Personen der Zielgruppe ein autonomie-basierter Interventionsansatz nutzlos oder sogar schädlich wäre. Durch die Berechnung von Crosslevel Interaktionen lässt sich zudem untersuchen, welche persönlichen Eigenschaften als Moderatoren situativer Zusammenhänge wirken. In der Krankenpflegestudie von Wimmer und Thomas (2016) zum Beispiel ließ sich die Varianz des Effektes von Kontrolle durch das persönliche Kontrollbedürfnis (Burger & Cooper, 1979) erklären: Während sich erhöhte Autonomie bei Personen mit hohem Kontrollbedürfnis günstig auf ihr Wohlbefinden auswirkte, zeigten Personen mit niedrigem Kontrollbedürfnis (gleichbedeutend mit dem Bedürfnis, Kontrolle abzugeben) bei einem Anstieg von Autonomie ein erhöhtes Erleben von Distress.

Herausforderungen und Grenzen des ambulanten Assessments

Compliance und fehlende Werte

Gute Daten ambulanter Assessments setzen eine hohe Compliance voraus. Im Kontext des ambulanten Assessments bedeutet eine hohe Compliance, dass die Teilnehmer/innen die vorgegebenen Fragen mehrfach gewissenhaft beantworten, bei Zeitstichproben innerhalb des Zeitrahmens und bei Ereignisstichproben in Übereinstimmung mit den Vorgaben (Myingermeys, 2012). Paper-Pencil Fragebögen und Ereignisstichproben lassen im Allgemeinen keine Angaben über die Compliance zu (Conner & Lehmann, 2012). Das Compliance-Problem von Paper-Pencil Befragungen wird durch die Studie von Stone und Kollegen eindrucksvoll demonstriert (Stone, Shiffman, Schwartz, Broderick, & Hufford, 2002): 80 Schmerzpatienten sollten 21 Tage lang dreimal täglich einen kurzen Fragebogen beantworten und bekamen für ihre Teilnahme 150 Dollar. Die Hälfte der Probanden machte ihre Angaben elektronisch, die andere Hälfte nutzte einen Papierfragebogen, auf welchem sie die Zeit des Ausfüllens vermerken sollten – diese berichtete Compliance wird bei Papierfragebögen, welche heute immer noch gelegentlich eingesetzt werden (z. B. Michel, Turgut, Hoppe, & Sonnentag, 2016), üblicherweise angegeben. Stone und Kollegen (Stone et al., 2002) bedienten sich jedoch auch lichtsensitiver Sensoren, welche die tatsächliche Uhrzeit erfassten, in der die Umschläge geöffnet wurden. Der Unterschied zwischen der von den Probanden angegebenen und der tatsächlichen, via Sensor gemessenen Uhrzeit kann nur als dramatisch bezeichnet werden: Innerhalb eines 30-minütigen Zeitfensters lag die durchschnittliche berichtete Compliance zwar bei 90 %, aber nur 11 % der Fragebögen wurden gemäß der automatischen Erfassung auch tatsächlich in diesem Zeitfenster beantwortet. Auch bei einem 90-minütigen Zeitfenster änderte sich wenig an dieser Diskrepanz: Die berichtete Compliance lag bei 95 %, die tatsächliche bei 20 %. Diese Ergebnisse legen nahe, dass eine große Anzahl an Papierfragebögen nachträglich beantwortet

wurden. Bei den Personen, welche elektronische Angaben machten, lag die Compliance bei 94 %. Hinsichtlich Compliance belegen die Ergebnisse von Stone et al. (2002) eindeutig den Vorteil von computer- oder smartphone-gestützten Befragungen, da nur diese eine valide Berechnung der Compliance erlauben.

Während Zeitstichproben im Bereich der Organisationspsychologie üblicherweise eine Compliance zwischen 70 bis 90 % erzielen (Fisher & To, 2012), sagen diese Prozentwerte aber nichts darüber aus, ob die Teilnehmer/innen die Fragebögen hochmotiviert und gewissenhaft beantworten (Beal, 2015) oder eher eine Satisficing-Strategie wie die Wahl undifferenzierter oder zufälliger Antworten einsetzen (Krosnick, 1991). In der Tat identifizierten Meade und Craig (2012) diese beiden Typen nachlässiger Teilnehmer/innen in einer Einmal-Online-Befragung: Die eine Gruppe tendierte zu Antworten nach dem Zufallsprinzip (9 % der Probanden), die andere zeigte ein Wiederholungsmuster und wählte für Blöcke aufeinanderfolgender Items immer die gleiche Antwort (2 % der Probanden). Als Gegen-Indiz für die Bedeutsamkeit von Satisficing bei ambulanten Erhebungen lässt sich vorbringen, dass ambulante Methoden bei Probanden in der Regel eine sehr hohe Akzeptanz aufweisen und die überwiegende Mehrheit, teilweise sogar fast 100 %, erneut an einer ähnlichen Untersuchung teilnehmen würden (Fahrenberg, Leonhart, & Foerster, 2002). Solange entsprechende Studien zum Thema Satisficing in ambulanten Erhebungen fehlen, muss jedoch offenbleiben, inwieweit sich aus einer retrospektiv positiven Methoden-Bewertung darauf schließen lässt, dass kein nachlässiges Antworten stattfindet (Beal, 2015).

Während Satisficing die Qualität der vorhandenen Daten thematisiert, können aber auch fehlende Werte, welche bei ambulanten Assessments im organisationspsychologischen Bereich üblicherweise bei 20 bis 30 % liegen (Beal, 2015), ein Problem darstellen. Dabei ist weniger der Prozentsatz fehlender Werte an sich von Bedeutung, sondern die Frage, ob fehlende Werte mit den Zielvariablen in Zusammenhang stehen oder nicht (Stone &

Broderick, 2009). Bei zufällig auftretenden fehlenden Werten, welche z. B. daraus resultieren, dass ein Proband den Alarm überhört oder das Smartphone an einem Befragungstag zu Hause vergessen hat (ohne dass es hierfür inhaltlich relevante Gründe wie antizipierten Stress gäbe), ergibt sich lediglich eine reduzierte Teststärke. Häufig ist es allerdings nicht unplausibel, anzunehmen, dass das Smartphone gerade dann ignoriert wurde, wenn sich eine Person z. B. gerade in einer starken Stresssituation befand, und somit nicht-zufällige fehlende Werte vorliegen. Da man im Regelfall nicht eruieren kann, weshalb die Fragebögen nicht ausgefüllt wurden, gibt es kaum Möglichkeiten, diesen Kritikpunkt zurückzuweisen (Fisher & To, 2012).

Silvia und Kollegen (Silvia, Kwapil, Eddington, & Brown, 2013) untersuchten u. a. zeitverzögertes stimmungsabhängiges Nicht-Antworten im ambulanten Kontext und fanden nur für eine von acht Variablen, nämlich Enthusiasmus, einen positiven Zusammenhang mit fehlenden Antworten beim nächsten Signal. Wesentlich bedeutsamere Prädiktoren waren die Tageszeit sowie der Erhebungstag: Die 18-Uhr-Befragung und die Befragungen ab dem vierten Studientag wiesen eine niedrigere Compliance auf. Zudem zeigten auch vier der elf Zwischensubjekt-Variablen negative Zusammenhänge mit der Compliance. Während die meisten der untersuchten Variablen keinen Zusammenhang mit der Compliance aufwiesen, waren die wenigen signifikanten Effekte klein – “this (...) should be reassuring to experience sampling researchers, who would prefer such effects to be small” (Silvia et al., 2013, p. 479). Dennoch sollte die Anzahl fehlender Werte so gering wie möglich gehalten werden, z. B. durch ein mit den Teilnehmern/innen abgestimmtes Sampling, durch Verschiebe- oder Wiederaufruf-Möglichkeiten, eine möglichst geringe Itemanzahl im Fragebogen, Compliance-Feedback, und persönlichen Kontakt mit den Teilnehmern/innen am Studienende usw. (Silvia et al., 2013).

Reaktivität

Das intensive Self-Monitoring, welches im Rahmen von ambulanten Assessments stattfindet, wirft die Frage auf, ob Mehrfachbefragungen anfälliger für Reaktivitätseffekte sind als andere Untersuchungsmethoden (Barta, Tennen, & Litt, 2012). In der Forschung wurden starke, mittelstarke und fehlende Reaktivitätseffekte gefunden. In der Studie von Latner und Wilson (2002) zeigte sich eine deutliche Verhaltensänderung der Teilnehmerinnen. 30 Frauen mit Bulimie oder Esssucht durchliefen nach einem klinischen Interview ein sechs- bis 18-tägiges Self-Monitoring, in dem es um das Auftreten von Essanfällen ging. Die Teilnehmerinnen wurden vorab informiert, dass es sich bei dem Self-Monitoring um reine Deskription handelt und keine therapeutischen Effekte zu erwarten seien. Dennoch wurden im Self-Monitoring weniger als die Hälfte der im Interview berichteten wöchentlichen Essanfälle berichtet. Die Hälfte der Esssucht-Patientinnen und 17 % der Frauen mit Bulimie erreichten im Self-Monitoring die Diagnose-Kriterien ihrer Erkrankungen nicht mehr.

In dieser Studie waren die starken Reaktivitätseffekte für die Teilnehmerinnen eindeutig positiv. Ein anderes Beispiel moderater Reaktivität mahnt jedoch zur Vorsicht, da sich Reaktivitätseffekte auch nachteilig für Teilnehmende ambulanter Assessments auswirken können. Bei Merrilees, Goetze-Morey, und Cummings (2008) nahmen 57 Paare an einer konflikt-bezogenen Ereignisstichproben-Studie teil. Bei den Ehemännern zeigte sich eine Abnahme der wahrgenommenen Ehequalität über die Erhebungszeit hinweg. Stone und Kollegen (2003) beschäftigten sich eingehend mit dem Thema Reaktivität in Abhängigkeit von der Sampling-Intensität bei Schmerzpatienten/innen. Fast 100 Schmerzpatienten/innen wurden randomisiert einer von vier Gruppen zugeteilt: Einer Kontrollgruppe ohne Self-Monitoring oder einer von drei Experimentalgruppen mit drei, sechs oder zwölf täglichen Befragungen. Zwischen den drei Experimentalgruppen gab es über die zwölf Befragungstage

hinweg keine Unterschiede im täglichen Schmerzrating. Auch bei der erinnerten Schmerzintensität waren keine Unterschiede zwischen den drei Experimentalgruppen und der Kontrollgruppe erkennbar.

Barta et al. (2012) erklären die Heterogenität der Studien, welche unterschiedlich starke Reaktivitätseffekte berichten, mit reaktivitätsbeeinflussenden Faktoren. Reaktivität aufgrund ambulanten Assessments ist vor allem dann wahrscheinlich, wenn ein bestimmtes, eindeutig erwünschtes oder unerwünschtes Verhalten im Fokus der Befragung steht und die Teilnehmer/innen eine hohe Motivation haben, dieses Verhalten zu ändern. Darüber hinaus ist Reaktivität wahrscheinlicher, wenn die Erhebung im Ereignisstichproben-Design stattfindet, vor und nicht nach dem Verhalten erfolgt (z. B. vor der Nahrungsaufnahme und nicht danach), und die Teilnehmer/innen Feedback über ihr Verhalten bekommen (explizit oder implizit durch die Verfügbarkeit der Einträge). Durch die Berücksichtigung dieser Faktoren lässt sich – je nach Intention – Reaktivität minimieren oder auch gezielt hervorrufen.

Zielsetzung der aktuellen Arbeit

Ziel der vorliegenden Arbeit ist die Überprüfung bzw. Weiterentwicklung prominenter arbeitspsychologischen Theorien mit Hilfe des ambulanten Assessments. Die ambulante Methode ist hierfür in besonderer Weise geeignet, da sie Erleben und Verhalten in Abhängigkeit von Erfahrungen am Arbeitsplatz realitätsnah abbildet. “Many, if not most, of the psychological phenomena in which we are interested are not characteristics of people; rather, they are common (or sometimes uncommon) sequences of events and event reactions that play out within each person’s stream of experience” (Beal, 2015, p. 385). Dennoch werden diese Phänomene häufig in einem Zwischensubjekt-Design untersucht (Beal, 2015), obwohl die zugrunde liegenden Theorien zumindest teilweise Innersubjekt-Hypothesen

formulieren. Das Job Demands-Resources (JDR) Modell (Bakker & Demerouti, 2007; Bakker & Demerouti, 2017; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Demerouti & Bakker, 2011) beispielsweise formuliert für den Health-Impairment Prozess zur Vorhersage von Belastungserleben und gesundheitlichen Beeinträchtigungen als Hypothese, dass Anforderungen physischer, psychischer, sozialer oder auch organisationaler Art die mentalen und physischen Ressourcen von berufstätigen Personen erschöpfen und somit zu einer “depletion of energy (i. e. a state of exhaustion)” (Bakker & Demerouti, 2007, p. 313) führen. Als Erklärung wird Hockeys Modell des Anforderungsmanagements (1993) herangezogen: Bei der Konfrontation mit hohen Anforderungen setzen Menschen leistungsschützende Strategien ein, wobei der Leistungserhalt durch sympathische Aktivierung und/oder erhöhte subjektive Anstrengung, d. h. Ressourceneinsatz, erreicht wird. Nach der Conservation of Resources Theorie (Hobfoll, 2002) verursacht das Investment von Ressourcen durch zunächst Stress. Je nachdem, wie gut die Anforderungen bewältigt werden, ist auf längere Sicht jedoch auch ein Ressourcengewinn durch hohe Anforderungen möglich (Hobfoll, 2002). Diese Formulierung des JDR Modells legt einen Innersubjekt-Fokus nahe, da über Aktivierung und erhöhte Anstrengung ein Zustand von Erschöpfung vorhergesagt wird.

Innerhalb des Health-Impairment Prozesses der JDR Theorie wird zudem angenommen, dass Ressourcen die negativen Effekte von Anforderungen im Sinne eines Stresspuffers abmildern können (Bakker & Demerouti, 2007; Bakker & Demerouti, 2017). Ressourcen werden in der JDR Theorie definiert als diejenigen physischen, psychischen, sozialen oder organisationalen Aspekte des Arbeitsplatzes, welche die Erreichung von arbeitsbezogenen Zielen unterstützen und/oder Anforderungen bzw. die damit verbundenen physischen und psychischen Kosten reduzieren und/oder persönliches Wachstum, Lernen und Entwicklung fördern. Aufgrund ihrer motivationalen Funktion ist die Rolle von Ressourcen nicht auf eine

Moderation von Anforderungen im Health-Impairment Prozess begrenzt. Während der Health-Impairment Prozess Belastungserleben und gesundheitliche Beeinträchtigungen adressiert, geht es im zweiten Prozess der JDR Theorie, im motivationalen Prozess, um die Vorhersage von Arbeitsengagement und Leistung (Bakker & Demerouti, 2007; Bakker & Demerouti, 2017). Hier werden Ressourcen als zentrale Prädiktoren angenommen (Bakker & Demerouti, 2007; Bakker & Demerouti, 2017). Zudem wird in der Coping-Hypothese des motivationalen Prozesses die Annahme formuliert, dass hohe Anforderungen den positiven Effekt von Ressourcen verstärken, da Ressourcen vor allem im Kontext von Ressourcenverlusten, welche hohe Anforderungen nach sich ziehen, an Salienz gewinnen (Hobfoll, 2002).

Im Jahr 2008 wurde die erste ambulante Studie zum motivationalen Prozess des JDR Modells veröffentlicht, in welcher 44 Flugbegleiter/innen vor und nach drei Flügen einen Fragebogen beantworteten (Xanthopoulou, Bakker, Heuven, Demerouti, & Schaufeli, 2008). In Übereinstimmung mit den Hypothesen zeigte situative Unterstützung durch Kollegen einen positiven Zusammenhang mit dem Arbeitsengagement, welches wiederum den positiven Zusammenhang zwischen situativer Unterstützung und Leistung vermittelte. Zwei Jahre später wurden im Rahmen einer Zeitstichproben-Studie von Simbula (2010) die beiden zentralen Prozesse der JDR Theorie simultan überprüft. 61 Lehrkräfte beantworteten über fünf Arbeitstage hinweg täglich einen Fragebogen zu ihren aktuellen Arbeitsbedingungen und ihrem aktuellen Befinden. In Übereinstimmung mit dem JDR Modell gingen Arbeit-Familie-Konflikte mit einem erhöhten Erleben von Erschöpfung und einer reduzierten Arbeitszufriedenheit und mentalen Gesundheit einher, während Unterstützung durch Kollegen positive Zusammenhänge mit Arbeitsengagement, Arbeitszufriedenheit und mentaler Gesundheit zeigte.

Seit diesen Pionier-Arbeiten wurden einige Innersubjekt-Studien zur JDR Theorie bzw. zu Vorläufer-Modellen wie der Job Demand-Control Theorie (Karasek, 1979) oder dem Effort-Reward Imbalance Modell (Siegrist, 2002) veröffentlicht: In zwei Arbeiten beschäftigten sich Johnston und Kollegen (Johnston, Jones, Charles, McCann, & McKee, 2013; Johnston et al., 2016) mit der Frage, welche Rolle situative Anforderungen bzw. Anstrengungen und situative Kontrolle sowie Belohnungserleben bei der Vorhersage des subjektiven Befindens (Stresserleben, Affekt, Müdigkeit) und der Herzrate von Krankenpflegern/innen spielen. In beiden Studien wurde auch untersucht, ob situativ erhöhte Ressourcen die stress-generierenden Effekte erhöhter Anforderungen mildern können. Somit adressieren die Arbeiten von Johnston et al. (2013; 2016) auch die Pufferhypothesen des Health-Impairment Prozesses (Bakker & Demerouti, 2017). Weitere Innersubjekt-Studien erschienen zur moderierenden Rolle von Anforderungen im motivationalen Prozess (i. e. zur Coping-Hypothese; Kühnel, Sonnentag, & Bledow, 2012; Tadić, Bakker, & Oerlemans, 2015) sowie zur Rolle fluktuierender (Bakker & Sanz-Vergel, 2013) sowie stabiler personaler Ressourcen (Biron, & van Veldhoven, 2012).

Bezugnehmend auf die Zukunft der JDR Theorie diskutieren Bakker und Demerouti (2017) das Thema Interaktionen zwischen Anforderungen, welche sich im gesundheitsbeeinträchtigenden Prozess möglicherweise stressverstärkend auswirken können. Im **ersten Kapitel** der vorliegenden Arbeit wird eine Studie präsentiert, in welcher aus Innersubjekt-Perspektive Interaktionen zwischen Arbeitsdruck und emotionalen Anforderungen in der Krankenpflege untersucht werden. Während ein paar wenige Zwischensubjekt-Studien Interaktionen zwischen Anforderungen thematisieren (Bridger & Brasher, 2011; Faucett, Corwyn, & Poling, 2013; Fried, Ben-David, Tiegs, Avital, & Yeverechyahu, 1998; Jimmieson, Tucker, & Walsh, 2017; Kemery, 2006; van Woerkom, Bakker, & Nishii, 2016), gab es dazu bislang noch keine Ergebnisse aus Innersubjekt-Perspektive. Im Gegensatz zu

den vorliegenden Zwischensubjekt-Studien, bei denen es um die Frage geht, welche chronische Anforderungen die Wirkung anderer chronischer Anforderungen moderieren, zielt die vorliegende Arbeit auf die Frage ab, welche Folgen es hat, wenn Personen in einer Arbeitssituation mit simultan erhöhten Anforderungen konfrontiert werden.

Im Rahmen einer weiteren Entwicklung wurde in Frage gestellt, ob Anforderungen – wie in der JDR Theorie angenommen – im motivationalen Prozess tatsächlich nur als Moderatoren fungieren oder ob sie bedeutsame selbständige Prädiktoren darstellen. Crawford und Kollegen (Crawford, LePine, & Rich, 2010), sowie Van den Broeck und Kollegen (Van den Broeck, De Cuyper, De Witte, & Vansteenkiste, 2010) schlugen eine Integration des Challenge-Hindrance Modells (Cavanaugh, Boswell, Roehling, & Boudreau, 2000; LePine, Podsakoff, & LePine, 2005; Podsakoff, LePine, & LePine, 2007) in die JDR Theorie vor. Hier werden zwei Typen von Anforderungen unterschieden: Für Herausforderungs-Anforderungen – definiert als Stressoren, welche mit potenziellen Gewinnen im Sinne von persönlichem Wachstum, Mastery-Erleben und Leistung assoziiert sind – wird ein positiver Effekt auf das Arbeitsengagement angenommen. Hindernis-Anforderungen, welche mit der Zielerreichung interferieren, sollen dagegen eine negative Wirkung auf das Arbeitsengagement zeigen (Cavanaugh et al., 2000; Podsakoff et al., 2007).

Die Allgemeingültigkeit dieser Befunde ist aber bisher noch nicht eindeutig geklärt (Bakker, 2014; Demerouti & Bakker, 2011) und in mehreren Studien aus Innersubjekt-Perspektive wurde entgegen den Vorhersagen des Challenge-Hindrance Modells (Crawford et al., 2010; Van den Broeck et al., 2010) kein positiver Haupteffekt von Herausforderungs-Anforderungen im motivationalen Prozess gefunden (Baethge, Vahle-Hinz, Schulte-Braucks, & van Dick, 2018; Bakker & Sanz-Vergel, 2013; Riedl & Thomas, 2019; Tadić et al., 2015). Im **zweiten Kapitel** wird eine Studie an Altenpflegekräften vorgestellt, die eine mögliche Erklärung für die fehlenden Haupteffekte von Herausforderungs-Anforderungen untersucht:

Inkonsistente Mediation. Der Begriff inkonsistente Mediation (MacKinnon, Fairchild, & Fritz, 2007) kann im Zusammenhang mit Anforderungen gut mit dem Bild eines zweischneidigen Schwertes beschrieben werden: Während erhöhte Anforderungen einerseits mit Stresserleben und Erschöpfung einhergehen, können sie gleichzeitig aber das Erleben von Bedeutsamkeit bei der Arbeit fördern. Ein konkretes Beispiel könnte Zeitdruck aufgrund eines medizinischen Notfalls sein. In dieser Situation sollte eine Altenpflegekraft ihre Arbeit als hoch bedeutsam erleben. Andererseits wird diese Situation jedoch auch stark kräftezehrend wirken. Wenn Erschöpfung und Bedeutsamkeit ihrerseits beide wichtige Prädiktoren des affektiven Arbeitsengagements darstellen, würde sich für die Variable Zeitdruck ein geringer oder kein Zusammenhang mit dem affektiven Arbeitsengagement ergeben, da der positive Pfad über das Bedeutsamkeitserleben durch einen negativen Pfad über die Erschöpfung wieder aufgehoben wird. In der Altenpflegestudie wird untersucht, ob Herausforderungs-Stressoren ein solches zweiseitiges Schwert darstellen und einerseits mit erhöhtem Bedeutungserleben, andererseits aber auch mit erhöhter Erschöpfung einhergehen. Kernfrage ist, ob diese divergenten Beziehungen erklären, weshalb Herausforderungs-Stressoren ihrerseits keinen Zusammenhang mit dem affektiven Arbeitsengagement aufweisen, da Erschöpfung negativ und Bedeutsamkeitserleben positiv mit dem affektiven Arbeitsengagement in Verbindung stehen und sich somit beide indirekten Pfade aufheben.

Im **dritten Kapitel** der Arbeit steht nicht das Wohlbefinden einzelner Personen am Arbeitsplatz im Vordergrund, sondern das Wohlbefinden von Paaren in der Freizeit. 2013 verwendeten Bakker und Demerouti die JDR Theorie als Grundlage zur Formulierung des Spillover-Crossover Modells, in welchem die Rolle von Erfahrungen am Arbeitsplatz für das Erleben und Verhalten im häuslichen Umfeld thematisiert wird. Nach diesem Modell führen im Rahmen eines negativen Prozesses Anforderungen zum Belastungserleben des Akteurs, welches – vermittelt über Interaktionen mit dem Partner bzw. der Partnerin – das

Wohlbefinden nicht nur des Akteurs (negativer Spillover), sondern auch des Partners bzw. der Partnerin (negativer Crossover) in der Freizeit beeinträchtigen. Im Rahmen eines positiven Spillovers (bezogen auf die Person) und positiven Crossovers (bezogen auf die Partnerin bzw. den Partner) können andererseits Ressourcen am Arbeitsplatz zu einem Work-Family Enrichment führen und somit zum Wohlbefinden und zur Zufriedenheit beider Partner zu Hause beitragen. In der dritten Studie werden die ambulanten Daten von Paaren analysiert, welche schulpflichtige Kinder haben und beide berufstätig sind, um das Spillover-Crossover Modell aus einer Innersubjekt-Perspektive zu überprüfen. Der wichtigste Beitrag dieser Arbeit ist, dass die vermittelnde Rolle partnerschaftlicher Interaktionen sowohl für negative als auch für positive Spillover- und Crossover-Effekte betrachtet wird. Im Kontext positiver Spillover- und Crossover-Effekte existieren nur zwei Studien zur vermittelnden Rolle partnerschaftlicher Interaktionen (Liu, Ngo, & Cheung, 2016; van Steenbergen, Kluwer, & Karney, 2014), welche beide eine Zwischensubjekt-Perspektive einnehmen.

Literatur

- Augustine, A. A., & Larsen, R. J. (2012). Emotion research. In M. R. Mehl, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 497–510). New York, NY: Guilford Press.
- Baethge, A., Vahle-Hinz, T., Schulte-Braucks, J., & van Dick, R. (2018). A matter of time? Challenging and hindering effects of time pressure on work engagement. *Work & Stress*, 32(3), 228–247. doi:10.1080/02678373.2017.1415998
- Bakker, A. B. (2014). Daily fluctuations in work engagement: An overview and current directions. *European Psychologist*, 19(4), 227–236. doi:10.1027/1016-9040/a000160
- Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, 22(3), 309–328. doi:10.1108/02683940710733115
- Bakker, A. B., & Demerouti, E. (2013). The spillover-crossover model. In J. G. Grzywacz, & E. Demerouti (Eds.), *New frontiers in work and family research* (pp. 55–70). Hove, UK: Psychology Press.
- Bakker, A. B., & Demerouti, E. (2017). Job demands-resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology*, 22(3), 273–285. doi:10.1037/ocp0000056
- Bakker, A. B., & Sanz-Vergel, A. I. (2013). Weekly work engagement and flourishing: The role of hindrance and challenge job demands. *Journal of Vocational Behavior*, 83(3), 397–409. doi:10.1016/j.jvb.2013.06.008
- Barta, Tennen, & Litt, (2012). Measuring reactivity in diary research. In M. R. Mehl, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 108–123). New York, NY: Guilford Press.

- Beal, D. J. (2012). Industrial/Organizational Psychology. In M. R. Mehl, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 601–619). New York, NY: Guilford Press.
- Beal, D. J. (2015). ESM 2.0: State-of-the-art and the future potential of experience sampling methods in organizational research. *Annual Review of Organizational Psychology and Organizational Behavior*, 2, 383–407. doi:10.1146/annurev-orgpsych-032414-111335
- Biron, M., & van Veldhoven, M. (2012). Emotional labour in service work: Psychological flexibility and emotion regulation. *Human Relations*, 65(10), 1259–1282.
doi:10.1177/0018726712447832
- Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods: Capturing life as it is lived. *Annual Review of Psychology*, 54, 579–616.
doi:10.1146/annurev.psych.54.101601.145030
- Bridger, R. S., & Brasher, K. (2011). Cognitive task demands, self-control demands and the mental well-being of office workers. *Ergonomics*, 54(9), 830–839.
doi:10.1080/00140139.2011.596948
- Burger, J. M., & Cooper, H. M. (1979). The desirability of control. *Motivation and Emotion*, 3, 381–393. doi:10.1007/BF00994052
- Cavanaugh, M. A., Boswell, W. R., Roehling, M. V., & Boudreau, J. W. (2000). An empirical examination of self-reported work stress among US managers. *Journal of Applied Psychology*, 85(1), 65–74. doi:10.1037/0021-9010.85.1.65
- Conner, T. S., Lehmann, B. J. (2012). Getting started: Launching a study in daily life. In M. R. Mehl, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 89–107). New York, NY: Guilford Press.

- Crawford, E. R., LePine, J. A., & Rich, B. L. (2010). Linking job demands and resources to employee engagement and burnout: A theoretical extension and meta-analytic test. *Journal of Applied Psychology, 95*, 834–848. doi:10.1037/a0019364
- Csikszentmihalyi, M., Larson, R., & Prescott, S. (1977). The ecology of adolescent activity and experience. *Journal of Youth and Adolescence, 6*, 281–294.
- Demerouti, E., & Bakker, A. B. (2011). The job demands-resources model: Challenges for future research. *South African Journal of Industrial Psychology, 37*(2), 01–09. doi:10.4102/sajip.v37i2.974
- Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology, 86*(3), 499–512. doi:10.1037//0021-9010.86.3.499
- Fahrenberg, J., Leonhart, R., & Foerster, F. (2002). *Alltagsnahe Psychologie: Datenerhebung im Feld mit hand-held PC und physiologischem Mess-System*. Bern, Deutschland: Hans Huber.
- Faucett, J. M., Corwyn, R. F., & Poling, T. H. (2013). Clergy role stress: Interactive effects of role ambiguity and role conflict on intrinsic job satisfaction. *Pastoral Psychology, 62*(3), 291–304. doi:10.1007/s11089-012-0490-8
- Fisher, C. D., & To, M. L. (2012). Using experience sampling methodology in organizational behavior. *Journal of Organizational Behavior, 33*(7), 865–877. doi:10.1002/job.1803
- Fleeson, W., & Nettle, E. E. (2012). Personality Research. In M. R. Mehl, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 525–538). New York, NY: Guilford Press.
- Fried, Y., Ben-David, H. A., Tiegs, R. B., Avital, N., & Yeverechyahu, U. (1998). The interactive effect of role conflict and role ambiguity on job performance. *Journal of Occupational and Organizational Psychology, 71*(1), 19–27. doi:10.1111/j.2044-

8325.1998.tb00659.x

- Hamaker, E. L. (2012). Why researchers should think ‘within-person’: A paradigmatic rationale. In M. R. Mehl, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 43–61). New York, NY: Guilford Press.
- Hektner, J. M. (2012). Developmental psychology. In M. R. Mehl, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 585–600). New York, NY: Guilford Press.
- Hersey, R. B. (1932). Rate of production and emotional state. *Personnel Journal*, *10*, 355–364.
- Hobfoll, S. E. (2002). Social and psychological resources and adaptation. *Review of General Psychology*, *6*(4), 307–324. doi:10.1037//1089-2680.6.4.307
- Hockey, G. R. J. (1993). Cognitive-energetical control mechanisms in the management of work demands and psychological health. In A. Baddeley, & L. Weiskrantz (Eds.), *Attention: Selection, awareness, and control* (pp. 328–345). Oxford, UK: Clarendon Press.
- Janke, W., Erdmann, G. & Kallus, W. (1985). *Stressverarbeitungsfragebogen SVF-E*. Göttingen: Hogrefe.
- Jimmieson, N. L., Tucker, M. K., & Walsh, A. J. (2017). Interaction effects among multiple job demands: An examination of healthcare workers across different contexts. *Anxiety, Stress, & Coping*, *30*(3), 317–332. doi:10.1080/10615806.2016.1229471
- Johnston, D. W., Bell, C., Jones, M. C., Farquharson, B., Allan, J., Schofield, P., Ricketts, I., & Johnston, M. (2016). Stressors, appraisal of stressors, experienced stress and cardiac response: A real-time, real-life investigation of work stress in nurses. *Annals of Behavioral Medicine*, *50*, 187–197. doi:10.1007/s12160-015-9746-8

- Johnston, D. W., Jones, M. C., Charles, K., McCann, S. K., & McKee, L. (2013). Stress in nurses: Stress-related affect and its determinants examined over the nursing day. *Annals of Behavioral Medicine*, *45*, 348–356. doi:10.1007/s12160-012-9458-2
- Karasek, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly*, *24*(2), 285–308. doi:10.2307/2392498
- Kemery, E. R. (2006). Clergy role stress and satisfaction: Role ambiguity isn't always bad. *Pastoral Psychology*, *54*(6), 561–570. doi:10.1007/s11089-006-0024-3
- Krosnick, J. A. (1991). Response strategies for coping with the cognitive demands of attitude measures in surveys. *Applied Cognitive Psychology*, *5*(3), 213–236. doi:10.1002/acp.2350050305
- Kühnel, J., Sonnentag, S., & Bledow, R. (2012). Resources and time pressure as day-level antecedents of work engagement. *Journal of Occupational and Organizational*, *85*(1), 181–198. doi:10.1111/j.2044-8325.2011.02022.x
- Latner, J. D. & Wilson, G. T. (2002). Self-monitoring and the assessment of binge eating. *Behavior Therapy*, *33*(3), 465–477. doi: 10.1016/S0005-7894(02)80039-9
- LePine, J. A., Podsakoff, N. P., & LePine, M. A. (2005). A meta-analytic test of the challenge stressor-hindrance stressor framework: An explanation for inconsistent relationships among stressors and performance. *Academy of Management Journal*, *48*(5), 764–775. doi:10.5465/AMJ.2005.18803921
- Liu, H., Ngo, H. Y., & Cheung, F. M. (2016). Work-family enrichment and marital satisfaction among Chinese couples: A crossover-spillover perspective. *International Journal of Stress Management*, *23*(2), 209–231. doi:10.1037/a0039753
- MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. *Annual Review of Psychology*, *58*, 593–614. doi:10.1146/annurev.psych.58.110405.085542

- Martínez, M. A., Garcia-Puig, J., Martin, J. C., Guallar-Castillón, P., Aguirre de Cárcer, A., Torre, A. et al. (1999). Frequency and determinants of white coat hypertension in mild to moderate hypertension: A primary care-based study. *American Journal of Hypertension*, *12*(3), 251–259. doi:10.1016/s0895-7061(98)00262-3
- Meade, A. W., & Craig, S. B. (2012). Identifying careless responses in survey data. *Psychological Methods*, *17*(3), 437–455. doi:10.1037/a0028085
- Merrilees, C. E., Goeke-Morey, M. & Cummings, E. M. (2008). Do event-contingent diaries about marital conflict change marital interactions? *Behaviour Research and Therapy*, *46*(2), 253–262. doi:10.1016/j.brat.2007.11.007
- Michel, A., Turgut, S. Hoppe, A., & Sonntag, K. (2016). Challenge and threat emotions as antecedents of recovery experiences: Findings from a diary study with blue-collar workers. *European Journal of Work and Organizational Psychology*, *25*(5), 674–689. doi:10.1080/1359432X.2015.1128414
- Mitchell, T. R., Thompson, L., Peterson, E., & Cronk, R. (1997). Temporal adjustments in the evaluation of events: The “Rosy View”. *Journal of Experimental Social Psychology*, *33*(4), 421–448. doi:10.1006/jesp.1997.1333
- Myers, C. S. (1933). Reviewed work: Workers' emotions in shop and home: A study of individual workers from the psychological and physiological standpoint. *The Economic Journal*, *43*, 136–139.
- Myin-Germeys, I. (2012). Psychiatry. In M. R. Mehl, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 636–650). New York, NY: Guilford Press.
- Podsakoff, N. P., LePine, J. A., & LePine, M. A. (2007). Differential challenge stressor-hindrance stressor relationships with job attitudes, turnover intentions, turnover, and withdrawal behavior: A meta-analysis. *Journal of Applied Psychology*, *92*(2), 438–454. doi:10.1037/0021-9010.92.2.438

- Podsakoff, N. P., Spoelma, T. M., Chawla, N., & Gabriel, A. S. (2019). What predicts within-person variance in applied psychology constructs? An empirical examination. *Journal of Applied Psychology, 104*(6), 727–754. doi:10.1037/apl0000374
- Reis, E. L. (2012). Why researchers should think 'real-world': A conceptual rationale. In M. R. Mehl, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 3–21). New York, NY: Guilford Press.
- Riedl, E. M., & Thomas, J. (2019). The moderating role of work pressure on the relationships between emotional demands and tension, exhaustion, and work engagement: An experience sampling study among nurses. *European Journal of Work and Organizational Psychology, 28*(3), 414–429. doi:10.1080/1359432X.2019.1588251
- Schwarz, E. L. (2012). Why researchers should think 'real-time': A cognitive rationale. In M. R. Mehl, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 22–43). New York, NY: Guilford Press.
- Siegrist, J. (2002). Effort–reward imbalance at work and health. In P. L. Perrowe, & D. C. Ganster (Eds.), *Historical and current perspectives on stress and health* (pp. 261–291). New York, NY: JAI Elsevier.
- Silvia, P. J., Kwapil, T. R., Eddington, K. M., & Brown, L. H. (2013). Missed beeps and missing data: Dispositional and situational predictors of non-response in experience sampling research. *Social Science Computer Review, 31*(4), 471–481. doi:10.1177/0894439313479902
- Simbula, S. (2010). Daily fluctuations in teachers' well-being: A diary study using the Job Demands-Resources model. *Anxiety, Stress, and Coping, 23*(5), 563–584. doi:10.1080/10615801003728273
- Society for Ambulatory Assessment (2014). *Ambulatory Assessment: Methods*. <http://www.saa2009.org>

- Stone, A. A., & Broderick, J. E. (2009). Protocol compliance in real-time data collection studies. In R. F. Belli, F. P. Stafford, & D. F. Alwin (Eds.), *Calendar and time diary methods in life course research* (pp. 243–256). Thousand Oaks, CA: Sage.
- Stone, A. A., Broderick, J. E., Schwartz, J. E., Shiffman, S., Litcher-Kelly, L., & Calvanese, P. (2003). Intensive momentary reporting of pain with an electronic diary: Reactivity, compliance, and patient satisfaction. *Pain, 104*, 343–351.
- Stone, A. A., Shiffman, S., Schwartz, J. E., Broderick, J. E., & Hufford, M. R. (2002). Patient non-compliance with paper diaries. *The BMJ, 324*, 1193–1194.
- Tadić, M., Bakker, A. B., & Oerlemans, W. G. M. (2015). Challenge versus hindrance job demands and well-being: A diary study on the moderating role of job resources. *Journal of Occupational and Organizational Psychology, 88*(4), 702–725. doi:10.1111/joop.12094
- Trull, T. J., Ebner-Priemer, U. W., Brown, W. C., Tomko, R. L., & Scheiderer, E. M. (2012). Clinical psychology. In M. R. Mehl, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 620–635). New York, NY: Guilford Press.
- Van den Broeck, A., De Cuyper, N., De Witte, H., & Vansteenkiste, M. (2010). Not all job demands are equal: Differentiating job hindrances and job challenges in the Job Demands-Resources model. *European Journal of Work and Organizational Psychology, 19*(6), 735–759. doi:10.1080/13594320903223839
- Van Steenbergen, E. F., Kluwer, E. S., & Karney, B. R. (2014). Work-family enrichment, work-family conflict, and marital satisfaction: A dyadic analysis. *Journal of Occupational Health Psychology, 19*(2), 182–194. doi:10.1037/a0036011
- Van Woerkom, M., Bakker, A. B., & Nishii, L. H. (2016). Accumulative job demands and support for strength use: Fine-tuning the job demands-resources model using conservation of resources theory. *Journal of Applied Psychology, 101*(1), 141–150. doi:10.1037/apl0000033

Wimmer, E. M., & Thomas, J. (2016). The buffer-effect of control on distress in three different demand settings: An experience sampling study of the moderating influence of desire for control. Poster session presented at the 50th conference of the German Psychological Society, Leipzig, Deutschland.

Xanthopoulou, D., & Bakker, A. B. (2013). State work engagement: The significance of within- person fluctuations. In A. B. Bakker, & K. Daniels (Eds.), *A day in the life of a happy worker* (pp. 25–40). Hove, UK: Psychology Press.

Xanthopoulou, D., Bakker, A. B., Heuven, E., Demerouti, E., & Schaufeli, W. B. (2008). Working in the sky: A diary study on work engagement among flight attendants. *Journal of Occupational Health Psychology, 13*(4), 345–356. doi:10.1037/1076-8998.13.4.345

The moderating role of work pressure on the relationships between emotional demands and tension, exhaustion, and work engagement: An experience sampling study among nurses

Elisabeth M. Riedl¹ and Joachim Thomas¹

¹Department of Psychological Assessment and Intervention, Faculty of Philosophy and Education, Catholic University of Eichstätt-Ingolstadt, Germany

The Version of Record of this manuscript has been published and is available in the European Journal of Work and Organizational Psychology, 11 March 2019, <http://www.tandfonline.com/10.1080/1359432X.2019.1588251>

Abstract

The purpose of this study is to examine the moderating role of state work pressure (conceived as a hindrance demand) on the relationships between situational emotional demands (conceived as a challenge demand) and tension, emotional exhaustion and work engagement within nursing while considering job resources as covariates. Ninety-seven nurses from two German hospitals provided 1026 measurements. Multilevel analyses indicated a significant Work Pressure x Emotional Demands interaction for emotional exhaustion, with high situational work pressure exacerbating the positive association between state emotional demands and emotional exhaustion. Furthermore, work pressure moderated the relationship between emotional demands and vigour: state emotional demands related negatively to vigour only when work pressure was higher than usual, while the relationship was non-significant when work pressure was lower than usual. For dedication, similar results were obtained: state emotional demands were negatively associated with dedication only when combined with high situational work pressure; with low situational work pressure, state emotional demands did not relate to dedication. Contributing to the job demands-resources literature, this study shows that there are stress-exacerbating and stress-buffering interactions between different job demands from a within-subject perspective. However, we did not find positive relationships between challenge demands and work engagement, even in the case of low situational hindrances, indicating that there are conditions for the functioning of job demands as a challenge beyond hindrances.

Keywords: Interactions among job demands, job demands-resources theory, challenge and hindrance stressors, job strain, work engagement, experience sampling

Introduction

Cross-nationally, nurses are considered a risk group for job-related strain and burnout (Adriaenssens, De Gucht, & Maes, 2015; Aiken et al., 2001; Aiken, Clarke, Sloane, Sochalski, & Silber, 2002). In addition to the job demands that are generally encountered in working life such as time pressure, nurses are confronted with profession-specific emotional demands that arise from contact with ill people. While many studies investigate the role of job demands in nursing (e.g., Adriaenssens et al., 2015), there is a lack of empirical studies investigating their combined impact. Recently, Bakker and Demerouti (2017) called for greater attention to the interactions among various job demands. While there are a few between-subject studies on this theme (Bridger & Brasher, 2011; Faucett, Corwyn, & Poling, 2013; Fried, Ben-David, Tiegs, Avital, & Yeverechyahu, 1998; Jimmieson, Tucker & Walsh, 2017; Kemery, 2006; van Woerkom, Bakker, & Nishii, 2016), to the best of our knowledge, there is no empirical investigation of within-subject associations in the context of the interactions among job demands. A special analysis of the Stress Report of the German Federal Institute for Occupational Safety and Health (BAuA, 2014) indicates that nurses in particular are often exposed to multiple job demands: 77 % of nurses reported being frequently involved in different tasks simultaneously, while for employees in other professions, this statement held true for 58 %. Thus, for many employees, and nurses in particular, it is a fact that demands “do not occur in isolation from all other job demands” (Bakker & Demerouti, 2017, p. 278), but studies investigating the associations of interactions between multiple job demands are rare. While in light of the high prevalence of multiple job demands, such investigations are theoretically important, it may also be possible to use such findings for work design approaches.

Filling this gap is the purpose of this experience sampling study, which focuses on the real-life and real-time relationships between simultaneous job demands and situational

changes in tension, emotional exhaustion and work engagement among nurses. While tension and emotional exhaustion represent two typically investigated indicators of psychological strain (Boswell, Olson-Buchanan, & LePine, 2004), work engagement is defined as a “positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption” (Schaufeli, Salanova, González-Romá, & Bakker, 2002, p. 74). Two job demands are investigated: work pressure and emotional demands. Representing the most crucial job stressors within nursing, both demand types are considered to be important across occupations (e.g., Bakker, Demerouti, & Euwema, 2005; Bakker, van Veldhoven, & Xanthopoulou, 2010).

Beyond methodological advantages, such as high ecological validity (E. L. Reis, 2012) and a lower proneness to retrospective biases (Schwarz, 2012), the experience sampling method offers knowledge about the situational predictors of momentary job strain and engagement. Shifting the perspective from the investigation of chronic levels to the analysis of states offers new insights into the proximal antecedents of outcome variables and thus reveals more dynamic relationships (Xanthopoulou & Bakker, 2013). While both the within- and the between-subject focus are important for better understanding a phenomenon (Xanthopoulou & Bakker, 2013), the related questions and answers differ. For example, a between-subject study could examine which nurses exhibit low work engagement. This question—and conceivably the answer—is different from a within-subject study investigating which working situations are associated with a momentary increase in work engagement among nurses. While between-subject studies investigate the *who*, experience sampling studies investigate the *when* (Johnston et al., 2016). The available between-subject studies analysing interactions among job demands (Bridger & Brasher, 2011; Faucett et al., 2013; Fried et al., 1998; Jimmieson et al., 2017; Kemery, 2006; van Woerkom et al., 2016) have added knowledge about which stable job demands moderate the health-related and

motivational associations of other job demands. However, this study aims to gain insights into the associations of situations characterised by simultaneously elevated job demands. In addition to the theoretical reasons for this study's approach, knowledge about situational antecedents of strain and engagement is fruitful because the use of theories for prevention and intervention approaches requires their within-person applicability (Johnston et al., 2016), and research addressing situational relationships can reveal new intervention approaches directed at improving working situations in contrast to chronic job conditions (Demerouti & Bakker, 2011).

We elaborate previous work investigating interactions among job demands (Bridger & Brasher, 2011; Faucett et al., 2013; Fried et al., 1998; Jimmieson et al., 2017; Kemery, 2006; van Woerkom et al., 2016) by drawing on the integration of the challenge-hindrance framework into the job demands-resources theory (Crawford, LePine, & Rich, 2010; Van den Broeck, De Cuyper, De Witte, & Vansteenkiste, 2010). This theoretical framework provides the basis for differentiating two types of job demands: challenge job demands and hindrance job demands. Both demand types are characterised by a divergent functioning, which is why we assume interactions among challenge and hindrance job demands to be particularly conflictual. Furthermore, this framework allows us to derive precise and differentiated hypotheses concerning the role of interactions among challenge and hindrance demands for health-related and motivational outcomes. Another important aspect involving the development of previous work is that we control for job resources, which is of great relevance because resources, next to job demands, represent a highly important aspect of the working environment (Bakker & Demerouti, 2007).

Multiple Job Demands in Nursing and the Challenge-Hindrance Framework

A main assumption of the job demands-resources (JDR) theory (Bakker & Demerouti, 2007; Bakker & Demerouti, 2017; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Demerouti & Bakker, 2011) is that job conditions can be classified into two broad categories: job demands and job resources. Job demands refer to job conditions that require effort and are therefore associated with physiological and / or psychological costs (Demerouti et al., 2001). Job resources are defined as aspects of the job that either reduce the negative effects of high job demands or support goal attainment or personal growth (Demerouti et al., 2001). While job demands are thought to be decisive in the health-impairment process, leading to strain, exhaustion and health problems, job resources—promoting work engagement and performance—play a crucial role within the motivational process (Demerouti & Bakker, 2011). To explain why job demands are costly, the JDR theory draws on Hockey's (1993) control model of demand management: individuals who are confronted with high job demands engage in performance-protection strategies that are characterised by the investment of psychological and physiological resources. Following the conservation of resources (COR) theory (Hobfoll, 2002), the depletion of resources due to coping with high demands provokes stress. However, at a later stage in this process and provided that coping succeeds, stressors may contribute to resource gain (Hobfoll, 2002). Thus, job demands are not necessarily negative (Bakker & Demerouti, 2007).

The JDR theory emphasises that the issue of which concrete demands are crucial depends on the occupational context (Bakker & Demerouti, 2007). Many studies on nursing assess two types of job demands—work pressure and emotional demands—allowing the conclusion that these demands are considered the most important demand types with which nurses are confronted (Bakker et al., 2010; Bakker & Sanz-Vergel, 2013; van Woerkom et al., 2016). Work pressure relates to quantitative aspects of demands in terms of the pace and amount of

work (Gelsema, van der Doef, Maes, Akerboom, & Verhoeven, 2005; Pisanti et al., 2015; van Woerkom et al., 2016). From a between-subject perspective, work pressure in nursing is positively associated with burnout, psychological distress, somatic complaints (Gelsema et al., 2005; Pisanti et al., 2015), and absenteeism¹ (Trybou et al., 2014; van Woerkom et al., 2016). Moreover, there is evidence that high quantitative job demands in terms of a high patient-to-nurse ratio represent a risk factor not only for burnout but also for patient safety (Aiken et al., 2002). However, nurses are further confronted with profession-specific emotional demands that arise from contact with ill people. From a between-subject perspective, emotional demands in nursing have been shown to be positively associated with stress (Balducci, Avanzi, & Fraccaroli, 2014; Cho, Park, Jeon, Chang, & Hong, 2014), burnout (Cho et al., 2014; Montgomery, Spânu, Băban, & Panagopoulou, 2015), and poor health and sleeping difficulties (Cho et al., 2014) over and above a nurse's work pressure.

In summary, from a between-subject perspective, both work pressure and emotional demands have consistently been found to be associated with impaired health and increased strain, as predicted by the JDR (Bakker & Demerouti, 2007; Bakker & Demerouti, 2017; Demerouti et al. 2001; Demerouti & Bakker, 2011). However, while the JDR does not make assumptions regarding the direct associations between job demands and motivational outcomes, the challenge-hindrance framework (Cavanaugh, Boswell, Roehling, & Boudreau, 2000; LePine, Podsakoff, & LePine, 2005; Podsakoff, LePine, & LePine, 2007) proposes that job demands are also important for motivational outcomes.

Within the challenge-hindrance framework (Cavanaugh et al., 2000; LePine et al., 2005; Podsakoff et al., 2007), two types of job demands are differentiated. While stressors, such as red tape, that constrain personal growth and interfere with goal attainment are classified as

¹ Schaufeli, Bakker, and Van Rhenen (2009) identified absence duration as an indicator of health impairment and absence frequency as an indicator of motivation. Based on this finding, we report studies investigating absenteeism depending on operationalisation either in the section relating to health impairment or in the section about motivational outcomes.

hindrance demands that are deleterious to motivation and satisfaction, challenge demands, such as responsibility, have the potential to encourage personal development and achievement and are therefore suggested as being favourable for motivational outcomes (Cavanaugh et al., 2000; LePine et al., 2005; Podsakoff et al., 2007). The differential functioning of challenge and hindrance demands is theoretically reasoned by Lazarus and Folkman's (1987) stress appraisals (Cavanaugh et al., 2000; LePine et al., 2005; Podsakoff et al., 2007): while hindrance demands are appraised as threatening by employees, challenge demands are supposed to elicit challenge appraisals. Challenge and hindrance appraisals are associated with differential affective states such as hope or anxiety and depending on the outcome of the appraisal process, people choose specific strategies to deal with these situations, i. e., coping, which differ in their effectiveness (Lazarus & Folkman, 1987). Both appraisals and coping strategies influence short-term psychological well-being in terms of affect and physiological changes and in the long run, health (Lazarus & Folkman, 1987).

However, Lazarus and Folkman's (1987) transactional stress theory alone does not explain why challenge and hindrance demands are related differentially to motivational outcomes. LePine et al. (2005) explain the differential relationships between challenge and hindrance demands and motivation by referring to the expectancy theory by Vroom (1964). Following this theory, motivation will be high when an individual expects that a demand can be effectively coped with by action (expectancy) accompanied by the belief that successfully meeting the demand will lead to an outcome (instrumentality) that is positively valued by the individual (valence). LePine et al. (2005) argue that challenge demands are favourable for motivation because people believe that invested effort will increase the probability of meeting them. Furthermore, challenge demands are supposed to be characterised by the perception of a positive relationship between successful coping and valued outcomes (LePine et al., 2005).

Indeed, three meta-analyses provide empirical support for the differential roles of challenge and hindrance demands on motivational outcomes: while both types of demands showed positive relationships with strain (LePine et al., 2005; Podsakoff et al., 2007) and burnout (Crawford et al., 2010), hindrance demands were associated with lower levels, and challenge demands were associated with higher levels of motivation (LePine et al., 2005), job satisfaction, commitment (Podsakoff et al., 2007), and work engagement (Crawford et al., 2010). Predicting general well-being from a between-subject perspective, Widmer, Semmer, Kälin, Jacobshagen, and Meier (2012) showed that challenge demands showed positive relationships to strain on the one hand and to organisation-based self-esteem on the other, while the ambivalent role of challenge demands explained why they did not exhibit a clear association with general well-being. Conducting an experience sampling study, Tadić, Bakker, and Oerlemans (2015) found that daily hindrance job demands were negatively associated with positive affect and work engagement, while daily challenge demands showed positive relationships with both outcome variables.

Bakker and Sanz-Vergel (2013), however, assessed nurses' chronic perceptions of work pressure and emotional demands as either hindrance or challenge and showed that in nursing, work pressure, which is typically classified as a challenge demand, is appraised more as a hindrance, while emotional demands represent a challenge for nurses. Thus, the classification of demands as challenges versus hindrances seems to be occupation-specific.

Supporting the view of emotional demands as a challenge in nursing, de Jonge, Le Blanc, Peeters, and Noordam (2008) found a positive relationship between chronic emotional demands and creativity and work motivation. Recently, Moloney, Boxall, Parsons, and Cheung (2018) adopted a between-subject perspective on nurses' intentions to leave the organisation and profession. They found that challenging emotional demands in terms of patient suffering predicted higher work engagement, which mediated the negative

associations between emotional demands and intentions to leave. The challenging role of emotional demands in nursing is not surprising, as the desire to help and care for people is a central reason that nurses choose and continue to work in this profession (Eley, Eley, Bertello, & Rogers-Clark, 2012; Kirpal, 2004; Newton, Kelly, Kremser, Jolley, & Billet, 2009).

Arguably, high work pressure can interfere with the primary goal of providing high-quality care and thus may be appraised as a hindrance stressor in nursing. Van Bogaert et al. (2017) performed semi-structured interviews with nurses. The respondents stated that unacceptable workload resulted in a failure to meet patients' care demands. Conducting a qualitative study across four European countries, Kirpal (2004) identified work intensification as a central common theme that conflicted with patient-oriented care. In the cross-sectional between-subject study by MacPhee, Dahinten, and Havaei (2017), compromised professional standards and tasks left undone mediated the negative relationship between heavy workloads and job satisfaction. The view of work pressure as a hindrance demand in nursing is supported by other studies that found negative associations between work pressure and motivational outcomes (turnover intentions: Moloney et al., 2018; Peterson, Hall, O'Brien-Pallas, & Cockerill, 2011; absence frequency: Trybou et al., 2014; job dissatisfaction: Aiken et al., 2002; Peterson et al., 2011; Pisanti et al., 2015).

Thus, we conceived emotional demands as challenge demands and work pressure as a hindrance demand. However, it should be noted that there are empirical findings contradicting this classification. In the nursing study of Montgomery et al. (2015), for example, emotional demands were associated with lower vigour and dedication, even when work pressure and organisational demands were controlled, while the relationship between work pressure and dedication became insignificant once emotional and organisational demands were considered. While studies investigating the role of emotional demands in

nursing found positive (e.g., de Jonge et al., 2008) and negative associations (e.g., Montgomery et al., 2015) with motivational outcomes, we did not find a study reporting a positive relationship between work pressure and work engagement or job satisfaction. Thus, the role of emotional demands in nursing is not straightforward, but for work pressure, there is little evidence for its functioning as a challenge.

The Job-Demands Resources Theory and Interactions among Job Demands

While work pressure—at least theoretically and at least to some extent—could be directly reduced by organisational improvements, this reduction does not apply to emotional demands, which result from interacting with ill people and therefore represent an unchangeable core requirement of the nursing profession. In this respect, the exploration of options to buffer these stressors is decisive. One very prominent theory addressing this question is the JDR theory (Bakker & Demerouti, 2007; Bakker & Demerouti, 2017; Demerouti & Bakker, 2011).

Demands x Demands Interactions Within the Health-Impairment Process

The definition of job resources of the JDR (Bakker & Demerouti, 2007; Bakker & Demerouti, 2017; Demerouti & Bakker, 2011) includes the assumption that job resources can buffer the negative impact of job demands within the health-impairment process. Following COR theory (Hobfoll, 2002), the depletion of resources due to coping with high demands provokes stress. However, when the resource loss associated with meeting high demands is balanced by other resources, well-being may not be damaged. Furthermore, resources by definition increase the probability of success, while COR theory (Hobfoll, 2002) assumes that successfully coping with stressful events protects the resource pool from essential depletion and even has the potential to finally increase the available resources.

However, Bakker and Demerouti (2017) recently broached the issue of the interactions among job demands, referring to the future of the JDR model, and suggest that multiple job

demands may show a stress-exacerbating interaction within the health-impairment process. Following COR theory (Hobfoll, 2002), the high level of one job demand consumes energy and resources, which increases individuals' vulnerability when they are simultaneously confronted with other job demands.

While the JDR model assumes that the harmful effects of job demands may be buffered by job resources, Jimmieson et al. (2017) recently proposed that a low level of one job demand could show a similar stress-buffering role that offsets the deleterious association of another job demand. Kahn and Byosiere (1992) supposed that buffer effects occur because stress buffers either modify the generation or appraisal of the stressor or modify the coping or health response to it. We assume that the absence of hindrance demands may, similar to job resources, alter the perception of a challenge demand and allow purposeful coping, which could prevent the harmful health-related associations of challenge demands. For example, having enough time to meet high emotional demands may be as stress reducing as the feeling of being supported. To give a concrete example, a working situation in the context of nursing could be characterised by high emotional demands when a seriously ill patient refuses a necessary treatment. In this situation, it should be beneficial to obtain support from other nurses. However, low work pressure may also be helpful for a nurse in this situation, as it allows her or him to provide the patient with accurate and detailed information and to inform and include his or her relatives, for example. Regardless of the outcome, the certainty of having done everything possible in this situation may alleviate the nurse's feelings of tension and emotional exhaustion. Van den Broeck et al. (2010) proposed that challenge demands may always cost energy, but this energy investment need not be associated with subsequent exhaustion. We expect that this reasoning may be particularly true when high challenge demands meet low hindrance demands.

Indeed, there is between-subject evidence for the assumptions of the stress-buffering and stress-exacerbating interactions of multiple job demands within the health impairment process. Bridger and Brasher (2011) investigated office workers and found that cognitive task demands increased the negative relationship between self-control demands and mental well-being and vice versa. In van Woerkom et al.'s (2016) study of employees at a mental health care organisation, high workload strengthened the positive relationship between emotional demands and absenteeism from a between-subject perspective. For employees reporting low workload, emotional demands were not significantly associated with absenteeism, indicating that low workload acted as a buffer. In two between-subject studies conducted by Jimmieson et al. (2017), evidence for stress-exacerbating interactions were found for combinations of emotional demands and cognitive / time demands on strain, burnout, sleep problems and stress-remedial intentions. Furthermore, low levels of cognitive demands and time demands were found to buffer the positive associations of emotional demands with these outcome variables: At low levels of cognitive / time demands, high emotional demands were only marginally related to strain and were unrelated to burnout, sleep problems and stress-remedial intentions. Integrating the assumptions of stress-buffering (Jimmieson et al., 2017) and stress-exacerbating interactions (Bakker & Demerouti, 2017; Hobfoll, 2002; Jimmieson et al., 2017) among multiple job demands into the challenge-hindrance framework (Crawford et al., 2010; Van den Broeck et al., 2010), we hypothesise that state emotional demands positively relate to tension (hypothesis 1) and emotional exhaustion (hypothesis 2) only when work pressure is higher than usual (hypothesis 1a; hypothesis 2a), while these relationships will be non-significant when work pressure is lower than usual (hypothesis 1b; hypothesis 2b).

Demands x Demands Interactions Within the Motivational Process

The JDR model assumes that the motivational process is mainly determined by job resources (Bakker & Demerouti, 2007; Bakker & Demerouti, 2017; Demerouti et al., 2001;

Demerouti & Bakker, 2011). Fostering learning and personal development, job resources favour intrinsic motivation (Bakker & Demerouti, 2007). Furthermore, job resources play an extrinsic motivational role as they support goal attainment (Bakker & Demerouti, 2007). Job demands are supposed to be important within the motivational process as moderators of job resources (Bakker & Demerouti, 2007). Drawing on COR theory (Hobfoll, 2002), job resources are supposed to gain salience under demanding conditions (Demerouti & Bakker, 2007); thus, job demands are hypothesised to boost the positive relationship between job resources and work engagement.

In contrast, integrating the challenge-hindrance framework into the JDR model, Crawford et al. (2010) and Van den Broeck et al. (2010) found that job demands had a predictive value for motivational outcomes above and beyond job resources when they were differentiated into challenge and hindrance stressors. In the meta-analysis by Crawford et al. (2010), challenge demands were positively related and hindrance demands were negatively related to work engagement. Van den Broeck et al. (2010) showed that both demand types related differentially to vigour (absorption and dedication were not included): hindrance demands showed a negative and challenge demands a positive association.

While there is evidence for the role of job demands within the motivational process, only a few studies address the role of interactions between various job demands. Based on empirical findings about the challenge-hindrance framework (Crawford et al., 2010; LePine et al., 2005; Podsakoff et al., 2007; Tadić et al., 2015; Van den Broeck et al., 2010), high challenge demands should generally play a beneficial role in motivational outcomes. However, we would expect situations in which high hindrance demands coincide with high challenge demands to result in decreased work engagement. Challenge demands are thought to function as challenges when people believe that successfully coping with them increases the probability of desired outcomes (LePine, LePine, & Jackson, 2004). In the context of nursing,

it can be argued that successfully coping with emotional demands will often require a time investment and an attentional focus when the primary motive of a high quality of care should be satisfied.

In line with these assumptions are the findings of Kemery (2006), who observed the lowest levels of stable job satisfaction among clergy who perceived chronically high role ambiguity and high role conflict, while in the presence of low role conflict, role ambiguity was associated with an increased rather than decreased appointment satisfaction. Wincent and Örtqvist (2011) conducted a three-year longitudinal study among managers. Classified as a hindrance stressor, low role ambiguity allowed role overload and role conflict to act as challenge stressors that increased positive affect. Based on the argumentation presented above, we hypothesise that situational emotional demands relate negatively to work engagement (vigour: hypothesis 3, dedication: hypothesis 4, and absorption: hypothesis 5) when work pressure is higher than usual (hypothesis 3a; hypothesis 4a; hypothesis 5a) but will be positively related to work engagement when work pressure is lower than usual (hypothesis 3b; hypothesis 4b; hypothesis 5b).

Method

Sample and Procedure

This study was conducted among nurses in the medical and surgical wards of two general hospitals in Germany. After obtaining consent from the nursing directors and work councils of both hospitals, this study was presented at a meeting of head nurses, who distributed information sheets to their teams. Nurses who were willing to participate in the study were asked to indicate the date and time of five upcoming shifts on the last page of the information sheet and to retain the front page to transfer the study materials via their participant number. On each ward, the shift schedules were collected in an envelope. From the first hospital, 47

out of 54 information sheets were returned; from the second hospital, 64 out of 84 information sheets were returned. Via the participant number on the information sheets, the study materials were anonymously transferred to the nurses (the nurses were asked to retain their information sheet or to note or memorise their participant code until the packages were stored in the unit rooms for collection a few days later). The package contained instructions, a general questionnaire, a smartphone with a charger and an envelope for the return transfer. Using the movisensXS app (movisens GmbH, Karlsruhe, Germany) the experience sampling data were collected over a maximum of five shifts, with a maximum of three surveys per shift, signal-contingently at random times, with a minimum of two hours between two prompts and a minimum of two hours after the start of the shift. In the event of inappropriate timing, the participants could postpone data entry for up to 20 minutes. The average length of shifts was $M = 7.73$ hours ($SD = 0.83$). Sixty-two percent of the shifts started between 6:00 and 9:00, 32 % started between 10:00 and 15:00 and the remaining 6 % started between 19:00 and 23:00. The majority of the participants (67 %) reported rotating shifts for the study sample.

Fourteen nurses were excluded from the analyses because they either did not complete the demographic questions or provided only one level 1 measurement. The remaining 97 participants completed the smartphone survey 6.3 times on average (range: 2–15), yielding 1026 measurements and a compliance rate of 66 % (for some participants fewer than 15 prompts were the maximum; overall, 1560 prompts were programmed). We know from the nursing directors that some values were missing due to swapped shifts and sick leave. Waiving individual-related data, we did not collect these data, and thus we could not differentiate between these types of missing data and actually ignored or missed alarms.

Thirty-eight nurses worked in the first clinic and 59 nurses worked in the second clinic. Eighty-five of the nurses were female, and twelve of the nurses were male. Forty-eight of the

participants were between 18 and 29 years old, and 49 of the participants were more than 29 years old. Sixty-nine participants were engaged full-time; 28 participants were engaged part-time.

Measures

Each item of the smartphone questionnaire was rated on a seven-point Likert scale ranging from *not at all* (1) to *to a great extent* (7). The items measuring state job demands and resources were introduced by the phrase “During the past two hours...”. The outcome variables were rated referring to “At the moment...”.

Covariates. This study draws on the integration of the challenge-hindrance framework into the job demands-resources theory (Crawford et al., 2010; Van den Broeck et al., 2010), in which three categories of job conditions are distinguished: challenge and hindrance job demands and job resources. Like job demands, job resources constitute a highly important aspect of the working environment (Bakker & Demerouti, 2007). Thus, we included state job resources in terms of job autonomy and social support as covariates. Job autonomy and social support represent the most-often investigated job resources and have found to be important in many studies (Bakker et al., 2005; Pisanti et al., 2015; Van den Broeck et al., 2010; Xanthopoulou et al., 2007). Oriented towards the German version (Nübling, Stöbel, Hasselhorn, Michaelis, & Hofmann, 2005) of the Copenhagen Psychosocial Questionnaire (COPSOQ; Kristensen, Borg, & Hannerz, 2002), job autonomy was measured with the item “...I had a great decision latitude” and social support was measured with the item “...I felt supported in my work”.

State job demands. Adapted from the German version (Nübling et al., 2005) of the Copenhagen Psychosocial Questionnaire (COPSOQ; Kristensen et al. 2002), state emotional demands were measured with the single item “...my work demanded a lot of me emotionally”. Situational work pressure was assessed in terms of time-related work pressure

(item "...I was under time pressure") and attention-related work pressure (item "...I had to be attentive to many things at the same time"; COPSQ; Nübling et al., 2005).

Because both items capture somewhat different aspects of the construct work pressure, we conducted multilevel confirmatory factor analyses (for level 1 only, as this is the focused level of this study) to investigate the factor structure of the measure of work pressure. The analyses were performed using the lavaan package (Rosseel et al., 2018) in R following the procedure described by Huang (2017). Two models were compared: A one-factor model where both items loaded on a common work pressure factor, and a single-item model where time-related and attention-related work pressure represented single factors. In both models, the other constructs were included as distinct factors. The factor solution combining both work pressure items was compared to the single-item solution based on *AIC* and *BIC* (Burnham & Anderson, 2002). Furthermore, the fit measures *CFI*, *RMSEA* and *SRMR* (West, Taylor, & Wu, 2012) of the factor solution were considered. The multilevel confirmatory factor analyses supported the factor solution compared to the single items: while the difference in *AIC* preferring the single-item solution was small ($AIC_1 - AIC_2 = 3.19$), there was a large difference in *BIC* preferring the factor solution ($BIC_2 - BIC_1 = 20.98$). The factor solution showed a very good fit in terms of *CFI* (.997), *SRMR* (.013) and *RMSEA* (.042). The work pressure measure showed a within-person reliability (Nezlek, 2011) of .69, which is considered satisfactory (Johnston et al., 2016; Wilhelm & Schoebi, 2007). Therefore, in the results section the findings for the combined measure of work pressure are reported. However, because the items depict somewhat different aspects of work pressure, the results of the separate analyses of both items are reported in the footnotes. Based on the arguments presented in the introduction, emotional demands were conceived as challenge demands, and work pressure was conceived as a hindrance demand.

State tension and emotional exhaustion. State tension was measured with the item "...I feel tense", which represents a typical item of measures of job-related anxiety (e.g., Warr, 1990) or general anxiety (e.g., Symptom Checklist-90, German version by Franke, 2002). Adapted from the German version (Büssing & Perrar, 1992) of the Maslach Burnout Inventory (Maslach & Jackson, 1981), state emotional exhaustion was assessed with the item "...I feel emotionally exhausted".

State work engagement. State vigour, absorption and dedication were measured with a single item each, and these items were derived from the German version (Schaufeli, Bakker, & Salanova, 2006) of the shortened Utrecht Work Engagement Scale (Schaufeli & Bakker, 2004). Vigour was assessed with the item "...I feel strong and vigorous", absorption was assessed with the item "...I am immersed in my work" and dedication was assessed with the item "...I am enthusiastic about my job".

Data Analysis

The data were analysed by applying a multilevel modelling approach using the R packages lme4 (Bates, Mächler, Bolker, & Walker, 2015) and lmerTest (Kuznetsova, Brockhoff, & Christensen, 2017). Repeated measures were nested within nurses, which led to a two-level model with $N = 1026$ within-person measurements at level 1 and $N = 97$ between-person measurements at level 2.

Following the guideline provided by Hox (2010), the models were built stepwise starting with null models. In the next step, the level 1 predictor variables of work pressure and emotional demands, the interaction term Work Pressure x Emotional Demands and the covariates of job autonomy and social support were entered as fixed predictors. When not explicitly mentioned, the results did not change significantly when the covariates were excluded. All the predictor variables were centred within-person (Enders & Tofighi, 2007; Nezlek, 2011), while the interaction term of the person-mean centred variables Work

Pressure x Emotional Demands was entered uncentred, leading to a comprehensible reference point of zero (Nezlek, 2011).

In the third step, random effects were included. There is an ongoing debate about which structure of random effects should be applied (Barr, Levy, Sheepers, & Tily, 2013; Bates, Kliegl, Vasishth, & Baayen, 2013; Nezlek, 2011). Following Snijders and Bosker (2012), we decided to treat the interaction term as a fixed effect to avoid over-parameterisation (Bates et al., 2013) while estimating the full random effect matrix for the key variables of work pressure and emotional demands. Applying this procedure, there was little evidence for over-parameterisation because a correlation exceeded $r = .80$ in only one model (Bates et al., 2013). From our point of view, this decision represents a reasonable compromise between the desire to be as accurate as possible on the one hand (Barr et al., 2013) and the limitations of real data sets combined with the virtue of parsimony on the other hand (Bates et al., 2013; Nezlek, 2011; Snijders & Bosker, 2012).

The tables include the final model estimates based on restricted maximum likelihood estimation (Snijders & Bosker, 2012), the standardised estimates calculated by the formula provided by Hox (2010), and parameters for comparing the null model, the model including the main effects only and the full model with the interaction term Work Pressure x Emotional Demands. For the model comparisons, the analyses were refitted with the full maximum likelihood function (Snijders & Bosker, 2012).

Significant interactions between work pressure and emotional demands were probed with simple slope analyses using the online resource <http://www.quantpsy.org>, presented by Preacher, Curran, and Bauer (2006), in which conditional values of $\pm 1 SD_{\text{within}}$ (Nezlek, 2011) were chosen. This website also provides the regions of significance according to the Johnson-Neyman technique (Johnson & Neyman, 1936), which indicates the values of the moderator variable from which the simple slopes of the focal predictor are significant or not

significant. In the case that a simple slope was not in line with the hypotheses at a conditional value of $\pm 1 SD_{\text{within}}$, we report the boundary of (non-)significance if this boundary is within the range of realistic values ($\pm 3 SD_{\text{within}}$). We also provide figures to illustrate the interactions graphically.

Results

Descriptive Statistics and Preliminary Analyses

Table 1 outlines the descriptive statistics of the variables, their within- and between-person correlations and the intraclass correlations. With intraclass correlations ranging from .33 to .68, the null models of all variables indicated substantial within-person variances from one-third to two-thirds of the total variance and thus were rated differently depending on the current situation. For work pressure, emotional demands, tension and emotional exhaustion, within-subject variances outweighed between-subject differences; however, for vigour, dedication and absorption, between-subject differences accounted for a higher proportion of variance than within-subject differences, which is in line with previous studies (Breevaart, Bakker, Demerouti, & Hetland, 2012; Tadić et al., 2015; Xanthopoulou, Bakker, Heuven, Demerouti, & Schaufeli, 2008).

Table 1
Descriptive statistics of the within-subject variables

Variable	<i>M</i>	<i>SD_w</i>	<i>SD_b</i>	<i>ICC</i>	1	2	3	4	5	6	7	8	9
1. Work pressure	4.75	1.33	0.93	.33		.49**	-.09**	.10**	.49**	.35**	-.14**	-.13**	-.04
2. Emotional demands	3.51	1.31	1.04	.39	.54**		-.06	.12**	.41**	.38**	-.17**	-.09**	-.02
3. Social support	4.75	1.21	1.30	.53	-.31**	-.32**		.11**	-.16**	-.14**	.22**	.33**	.32**
4. Job autonomy	4.06	1.11	1.27	.57	.09	.24*	.15		.04	.02	.01	.07*	.13**
5. Tension	3.44	1.48	1.08	.35	.63**	.64**	-.51**	-.00		.61**	-.25**	-.18**	-.12**
6. Emotional exhaustion	3.10	1.33	1.27	.47	.52**	.73**	-.47**	.09	.83**		-.33**	-.19**	-.12**
7. Vigour	4.18	1.16	1.40	.59	-.35**	-.51**	.58**	.06	-.60**	-.71**		.36**	.29**
8. Dedication	4.40	0.94	1.36	.68	-.06	-.18	.71**	.18	-.31**	-.31**	.59**		.57**
9. Absorption	4.38	0.97	1.31	.64	-.02	-.11	.70**	.23*	-.25*	-.25*	.56**	.94**	

Note. *N*₂ (subjects) = 97, *N*₁ (number of observations) = 1026.

The possible range of the variables is 1–7. Above the diagonal, the within-person correlations are reported, and below the diagonal, the between-person correlations based on aggregated data are shown. *ICC* = intraclass correlation. *SD_w* = within-subject standard deviation. *SD_b* = between-subject standard deviation.

p* < .05; *p* < .01.

The Associations between Work Pressure, Emotional Demands and Work Pressure x Emotional Demands and Tension and Emotional Exhaustion

While state social support was negatively associated with tension ($\gamma = -0.11$, $t(903) = -3.30$, $p < .01$), situational work pressure ($\gamma = 0.43$, $t(114) = 11.20$, $p < .01$) and state emotional demands ($\gamma = 0.24$, $t(124) = 6.11$, $p < .01$) showed significant positive associations (see Table 2). The interaction between work pressure and emotional demands missed the significance threshold of $p < .05$ ($\gamma = 0.05$, $t(835) = 1.91$, $p = .057$). When no covariates were considered, the p -value of the interaction term was below the limit of $p < .05$ ($\gamma = 0.05$, $t(842) = 2.11$, $p = .035$). For tension, hypotheses 1a and 1b were rejected².

Similar to the findings for tension, situational work pressure ($\gamma = 0.23$, $t(134) = 6.21$, $p < .01$) and state emotional demands ($\gamma = 0.27$, $t(98) = 6.99$, $p < .01$) showed significant positive associations with emotional exhaustion (see Table 2), while situational social support was negatively associated with emotional exhaustion ($\gamma = -0.10$, $t(911) = -3.05$, $p < .01$). Furthermore, a significant interaction between work pressure and emotional demands was found ($\gamma = 0.05$, $t(864) = 2.02$, $p = .044$). To explore this interaction, simple slopes analyses were conducted. At work pressure lower than usual ($-1 SD_{\text{within}}$), state emotional demands showed an association of $\omega = 0.21$ ($z = 4.06$, $p < .01$) with emotional exhaustion, while at work pressure higher than usual ($+1 SD_{\text{within}}$), the association of state emotional demands with emotional exhaustion increased to $\omega = 0.34$ ($z = 6.84$, $p < .01$). Only from a state work pressure value of -2.61 , which is close to $-2 SD_{\text{within}}$, state emotional demands were not significantly related to emotional exhaustion. While these findings provide evidence for the

² In separate models, the item “I was under time pressure” showed a significant association with tension ($\gamma = 0.37$, $t(84) = 10.34$, $p < .01$), while there was no evidence for an interaction between state time pressure and state emotional demands ($\gamma = 0.03$, $t(924) = 1.41$, $p = .159$). The item “I had to be attentive to many things at the same time” was positively associated with tension ($\gamma = 0.35$, $t(57) = 9.59$, $p < .01$) and significantly moderated the association between state emotional demands and tension ($\gamma = 0.05$, $t(689) = 2.03$, $p = .043$). Simple slopes analyses revealed that the association between emotional demands and tension decreased from $\omega = 0.36$ ($z = 7.05$, $p < .01$) at $+1 SD_{\text{within}}$ to $\omega = 0.23$ ($z = 4.17$, $p < .01$) at $-1 SD_{\text{within}}$. Thus, for time-related work pressure, hypotheses 1a and 1b were rejected, while for attention-related work pressure there was support for hypothesis 1a but not for hypothesis 1b.

existence of stress-exacerbating interactions among situational job demands, supporting hypothesis 2a, they do not support the buffer hypothesis 2b: even at low situational work pressure in terms of $-1 SD_{\text{within}}$, situationally elevated emotional demands were significantly associated with increased emotional exhaustion³. Figure 1 illustrates the moderating role of situational work pressure on the association between state emotional demands and emotional exhaustion.

³ The item "...I was under time pressure" showed a main effect of $\gamma = 0.21$ ($t(160) = 6.77, p < .01$) on emotional exhaustion, while the interaction with emotional demands was $\gamma = 0.03$ ($t(898) = 1.56, p = .119$). For the item "...I had to be attentive to many things at the same time", these values were $\gamma = 0.16$ ($t(114) = 4.34, p < .01$) for the main effect and $\gamma = 0.05$ ($t(812) = 1.88, p = .060$) for the interaction with emotional demands. Thus, for both components of work pressure, hypotheses 1a and 1b were rejected.

Table 2
Multilevel model estimates for tension and emotional exhaustion

	Tension		Emotional exhaustion	
	<i>b</i> (SE)	β	<i>b</i> (SE)	β
Fixed effects				
Between-subject				
Intercept	3.41 (0.12)**		3.06 (0.14)**	
Within-subject				
Social support	-0.11 (0.03)**	-0.09	-0.10 (0.03)**	-0.09
Job autonomy	-0.01 (0.04)	-0.01	-0.03 (0.04)	-0.02
ED	0.24 (0.04)**	0.21	0.27 (0.04)**	0.27
WP	0.43 (0.04)**	0.39	0.23 (0.04)**	0.23
WP x ED	0.05 (0.02)	0.05	0.05 (0.02)*	0.06
Random effects				
	Estimates (SD)		Estimates (SD)	
Intercept	1.24 (1.11)		1.65 (1.28)	
Var (ED)	0.01 (0.11)		0.02 (0.15)	
Var (WP)	0.02 (0.13)		0.01 (0.10)	
Corr (Intercept, ED)	-.25		.21	
Corr (Intercept, WP)	.65		.06	
Corr (ED, WP)	.57		.99	
Model comparison				
	Null model	Main effects	Null model	Main effects
Residual variance	2.201	1.501	1.780	1.364
Intercept variance	1.157	1.225	1.589	1.635
-2*Log likelihood	3899.3	3570.3	3725.8	3515.2
χ^2		329.06**		210.67**
<i>df</i>		9		9
		1		1
		Inter-action		Inter-action

Note. N_2 (subjects) = 97, N_1 (number of observations) = 1026.

ED = emotional demands. WP = work pressure.

* $p < .05$; ** $p < .01$.

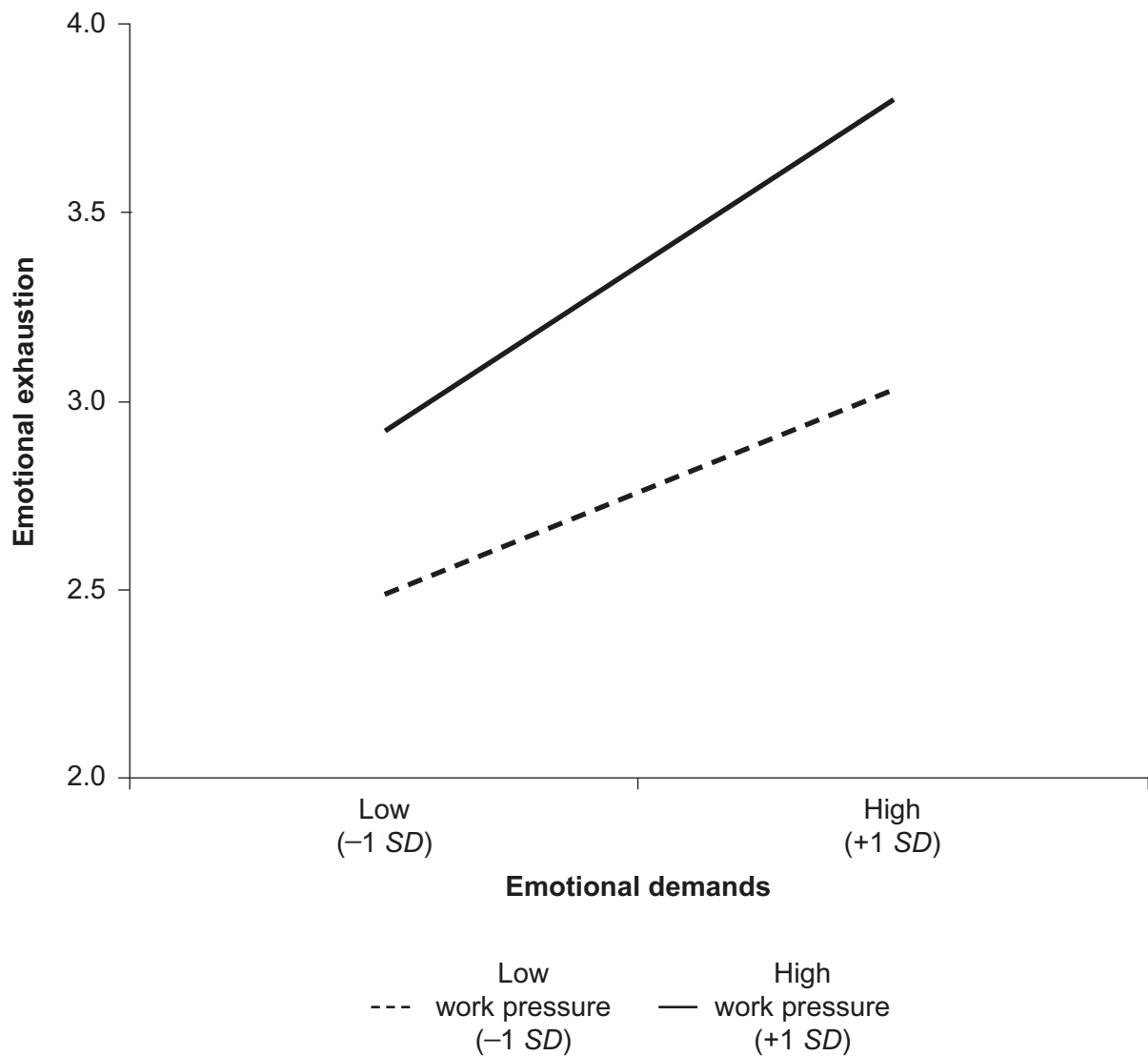


Figure 1. Moderating role of work pressure on the relationship between emotional demands and emotional exhaustion

The Associations between Work Pressure, Emotional Demands and Work Pressure x Emotional Demands and Vigour, Dedication and Absorption

Situational social support exhibited a significant positive association with vigour ($\gamma = 0.17$, $t(916) = 5.67$, $p < .01$; see Table 3). While state work pressure was not significantly associated with vigour ($\gamma = -0.07$, $t(81) = -1.83$, $p = .070$), situationally elevated emotional demands showed a negative association ($\gamma = -0.11$, $t(75) = -3.21$, $p < .01$). However, there

was a significant two-way interaction between work pressure and emotional demands ($\gamma = -0.06$, $t(773) = -2.67$, $p < .01$). Simple slopes analyses revealed that low situational work pressure ($-1 SD_{\text{within}}$) offset the negative association between state emotional demands and vigour ($\omega = -0.03$, $z = -0.67$, $p = .502$) and that there was a strong negative association between state emotional demands and vigour ($\omega = -0.19$, $z = -4.30$, $p < .01$) at high situational work pressure ($+1 SD_{\text{within}}$). However, while there was support for the stress-exacerbating hypothesis 3a, state emotional demands did not relate positively to vigour at low situational work pressure, conflicting with hypothesis 3b⁴. Figure 2 illustrates the moderating role of situational work pressure on the association between state emotional demands and vigour.

In the model for dedication, situational social support showed a significant positive association ($\gamma = 0.21$, $t(919) = 8.69$, $p < .01$) and situational work pressure showed a significant negative association ($\gamma = -0.08$, $t(76) = -2.26$, $p = .027$). State emotional demands were not associated with dedication ($\gamma = -0.02$, $t(46) = -0.57$, $p = .570$). However, state work pressure significantly moderated the association between situationally elevated emotional demands and dedication ($\gamma = -0.04$, $t(786) = -2.41$, $p = .016$). Simple slopes analyses revealed that when nurses experienced higher work pressure than their average ($+1 SD_{\text{within}}$), state emotional demands showed a negative association with dedication ($\omega = -0.07$, $z = -1.96$, $p = .050$), while at low situational work pressure ($-1 SD_{\text{within}}$), high emotional demands were not associated with dedication ($\omega = 0.04$, $z = 0.98$, $p = .326$). Because there

⁴ In separate models, the item "...I was under time pressure" showed a negative association with vigour ($\gamma = -0.08$, $t(89) = -2.21$, $p = .029$) and significantly moderated the association between emotional demands and vigour ($\gamma = -0.05$, $t(935) = -2.54$, $p = .011$). Situational emotional demands showed a negative association with vigour only in the case of high concurrent time pressure ($-1 SD_{\text{within}}$: $\omega = -0.04$, $z = -0.84$, $p = .402$; $+1 SD_{\text{within}}$: $\omega = -0.18$, $z = -4.27$, $p < .01$). The item "...I had to be attentive to many things at the same time" did not show a main effect on vigour ($\gamma = -0.04$, $t(82) = -1.02$, $p = .310$), but it significantly moderated the association between emotional demands and vigour ($\gamma = -0.05$, $t(761) = -2.11$, $p = .035$). At $-1 SD_{\text{within}}$, there was no association between state emotional demands and vigour ($\omega = -0.06$, $z = 1.26$, $p = .208$), while at $+1 SD_{\text{within}}$, state emotional demands significantly predicted lower vigour ($\omega = -0.19$, $z = 4.23$, $p < .01$). Thus, the results of both components of the work pressure measure are in line with hypothesis 3a, but they do not support hypothesis 3b.

was a negative association between state emotional demands and dedication at high situational work pressure and no significant relationship at low situational work pressure, these findings are in line with hypothesis 4a. However, they do not support hypothesis 4b, as even at low situational work pressure state emotional demands were not significantly associated with higher dedication⁵. Figure 3 provides a graphical illustration of the relationships.

While the job resources situational social support ($\gamma = 0.23$, $t(919) = 9.15$, $p < .01$) and situational job autonomy ($\gamma = 0.08$, $t(908) = 2.99$, $p < .01$) were significant predictors for absorption, neither state work pressure ($\gamma = -0.02$, $t(69) = -0.53$, $p = .598$) nor state emotional demands ($\gamma = 0.01$, $t(64) = 0.19$, $p = .851$) showed a significant relationship. There was no evidence for an interaction between the two demand types ($\gamma = -0.01$, $t(846) = -0.71$, $p = .480$). Therefore, there was no support for hypotheses 5a and 5b⁶.

Additionally, we tested the three-way interactions of emotional demands, work pressure and the job resources social support and job autonomy on the outcome variables but there was little evidence for such effects. These results are available from the authors upon request.

⁵ In separate models, the item "...I was under time pressure" showed a main effect of $\gamma = -0.07$ ($t(75) = -2.81$, $p < .01$) on dedication, and it significantly moderated the relationship between state emotional demands and dedication ($\gamma = -0.03$ ($t(787) = -2.19$, $p = .029$). However, the simple slopes analyses did not reveal straightforward results ($-1 SD_{within}$: $\omega = 0.04$, $z = 1.06$, $p = .290$; $+1 SD_{within}$: $\omega = -0.06$, $z = -1.69$, $p = .090$). Applying the Johnson-Neyman technique, the relationship between state emotional demands and dedication is significantly negative in situations where time-related work pressure takes or exceeds a value of 2.28, which is close to $+1.5 SD_{within}$. The item "...I had to be attentive to many things at the same time" did not show a main effect on dedication ($\gamma = -0.05$, $t(81) = -1.46$, $p = .147$), but it significantly moderated the association between state emotional demands and dedication ($\gamma = -0.04$, $t(791) = -2.05$, $p = .041$). Simple slopes analyses showed that situational emotional demands were associated with lower dedication only when attention-related work pressure was higher than usual ($+1 SD_{within}$: $\omega = -0.08$, $z = -2.14$, $p = .032$). When attention-related work pressure was lower than usual, state emotional demands did not relate to dedication ($-1 SD_{within}$: $\omega = 0.02$, $z = 0.49$, $p = .623$). While the results for attention-related work pressure provide support for hypothesis 4a, for time-related work pressure, this is only true at $+1.5 SD_{within}$. For both components of the work pressure measure, there was no support of hypothesis 4b.

⁶ The item "...I was under time pressure" showed a main effect of $\gamma = -0.03$ ($t(65) = -0.96$, $p = .343$) on absorption, while the interaction with emotional demands was $\gamma = -0.00$ ($t(851) = -0.27$, $p = .790$). For the item "...I had to be attentive to many things at the same time", these values were $\gamma = -0.00$ ($t(71) = -0.03$, $p = .980$) for the main effect and $\gamma = -0.02$ ($t(821) = -0.95$, $p = .345$) for the interaction with emotional demands. Thus, hypotheses 5a and 5b were rejected for both components of the work pressure measure.

Table 3
Multilevel model estimates for vigour, dedication and absorption

	Vigour		Dedication		Absorption	
	<i>b</i> (<i>SE</i>)	β	<i>b</i> (<i>SE</i>)	β	<i>b</i> (<i>SE</i>)	β
Fixed effects						
Between-subject						
Intercept	4.23 (0.15)**		4.43 (0.14)**		4.39 (0.14)**	
Within-subject						
Social support	0.17 (0.03)**	0.18	0.21 (0.02)**	0.27	0.23 (0.03)**	0.29
Job autonomy	0.00 (0.03)	0.00	0.04 (0.03)	0.04	0.08 (0.03)**	0.10
ED	-0.11 (0.03)**	-0.12	-0.02 (0.03)	-0.02	0.01 (0.03)	0.01
WP	-0.07 (0.04)	-0.08	-0.08 (0.03)*	-0.11	-0.02 (0.03)	-0.02
WP x ED	-0.06 (0.02)*	-0.09	-0.04 (0.02)*	-0.08	-0.01 (0.02)	-0.02
Random effects						
Intercept	Estimates (<i>SD</i>)		Estimates (<i>SD</i>)		Estimates (<i>SD</i>)	
Var (ED)	1.96 (1.40)		1.85 (1.36)		1.72 (1.31)	
Var (WP)	0.01 (0.09)		0.02 (0.14)		0.02 (0.15)	
Corr (Intercept, ED)	0.03 (0.19)		0.04 (0.19)		0.02 (0.15)	
Corr (Intercept, WP)	-.07	.08	.08	.08	.08	.08
Corr (ED, WP)	.04	.00	.00	.01	.01	.01
	.42	-.54	-.54	-.07	-.07	-.07
Model comparison						
Residual variance	Null model	Main effects	Null model	Main effects	Null model	Main effects
Intercept variance	1.347	1.155	0.876	0.699	0.949	0.774
-2*Log likelihood	1.932	1.954	1.830	1.849	1.692	1.711
χ^2	3481.7	3389.3	3074.9	2935.1	3142.6	3016.1
df	92.38**	7.01**	139.76**	5.69*	126.52**	0.51
	9	1	9	1	9	1

Note. N_2 (subjects) = 97, N_I (number of observations) = 1026.

ED = emotional demands. WP = work pressure.

* $p < .05$; ** $p < .01$.

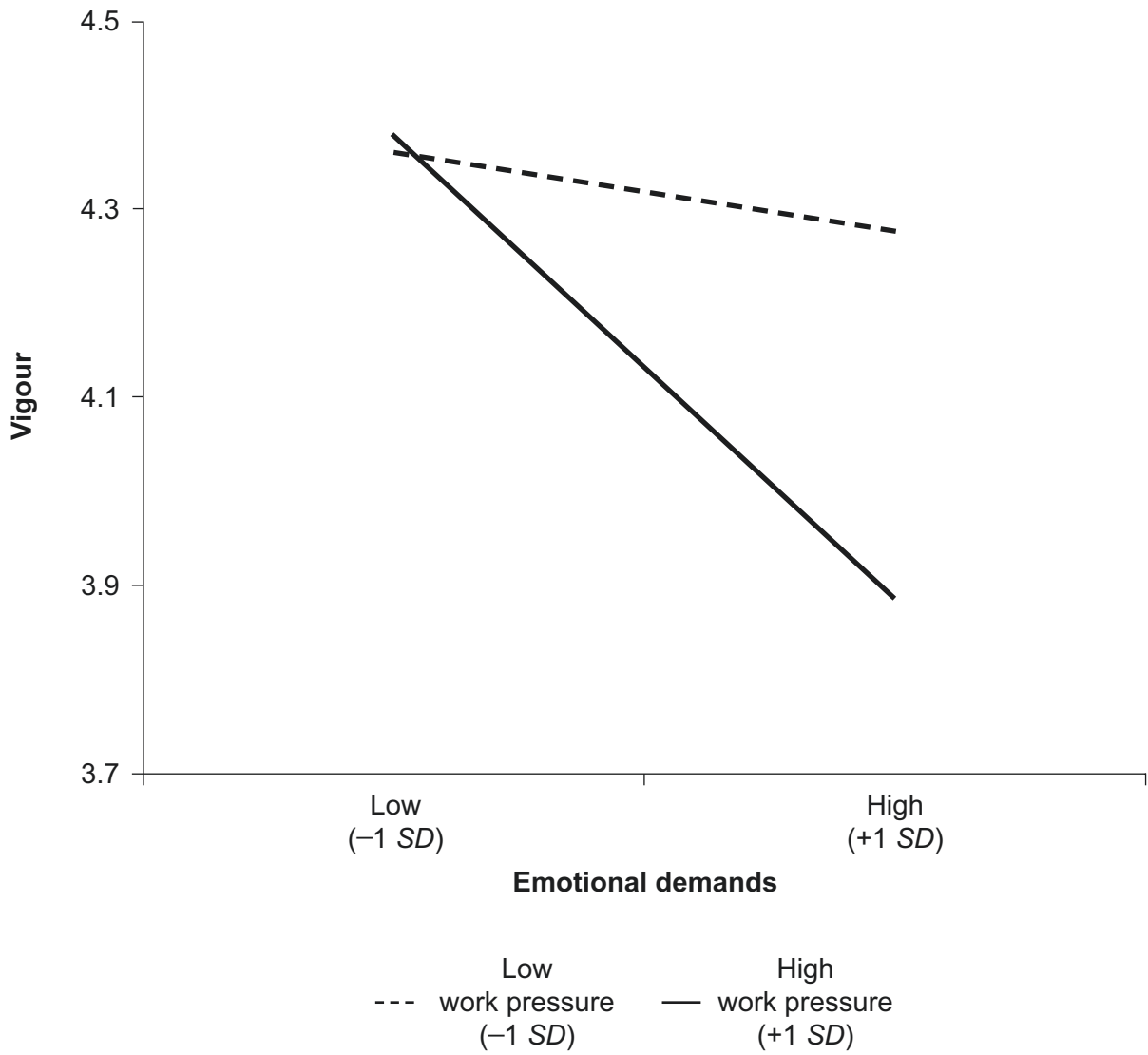


Figure 2. Moderating role of work pressure on the relationship between emotional demands and vigour

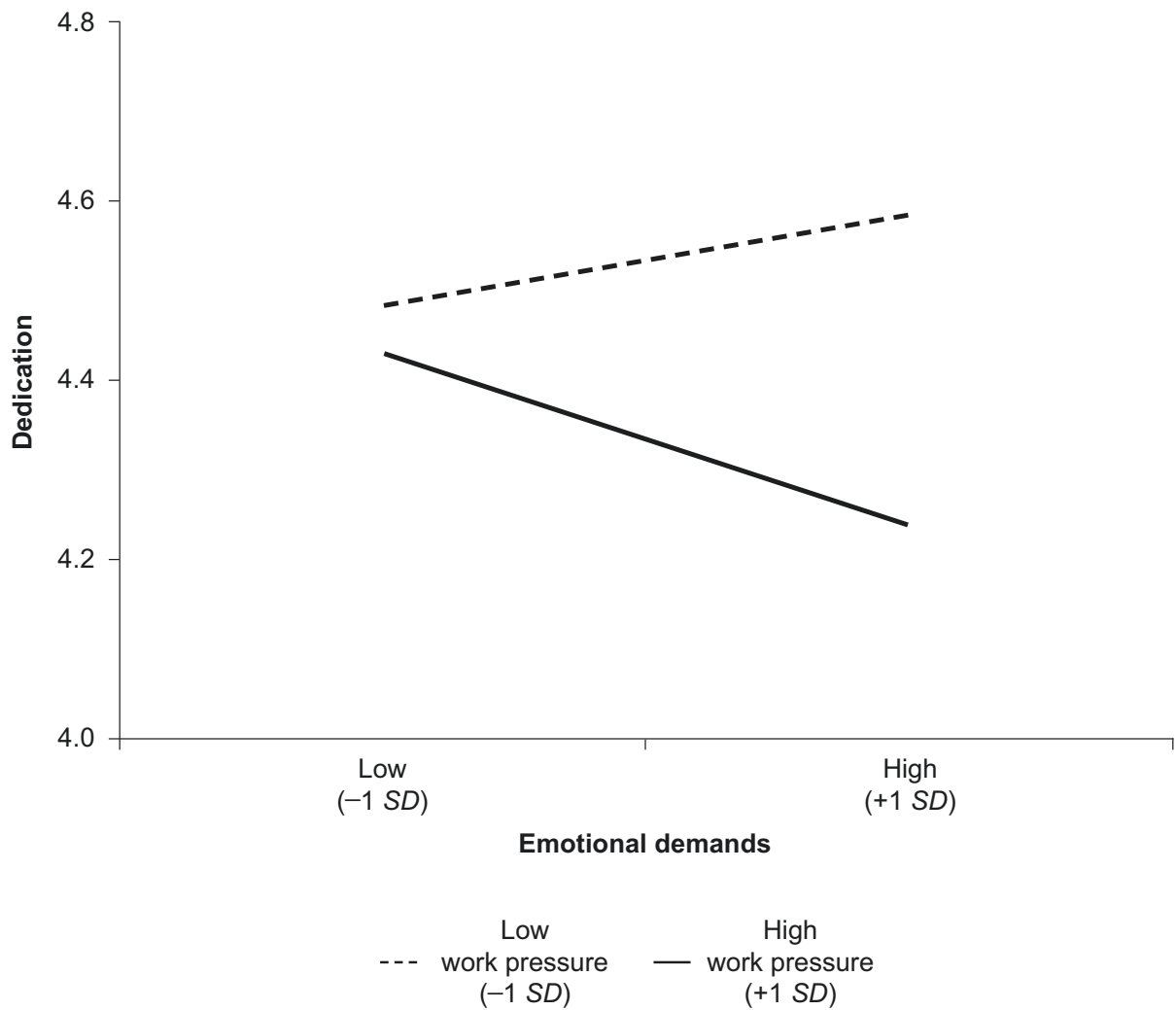


Figure 3. Moderating role of work pressure on the relationship between emotional demands and dedication

Discussion

Results and Interpretations

Based on the integration of the challenge-hindrance framework into the job demands-resources theory (Crawford et al., 2010; Van den Broeck et al., 2010), this experience sampling study aimed to gain insights into the real-life and real-time relationships between simultaneous challenge and hindrance job demands and situational changes in tension, emotional exhaustion and work engagement among nurses while considering the role of job resources. Considering the high variability of working conditions and affective well-being,

knowledge about their dynamic relationships is important from a theoretical (Xanthopoulou & Bakker, 2013) and practical (Hamaker, 2012; Johnston et al., 2016) perspective.

With respect to the health-impairment process, we hypothesised that hindrance demands in terms of high situational work pressure will exacerbate the positive association between state emotional demands and psychological strain and that low state hindrance demands will buffer this association similar to job resources. The model predicting tension narrowly failed to show a significant interaction between state work pressure and state emotional demands when the covariates were included. However, there was evidence for a stress-exacerbating role of high situational work pressure on the association between state emotional demands and emotional exhaustion, suggesting that combinations of high levels of situational job demands are particularly detrimental, as proposed by Bakker and Demerouti for between-subject relationships (2017). Contradicting the hypothesis, however, a low level of situational work pressure did not completely buffer the positive association between state emotional demands and emotional exhaustion—even at low situational work pressure, state emotional demands significantly predicted increased emotional exhaustion. Similarly, in the between-subject study of Jimmieson et al. (2017), high emotional demands at low time demands were still associated with emotional exhaustion. Thus, situationally and chronically elevated challenge demands may always be costly, which can be explained by Selye's (1956) assumption that both eustress and distress exert an activating effect on individuals, potentially leading to strain and exhaustion.

Within the motivational process, a stress-exacerbating role of high situational work pressure was found on the association between state emotional demands and vigour. Additionally, low situational work pressure acted as a buffer against the negative association between emotional demands and vigour: situationally elevated emotional demands exhibited an exhausting relationship only in situations in which work pressure was higher than the

individual average. When work pressure was lower than usual, state emotional demands were unrelated to vigour, suggesting that low situational work pressure acted as a buffer variable, by analogy with resources, offsetting the negative impact of state emotional demands.

Because there was no evidence for a challenge potential of state emotional demands on vigour, the results were more in line with the hypotheses for the health-impairment process than for the motivational process. As a dimension of work engagement, vigour is typically located within the motivational process (Van den Broeck et al., 2010). However, D. Reis, Hoppe, Arndt, and Lischetzke (2017) regarded vigour as an indicator of job strain because of its overlap with the concept of exhaustion. Indeed, it has been shown at the between-subject level that vigour can be understood as the conceptual opposite of emotional exhaustion (González-Romá, Schaufeli, Bakker, & Lloret, 2006), with the two concepts representing the opposite poles of a common energetical dimension (which is distinct from a second-dimension identification with the poles of depersonalisation and dedication).

For dedication, situationally elevated emotional demands again showed a negative association only when combined with high situational work pressure. When work pressure was lower than usual, emotional demands showed a positive but non-significant association with dedication. While the results indicated a buffering role of situational work pressure on the association between state emotional demands and dedication, there was little support for the challenge hypothesis (Crawford et al., 2010; Van den Broeck et al., 2010). In line with this result are findings from between-subject studies that did not support the challenge hypothesis, but instead a stress-buffering interaction of high / low combinations of job demands (Faucett et al., 2013; Fried et al., 1998; Jimmieson et al., 2017; in this article, a more detailed review of the results of between-subject studies on Demands x Demands interactions within the motivational process is provided). Wincent and Örtqvist (2011) proposed that challenge demands may exhibit their motivational potential only when

hindrance demands are kept low. However, this study's findings suppose that low levels of state hindrance demands may represent a favourable but not sufficient condition for a challenging role of state challenge demands. We assume that the motivational potential of challenge demands emerges particularly in situations in which low hindrance demands are combined with high job resources and / or personal resources. Interestingly, Bakker and Sanz-Vergel (2013) found that high emotional demands boosted the positive relationship between personal resources and work engagement on a weekly basis.

In the model for absorption, the covariates of situational job autonomy and situational social support exhibited strong positive associations, while neither state work pressure, state emotional demands nor Work Pressure x Emotional Demands contributed to predicting absorption. However, the random effects of work pressure and emotional demands indicated important individual differences. We assume that self-efficacy and optimism (Bakker & Sanz-Vergel, 2013), a prevention vs. a promotion focus (Brenninkmeijer, Demerouti, Pascale, le Blanc, & van Emmerik, 2010) or neuroticism (Rodell & Judge, 2009) could provide interesting insights into the within-subject relationships between challenge and hindrance job demands and absorption.

While the beneficial role of situational job autonomy was restricted absorption, situational social support showed highly significant relationships with all outcome variables. This is in line with the conclusion of the review by Gelsema (2007), that social support clearly represents a highly influential variable within nursing.

Regarding the separate analyses of both items, in line with the hypothesis, a significant stress-exacerbating interaction of the item "...I had to be attentive to many things at the same time" with state emotional demands on tension was found, while time-related work pressure did not show a significant interaction with state emotional demands on tension. However, in the model for emotional exhaustion, for both items, a significant interaction with state

emotional demands was absent, but compared to time pressure, the interaction term was stronger for attention-related work pressure. Within the motivational process, both aspects of work pressure showed significant interactions with emotional demands on vigour and dedication. While the separate analyses of both items provide support for the stress-exacerbating hypotheses for tension (for attention-related work pressure only), vigour and dedication (for time-related work pressure only for $+1.5 SD_{\text{within}}$), they do not support the buffer hypotheses for tension or emotional exhaustion or the challenge hypotheses for vigour, dedication or absorption. Thus, the results for the separate analyses are similar to the overall work pressure measure. When comparing the results for both items, it may be cautiously concluded that combinations of situationally elevated emotional demands and attention-related work pressure may be more harmful than interactions between emotional demands and time-related work pressure.

With regard to the future development of the JDR theory (Bakker & Demerouti, 2017), this study suggests that situational job demands interact in predicting health-related outcomes. Thus, within the health-impairment process, both interactions between job demands and job resources and interactions between job demands and job demands are important. While the JDR theory (Bakker & Demerouti, 2007; Bakker & Demerouti, 2017; Demerouti & Bakker, 2011) proposes that job resources buffer the positive associations of job demands and health-related outcomes, the findings of this study suggest that one job demand exacerbates the positive association of another job demand with health-related outcomes. Interestingly, interactions between situational job demands also contributed to the prediction of work engagement, which was negatively associated with high levels of combined job demands. Thus, job demands moderate not only the effect of job resources on work engagement but also the effect of another job demand. While low state hindrance demands completely buffered the harmful associations of situationally elevated challenge

demands with vigour and dedication, challenge demands did not significantly relate positively to vigour and dedication when state hindrance demands were low. Consequently, we found little support for the challenge potential of challenge demands (Crawford et al., 2010; Van den Broeck et al., 2010), which may indicate that there are multiple conditions for the functioning of job demands as challenges.

Practical Recommendations

The JDR model (Bakker & Demerouti, 2007; Bakker & Demerouti, 2017; Demerouti & Bakker, 2011) proposes that to buffer the harmful effects of job demands, employees should be provided with job resources such as autonomy and social support. However, there are both between- (Hu, Schaufeli, & Taris, 2011) and within-subject studies (van den Tooren & de Jonge, 2011) that have found weak evidence for the buffering role of job resources. Interestingly, Jimmieson et al. (2017) proposed that low job demands may buffer the unfavourable associations of other job demands, by analogy with resources, and provided promising evidence from their between-subject study among nurses. Applying an experience sampling design, this study shows that low hindrance demands in terms of work pressure lower than usual can offset or at least reduce the harmful associations of situationally elevated emotional demands, which represent an unchangeable core requirement of the nursing profession. Importantly, this study found evidence for such phenomenon from a within-subject perspective, meaning that the harmful associations of situationally increased emotional demands could be lessened by situationally reducing work pressure. Emotional demands showed an intraclass correlation of .39, suggesting that emotional demands in nursing are not always present to the same extent. In slightly more than one-fourth of the situations, emotional demands were rated above the scale mean, while in the remaining situations, emotional demands were rated as medium to low. Finding methods to reduce work

pressure during peak times of emotional demand would be highly beneficial for nurses to attenuate feelings of emotional exhaustion and energy depletion.

Unlike work pressure, emotional demands cannot be directly reduced. However, because such demands increase job strain and emotional exhaustion, it is important to consider ways to decrease their harmful consequences. First, nurses should be trained to cope with emotional demands in an effective and relieving fashion. Deep acting strategies appear to be a promising content of such trainings, as in the meta-analysis of Hülshager and Schewe (2011), they were not associated with impaired well-being in terms of emotional exhaustion and psychological strain, in contrast to the findings for surface acting. Furthermore, the provision of regular rest breaks should be highly beneficial, as they offer the opportunity to refill depleted resources and decrease negative strain reactions, as found in the meta-analysis of Wendsche, Lohmann-Haislah, and Wegge (2016). While rest breaks are fundamental for all employees, this may be particularly true for nurses, who are confronted with multiple demands. In their review, Wendsche, Ghadiri, Bengsch, and Wegge (2017) judged the status quo of rest breaks in this profession to be highly problematic. Finally, the strong associations of social support with all outcome variables suggest that the promotion of team support would be a promising strategy to reduce job strain and foster the work engagement of nurses.

Strengths, Limitations and Future Directions

While the within-subject perspective of this study fills a gap related to the research on interactions among job demands, for all of the study variables, between-subject differences were found; however, by person-mean centring, they were excluded. With respect to the predictive value of chronic job demands for momentary affective experiences, there is mixed empirical support. Johnston et al. (2016) found a main effect of job demands measured by the aggregation of situational ratings on experienced stress but not on fatigue and affect. In the study by Elfering et al. (2005), chronic job stressors predicted event-related well-being, but

another within-subject study did not find this predictive relationship (Grebner, Elfering, Semmer, Kaiser-Probst, & Schlapbach, 2004). Following the aggregation approach proposed by Johnston et al. (2016), it would have been possible to include chronic perceptions of job demands. Because of the within-subject focus of this study, the complexity of the models and the recommendation to build relatively sparse multilevel models (Nezlek, 2011), we decided not to consider job demands as aggregates of situational ratings, which is in line with the majority of experience sampling studies (Bakker & Sanz-Vergel, 2013; Johnston, Jones, Charles, McCann, & McKee, 2013; Tadić et al. 2015; van den Tooren & de Jonge, 2011).

The random effect variances indicated that there were important individual differences related to the associations between hindrance demands and challenge demands. Future studies should include personal resources, which are hypothesised to play a moderating role in the health-impairment and motivational processes (Schaufeli & Taris, 2014). Based on previous research, we assume that individual differences in self-efficacy and optimism (Bakker & Sanz-Vergel, 2013; Xanthopoulou, Bakker, & Fischbach, 2013) could provide particularly interesting insights.

This study applied an a priori differentiation of which demands should be regarded as challenge and hindrance demands in the context of nursing. However, this procedure can be criticised, as there is evidence of individual and situational differences related to the appraisal of job demands as challenges and hindrances (Searle & Auton, 2015) beyond occupational specificities (Bakker & Sanz-Vergel, 2013). Presenting findings from both between- and within-subject research, Searle and Auton (2015) demonstrated that appraisals accounted for unique variance in positive and negative outcomes above and beyond challenge and hindrance stressors. Thus, the appraisal of a job demand varied both between individuals and within an individual depending on the current situation, while both types of variances constituted meaningful predictors for affective states. Additionally, there is evidence from the

between-subject study by Webster, Beehr, and Love (2011) that job demands can be simultaneously appraised as both challenging and hindering. Bakker and Sanz-Vergel (2013) found that nurses appraised work pressure as more hindering than challenging and that they perceived work pressure as less challenging and more hindering than emotional demands. However, the values that work pressure reached on both challenge indicators were not far away from the scale mean. This indicates that the classification of work pressure as a hindrance demand in nursing may hold, particularly when compared to emotional demands and that work pressure could rather constitute a challenge stressor in comparison with hindrance demands such as role conflict. When further investigating Demands x Demands interactions, it will be important to include both individual and situational stress appraisals, while the study by Webster et al. (2011) suggests that challenge and hindrance appraisals should be assessed independently. Furthermore, it is possible that appraisals of job demands differ depending on the time frame. For example, it could be that an emotionally demanding patient contact is perceived as challenging within the situation, while on a weekly basis, emotional demands are rather appraised as a hindrance or vice versa. This issue should be addressed by future studies.

The question arises whether the results of this study can be applied to other occupational groups. On the one hand, the job demands on which this study focused are considered important across occupations (e.g., Bakker et al., 2005; Bakker et al., 2010). Furthermore, due to the person-mean centring of job demands, we concentrated on situational variations in job demands, while their average level was not considered. Thus, the results of this study should be applicable to other occupations. However, it is important to consider that the perceptions of work pressure and emotional demands as challenge versus hindrance demands have been shown to be occupation-specific (Bakker & Sanz-Vergel, 2013); thus, we expect applicability to hold only at the level of challenge versus hindrance demands.

This study focused on the modelling of job demands and their interactions and included job resources as covariates only. Future studies could investigate whether Demands x Demands interactions can be modified by job resources (in this study, there was little evidence for such effects). Interestingly, van Woerkom et al. (2016) found that the job resource strength use support buffered the interaction of high emotional demands combined with high workload on absenteeism from a between-subject perspective. Furthermore, it may be that the motivational potential of challenge demands emerges particularly in situations where low hindrance demands are combined with high job resources.

To design the smartphone questionnaire to be as short as possible, we relied on single-item measures. However, this may have affected the results, as constructs may have been assessed too broadly. This point of criticism is particularly applicable to emotional demands, as highly different types of situations can be rated as “emotionally demanding” within nursing, such as high patient suffering, aggressive patients and demanding contacts with relatives (Sundin, Hochwalder, & Bildt, 2008). It may be that special types of emotional demands, such as threats / harassment by patients, are appraised as a hindrance rather than as a challenge. Recently, Moloney et al. (2018) conceived of suffering and dying patients as challenge emotional demands and aggressive or troublesome patients as hindrance emotional demands which—mediated by burnout and work engagement—differentially related to nurses’ intentions to leave the organisation and profession. Both types of emotional demands could show different interaction patterns with work pressure. Conceivably, successfully coping with a suffering patient could require low work pressure, while high work pressure may be beneficial for nurses facing aggressive patients to achieve some distance. Future research should address this issue.

Another important limitation of this study is that the compliance rate was at the lower limit of compliance rates that are typically obtained in experience sampling studies (Fisher &

To, 2012). Because this compliance rate included missing data due to swapped shifts and sick leave that could not be separated, we consider the compliance rate to be acceptable. However, more important than the percentage of missing values is their nature in terms of whether or not they are missing at random. From a theoretical point of view, we must admit that due to its focus, this study may be at particularly high risk for non-random missing data, as it is possible that the smartphone questionnaire was ignored at times of high work pressure or at times of high work pressure combined with high emotional demands. Like most researchers applying an experience sampling design (Fisher & To, 2012), we cannot rule out this possibility. We propose that the comparably high percentages of extreme values for both items of work pressure (17 % for the item "...I was under time pressure" and 27 % for the item "...I had to be attentive to many things at the same time") are evidence against this point of criticism. Unfortunately, there is little research addressing this important methodological drawback. Applying lagged signal-level analyses for eight mood variables, Silvia, Kwapil, Eddington and Brown (2013) found little evidence for mood-dependent nonresponse, as only one (i. e., enthusiasm) out of eight mood variables (including anxious, relaxed, tired and sad) was significantly associated with nonresponse.

Conclusion

Drawing on the integration of the challenge-hindrance framework into the JDR theory (Crawford et al., 2010; Van den Broeck et al., 2010), this experience sampling study investigated interactions among job demands from a within-subject perspective. The key finding of this study is that there are stress-exacerbating and stress-buffering interactions between high and low levels of challenge and hindrance job demands from a within-subject perspective. With regards to the development of the JDR theory (Bakker & Demerouti, 2017), this study suggests that job demands interact in predicting health-related and motivational outcomes. However, we found little support for the challenge potential of

challenge demands (Crawford et al., 2010; Van den Broeck et al., 2010), which may indicate that there are multiple conditions for the functioning of job demands as challenges. In addition to the theoretical contributions of this study, its results extend the possible prevention and intervention approaches to reduce the harmful associations of unchangeable job aspects such as emotional demands in nursing: both job resources and job demands have stress-reducing potential. If theoretically changeable demands cannot generally be reduced, methods could be found to prevent high levels of one job demand from coinciding with high levels of another demand on a situational basis.

Disclosure of Interest

The authors report no conflicts of interest.

References

- Adriaenssens, J., De Gucht, V., & Maes, S. (2015). Determinants and prevalence of burnout in emergency nurses: A systematic review of 25 years of research. *International Journal of Nursing Studies*, *52*(2), 649–661. doi:10.1016/j.ijnurstu.2014.11.004
- Aiken, L. H., Clarke, S. P., Sloane, D. M., Sochalski, J. A., Busse, R., Clarke, H., . . . Shamian, J. (2001). Nurses' reports on hospital care in five countries. *Health Affairs*, *20*(3), 43–53. doi:10.1377/hlthaff.20.3.43
- Aiken, L. H., Clarke, S. P., Sloane, D. M., Sochalski, J., & Silber, J. H. (2002). Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *Journal of the American Medical Association*, *288*(16), 1987–1993. doi:10.1001/jama.288.16.1987
- Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, *22*(3), 309–328. doi:10.1108/02683940710733115
- Bakker, A. B., & Demerouti, E. (2017). Job demands-resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology*, *22*(3), 273–285. doi:10.1037/ocp0000056
- Bakker, A. B., Demerouti, E., & Euwema, M. C. (2005). Job resources buffer the impact of job demands on burnout. *Journal of Occupational Health Psychology*, *10*(2), 170–180. doi:10.1037/1076-8998.10.2.170
- Bakker, A. B., & Sanz-Vergel, A. I. (2013). Weekly work engagement and flourishing: The role of hindrance and challenge job demands. *Journal of Vocational Behavior*, *83*(3), 397–409. doi:10.1016/j.jvb.2013.06.008
- Bakker, A. B., van Veldhoven, M., & Xanthopoulou, D. (2010). Beyond the demand-control model: Thriving on high job demands and resources. *Journal of Personnel Psychology*, *9*(1), 3–16. doi:10.1027/1866-5888/a000006
- Balducci, C., Avanzi, L., & Fraccaroli, F. (2014). Emotional demands as a risk factor for

- mental distress among nurses. *Medicina Del Lavoro*, 105(2), 100–108.
- Barr, D. J., Levy, R., Scheepers, C., & Tilly, H. J. (2013). Random effects structure for confirmatory hypothesis testing: Keep it maximal. *Journal of Memory and Language*, 68(3), 255–278. doi:10.1016/j.jml.2012.11.001
- Bates, D., Kliegl, R., Vasishth, S., & Baayen, H. (2015). *Parsimonious mixed models*. Retrieved from <https://arxiv.org/pdf/1506.04967.pdf>
- Bates, D., Mächler, M., Bolker, B. M., & Walker, S. C. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, 67(1), 1–48. doi:10.18637/jss.v067.i01
- BAuA (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, 2014). *Arbeit in der Pflege – Arbeit am Limit? Arbeitsbedingungen in der Pflegebranche* [Care work – working at the limit? Working conditions in the care sector]. Retrieved from <http://www.baua.de/dok/6505548>
- Boswell, W. R., Olson-Buchanan, J. B., & LePine, M. A. (2004). Relations between stress and work outcomes: The role of felt challenge, job control, and psychological strain. *Journal of Vocational Behavior*, 64(1), 165–181. doi:10.1016/S0001-8791(03)00049-6
- Breevaart, K., Bakker, A. B., Demerouti, E., & Hetland, J. (2012). The measurement of state work engagement: A multilevel factor analytic study. *European Journal of Psychological Assessment*, 28(4), 305–312. doi:10.1027/1015-5759/a000111
- Bridger, R. S., & Brasher, K. (2011). Cognitive task demands, self-control demands and the mental well-being of office workers. *Ergonomics*, 54(9), 830–839. doi:10.1080/00140139.2011.596948
- Burnham K. P., & Anderson D. R. (2002). *Model selection and multi-model inference: A practical information-theoretic approach* (2nd. ed.). New York, NY: Springer.
- Büssing, A. P., & Perrar, K. M. (1992). Die Messung von Burnout: Untersuchung einer Deutschen Fassung des Maslach Burnout Inventory (MBI-D) [Measurement of burnout:

- Investigation of a German version of the Maslach Burnout Inventory (MBI-D)].
Diagnostica, 38, 328–353.
- Cavanaugh, M. A., Boswell, W. R., Roehling, M. V., & Boudreau, J. W. (2000). An empirical examination of self-reported work stress among US managers. *Journal of Applied Psychology*, 85(1), 65–74. doi:10.1037/0021-9010.85.1.65
- Cho, S.-H., Park, M., Jeon, S. H., Chang, H. E., & Hong, H.-J. (2014). Average hospital length of stay, nurses' work demands, and their health and job outcomes. *Journal of Nursing Scholarship*, 46(3), 199–206. doi:10.1111/jnu.12066
- Crawford, E. R., LePine, J. A., & Rich, B. L. (2010). Linking job demands and resources to employee engagement and burnout: A theoretical extension and meta-analytic test. *Journal of Applied Psychology*, 95(5), 834–848. doi:10.1037/a0019364
- de Jonge, J., Le Blanc, P. M., Peeters, M. C. W., & Noordam, H. (2008). Emotional job demands and the role of matching job resources: A cross-sectional survey study among health care workers. *International Journal of Nursing Studies*, 45(10), 1460–1469. doi:10.1016/j.ijnurstu.2007.11.002
- Demerouti, E., & Bakker, A. B. (2011). The job demands-resources model: Challenges for future research. *South African Journal of Industrial Psychology*, 37(2), 01–09. doi:10.4102/sajip.v37i2.974
- Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology*, 86(3), 499–512. doi:10.1037//0021-9010.86.3.499
- Eley, D., Eley, R., Bertello, M., & Rogers-Clark, C. (2012). Why did I become a nurse? Personality traits and reasons for entering nursing. *Journal of Advanced Nursing* 68(7), 1546–1555. doi:10.1111/j.1365-2648.2012.05955.x
- Elfering, A., Grebner, S., K. Semmer, N., Kaiser-Freiburghaus, D., Lauper-Del Ponte, S., &

- Witschi, I. (2005). Chronic job stressors and job control: Effects on event-related coping success and well-being. *Journal of Occupational and Organizational Psychology*, 78(2), 237–252. doi:10.1348/096317905X40088
- Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel models: A new look at an old issue. *Psychological Methods*, 12(2), 121–138. doi:10.1037/1082-989X.12.2.121
- Faucett, J. M., Corwyn, R. F., & Poling, T. H. (2013). Clergy role stress: Interactive effects of role ambiguity and role conflict on intrinsic job satisfaction. *Pastoral Psychology*, 62(3), 291–304. doi:10.1007/s11089-012-0490-8
- Fisher, C. D., & To, M. L. (2012). Using experience sampling methodology in organizational behavior. *Journal of Organizational Behavior*, 33(7), 865–877. doi:10.1002/job.1803
- Franke, G. H. (2002). *SCL-90-R: Die Symptom-Checkliste von L. R. Derogatis* (2. Auflage) [The symptom-checklist of L. R. Derogatis (2nd ed.)]. Göttingen, Germany: Beltz.
- Fried, Y., Ben-David, H. A., Tiegs, R. B., Avital, N., & Yeverechyahu, U. (1998). The interactive effect of role conflict and role ambiguity on job performance. *Journal of Occupational and Organizational Psychology*, 71(1), 19–27. doi:10.1111/j.2044-8325.1998.tb00659.x
- Gelsema, T. I. (2007). *Determinants of job stress in the nursing profession: A review*. Unpublished doctoral dissertation. Leiden, Netherlands: Leiden University. Retrieved from <https://openaccess.leidenuniv.nl/bitstream/handle/1887/12080/front.pdf?sequence=11>
- Gelsema, T. I., van der Doef, M., Maes, S., Akerboom, S., & Verhoeven, C. (2005). Job stress in the nursing profession: The influence of organizational and environmental conditions and job characteristics. *International Journal of Stress Management*, 12(3), 222–240. doi:10.1037/1072-5245.12.3.222

- González-Romá, V., Schaufeli, W. B., Bakker, A. B., & Lloret, S. (2006). Burnout and work engagement: Independent factors or opposite poles? *Journal of Vocational Behavior*, *62*(1), 165–174. doi:10.1016/j.jvb.2005.01.003
- Grebner, S., Elfering, A., Semmer, N. K., Kaiser-Probst, C., & Schlapbach, M.-L. (2004). Stressful situations at work and in private life among young workers: An event sampling approach. *Social Indicators Research*, *67*(1–2), 11–49. doi:10.1023/B:SOCI.0000007333.96382.3a
- Hamaker, E. L. (2012). Why researchers should think ‘within-person’: A paradigmatic rationale. In M. R. Mehl, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 43–61). New York, NY: Guilford Press.
- Hobfoll, S. E. (2002). Social and psychological resources and adaptation. *Review of General Psychology*, *6*(4), 307–324. doi:10.1037//1089-2680.6.4.307
- Hockey, G. R. J. (1993). Cognitive-energetical control mechanisms in the management of work demands and psychological health. In A. Baddeley, & L. Weiskrantz (Eds.), *Attention: Selection, awareness, and control* (pp. 328–345). Oxford, UK: Clarendon Press.
- Hox, J. J. (2010). *Multilevel analysis: Techniques and applications* (2nd ed.). New York, NY: Routledge.
- Hu, Q., Schaufeli, W. B., & Taris, T. W. (2011). The job demands-resources model: An analysis of additive and joint effects of demands and resources. *Journal of Vocational Behavior*, *79*(1), 181–190. doi:10.1016/j.jvb.2010.12.009
- Huang, F. L. (2017). *Conducting multilevel confirmatory factor analysis using R*. Retrieved from <http://faculty.missouri.edu/huangf/data/mcfa/MCFA%20in%20R%20HUANG.pdf>
- Hülshéger, U. R., & Schewe, A. F. (2011). On the costs and benefits of emotional labor: A meta-analysis spanning three decades of research. *Journal of Occupational Health Psychology*, *16*(3), 361–389. doi:10.1037/a0022876

- Jimmieson, N. L., Tucker, M. K., & Walsh, A. J. (2017). Interaction effects among multiple job demands: An examination of healthcare workers across different contexts. *Anxiety, Stress, & Coping, 30*(3), 317–332. doi:10.1080/10615806.2016.1229471
- Johnson, P. O., & Neyman, J. (1936). Tests of certain linear hypotheses and their applications to some educational problems. *Statistical Research Memoirs, 1*, 57–93.
- Johnston, D., Bell, C., Jones, M., Farquharson, B., Allan, J., Schofield, P., ... Johnston, M. (2016). Stressors, appraisal of stressors, experienced stress and cardiac response: A real-time, real-life investigation of work stress in nurses. *Annals of Behavioral Medicine, 50*(2), 187–197. doi:10.1007/s12160-015-9746-8
- Johnston, D. W., Jones, M. C., Charles, K., McCann, S. K., & McKee, L. (2013). Stress in nurses: Stress-related affect and its determinants examined over the nursing day. *Annals of Behavioral Medicine, 45*(3), 348–356. doi:10.1007/s12160-012-9458-2
- Kahn, R. L., & Byosiére, P. (1992). Stress in organizations. In M. D. Dunette, & L. M. Hough (Eds.), *Handbook of Industrial and Organizational Psychology*, (pp. 571–650). Palo Alto, CA: Consulting Psychologists Press.
- Karasek, R., Brisson, C., Kawakami, N., Houtman, I., Bongers, P., & Amick, B. (1998). The job content questionnaire (JQC): An instrument for internationally comparative assessments of psychosocial job characteristics. *Journal of Occupational Health Psychology, 3*(4), 322–355. doi:10.1037/1076-8998.3.4.322
- Kemery, E. R. (2006). Clergy role stress and satisfaction: Role ambiguity isn't always bad. *Pastoral Psychology, 54*(6), 561–570. doi:10.1007/s11089-006-0024-3
- Kirpal, S. (2004). Work identities of nurses: Between caring and efficiency demands. *Career Development International, 9*(3), 274–304. doi:10.1108/13620430410535850
- Kristensen, T., Borg, V., & Hannerz, H. (2002). Socioeconomic status and psychosocial work environment: Results from a Danish national study. *Scandinavian Journal of Public*

- Health*, 30, 41–48. doi:10.1177/14034948020300032401
- Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2017). Package ‘lmerTest’.
Retrieved from <https://cran.r-project.org/web/packages/lmerTest/lmerTest.pdf>
- Lazarus, R. S., & Folkman, S. (1987). Transactional theory and research on emotions and coping. *European Journal of Personality*, 1(3), 141–169. doi:10.1002/per.2410010304
- LePine, J. A., LePine, M. A., & Jackson, C. (2004). Challenge and hindrance stress: Relationships with exhaustion, motivation to learn, and learning performance. *Journal of Applied Psychology*, 89(5), 883–891. doi:10.1037/0021-9010.89.5.883
- LePine, J. A., Podsakoff, N. P., & LePine, M. A. (2005). A meta-analytic test of the challenge stressor-hindrance stressor framework: An explanation for inconsistent relationships among stressors and performance. *Academy of Management Journal*, 48(5), 764–775. doi:10.5465/AMJ.2005.18803921
- MacPhee, M., Dahinten, S., & Havaei, F. (2017). The impact of heavy perceived nurse workloads on patient and nurse outcomes. *Administrative Sciences* 7(7), 1–17.
doi:10.3390/admsci7010007
- Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal of Occupational Behaviour*, 2(2), 99–113. doi:10.1002/job.4030020205
- Moloney, W., Boxall, P., Parsons, M., & Cheung, G. (2018). Factors predicting registered nurses’ intentions to leave their organization and profession: A job demands-resources framework. *Journal of Advanced Nursing*, 74(4), 864–875. doi:10.1111/jan.13497
- Montgomery, A., Spânu, F., Băban, A., & Panagopoulou, E. (2015). Job demands, burnout, and engagement among nurses: A multi-level analysis of ORCAB data investigating the moderating effect of teamwork. *Burnout Research*, 2(2–3), 71–79.
doi:10.1016/j.burn.2015.06.001
- Newton, J. M., Kelly, C. M., Kremser, A. K., Jolly, B., & Billett, S. (2009). The motivations

- to nurse: an exploration of factors amongst undergraduate students, registered nurses and nurse managers. *Journal of Nursing Management*, 17(3), 392–400. doi:10.1111/j.1365-2834.2008.00945.x
- Nezlek, J. B. (2011). *Multilevel modeling for social and personality psychology*. Thousand Oaks, CA: Sage.
- Nübling, M., Stöbel, U., Hasselhorn, H.-M., Michaelis, M., & Hofmann, F. (2005). *Methoden zur Erfassung psychischer Belastungen: Erprobung eines Messinstrumentes (COPSOQ)* [Methods for the assessment of psychological strain: Test of a measuring instrument (COPSOQ)]. Schriftenreihe der Bundesanstalt für Arbeitsschutz und Arbeitsmedizin [publication series of the Bundesanstalt für Arbeitsschutz und Arbeitsmedizin]. Bremerhaven, Germany: Wirtschaftsverlag NW.
- Peterson, J., Hall, L. M., O'Brien-Pallas, L., & Cockerill, R. (2011). Job satisfaction and intentions to leave of new nurses. *Journal of Research in Nursing*, 16(6), 536–548. doi:10.1177/1744987111422423
- Pisanti, R., van der Doef, M., Maes, S., Lombardo, C., Lazzari, D., & Violani, C. (2015). Occupational coping self-efficacy explains distress and well-being in nurses beyond psychosocial job characteristics. *Frontiers in Psychology*, 6, 1143. doi:10.3389/fpsyg.2015.01143
- Podsakoff, N. P., LePine, J. A., & LePine, M. A. (2007). Differential challenge stressor-hindrance stressor relationships with job attitudes, turnover intentions, turnover, and withdrawal behavior: A meta-analysis. *Journal of Applied Psychology*, 92(2), 438–454. doi:10.1037/0021-9010.92.2.438
- Preacher, K. J., Curran, P. J., & Bauer, D. J. (2006). Computational tools for probing interactions in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics*, 31(4), 437–448.

doi:10.3102/10769986031004437

Reis, D., Hoppe, A., Arndt, C., & Lischetzke, T. (2017). Time pressure with state vigour and state absorption: Are they non-linearly related? *European Journal of Work and Organizational Psychology, 26*(1), 94–106. doi:10.1080/1359432X.2016.1224232

Reis, E. L. (2012). Why researchers should think ‘real-world’: A conceptual rationale. In M.

R. Mehl, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 3–21). New York, NY: Guilford Press.

Rodell, J. B., & Judge, T. A. (2009). Can “good” stressors spark “bad” behaviors? The mediating role of emotions in links of challenge and hindrance stressors with citizenship and counterproductive behaviors. *Journal of Applied Psychology, 94*(6), 1438–1451.

doi:10.1037/a0016752

Rosseel, Y., Oberski, D., Byrnes, J., Vanbrabant, L., Savalei, V., Merkle, E., ... Jorgensen, T.

D. (2018). Package ‘lavaan’. Retrieved from <https://cran.r-project.org/web/packages/lavaan/lavaan.pdf>

Schaufeli, W. B., Bakker, A. (2004). Utrecht Work Engagement Scale: Preliminary Manual.

Retrieved from

http://www.wilmarschaufeli.nl/publications/Schaufeli/Test%20Manuals/Test_manual_UWES_English.pdf

Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and Psychological Measurement, 66*(4), 701–716. doi:10.1177/0013164405282471

doi:10.1177/0013164405282471

Schaufeli, W. B., Bakker, A. B., & Van Rhenen, W. (2009). How changes in job demands and resources predict burnout, work engagement, and sickness absenteeism. *Journal of Organizational Behavior, 30*(7), 893–917. doi:10.1002/job.595

doi:10.1002/job.595

Schaufeli, W. B., Salanova, M., González-Romá, V., & Bakker, A. B. (2002). The

- measurement of engagement and burnout: A two sample confirmative factor analytic approach. *Journal of Happiness Studies*, 3(1), 71–92. doi:10.1023/A:1015630930326
- Schaufeli, W. B., & Taris, T. W. (2014). A critical review of the job demands-resources model: Implications for improving work and health. In G. F. Bauer, & O. Hämmig (Eds.), *Bridging occupational, organizational and public health: A transdisciplinary approach* (pp. 43–68). Dordrecht, Netherlands: Springer.
- Schwarz, E. L. (2012). Why researchers should think ‘real-time’: A cognitive rationale. In M. R. Mehl, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 22–43). New York, NY, US: Guilford Press.
- Searle, B. J., & Auton, J. C. (2015). The merits of measuring challenge and hindrance appraisals. *Anxiety, Stress, & Coping*, 28(2), 121–143.
doi:10.1080/10615806.2014.931378.
- Selye, H. (1956). *The stress of life*. New York, NY: McGraw-Hill.
- Silvia, P. J., Kwapil, T. R., Eddington, K. M., & Brown, L. H. (2013). Missed beeps and missing data: Dispositional and situational predictors of non-response in experience sampling research. *Social Science Computer Review*, 31(4), 471–481.
doi:10.1177/0894439313479902
- Snijders, T. A. B., & Bosker, R. J. (2012). *Multilevel analysis: An introduction to basic and advanced multilevel modeling* (2nd ed.). London, UK: Sage.
- Sundin, L., Hochwälder, J., & Bildt, C. (2008). A scale for measuring specific job demands within the health care sector: Development and psychometric assessment. *International Journal of Nursing Studies*, 45(6), 914–923. doi:10.1016/j.ijnurstu.2007.03.006
- Tadić, M., Bakker, A. B., & Oerlemans, W. G. M. (2015). Challenge versus hindrance job demands and well-being: A diary study on the moderating role of job resources. *Journal of Occupational and Organizational Psychology*, 88(4), 702–725. doi:10.1111/joop.12094

- Trybou, J., Germonpre, S., Janssens, H., Casini, A., Braeckman, L., De Bacquer, D., & Clays, E. (2014). Job-related stress and sickness absence among Belgian nurses: A prospective study. *Journal of Nursing Scholarship, 46*(4), 292–301. doi:10.1111/jnu.12075
- Van Bogaert, P., Peremans, L., Van Heusden, D., Verspuy, M., Kureckova, V., Van de Cruys, Z., & Franck, E. (2017). Predictors of burnout, work engagement and nurse reported job outcomes and quality of care: a mixed method study. *BMC Nursing, 16*(5), 1–14. doi:10.1186/s12912-016-0200-4
- Van den Broeck, A., De Cuyper, N., De Witte, H., & Vansteenkiste, M. (2010). Not all job demands are equal: Differentiating job hindrances and job challenges in the Job Demands-Resources model. *European Journal of Work and Organizational Psychology, 19*(6), 735–759. doi:10.1080/13594320903223839
- van den Tooren, M., & de Jonge, J. (2011). Job resources and regulatory focus as moderators of short-term stressor-strain relations: A daily diary study. *Journal of Personnel Psychology, 10*(3), 97–106. doi:10.1027/1866-5888/a000042
- Van Woerkom, M., Bakker, A. B., & Nishii, L. H. (2016). Accumulative job demands and support for strength use: Fine-tuning the job demands-resources model using conservation of resources theory. *Journal of Applied Psychology, 101*(1), 141–150. doi:10.1037/apl0000033
- Vroom, V. H. (1964). *Work and motivation*. New York, NY: Wiley.
- Warr, P. (1990). The measurement of well-being and other aspects of mental health. *Journal of Occupational Psychology, 63*(3), 193–210. doi:10.1111/j.2044-8325.1990.tb00521.x
- Webster, J. R., Beehr, T. A., & Love, K. (2011). Extending the challenge-hindrance model of occupational stress: The role of appraisal. *Journal of Vocational Behavior, 79*(2), 505–516. doi:10.1016/j.jvb.2011.02.001
- Wendsche, J., Ghadiri, A., Bengsch, A., & Wegge, J. (2017). Antecedents and outcomes of

- nurses' rest break organization: A scoping review. *International Journal of Nursing Studies*, 75, 65–80. doi:10.1016/j.ijnurstu.2017.07.005
- Wendsche, J., Lohmann-Haislah, A., & Wegge, J. (2016). The impact of supplementary short rest breaks on task performance – A meta-analysis. *sozialpolitik.ch*, 2, 1–24. doi:10.18753/2297-8224-75
- West, S. G., Taylor, A. B., & Wu, W. (2012). Model fit and model selection in structural equation modeling. In R. H. Hoyle (Ed.), *Handbook of structural equation modeling* (pp. 209–231). New York, NY: Guilford Press.
- Widmer, P. S., Semmer, N. K., Kälin, W., Jacobshagen, N., & Meier, L. L. (2012). The ambivalence of challenge stressors: Time pressure associated with both negative and positive well-being. *Journal of Vocational Behavior*, 80(2), 422–433. doi:10.1016/j.jvb.2011.09.006
- Wilhelm, P., & Schoebi, D. (2007). Assessing mood in daily life: Structural validity, sensitivity to change, and reliability of a short-scale to measure three basic dimensions of mood. *European Journal of Psychological Assessment*, 23(4), 258–267. doi:10.1027/1015-559.23.4.258
- Wincent, J., & Örtqvist, D. (2011). Examining positive performance implications of role stressors by the indirect influence of positive affect: A study of new business managers. *Journal of Applied Social Psychology*, 41(3), 699–727. doi:10.1111/j.1559-1816.2011.00733.x
- Xanthopoulou, D., Bakker, A. B., Dollard, M. F., Demerouti, E., Schaufeli, W. B., Taris, T. W., & Schreurs, P. J. G. (2007). When do job demands particularly predict burnout? The moderating role of job resources. *Journal of Managerial Psychology*, 22(8), 766–786. doi:10.1108/02683940710837714
- Xanthopoulou, D., & Bakker, A. B. (2013). State work engagement: The significance of

- within- person fluctuations. In A. B. Bakker, & K. Daniels (Eds.), *A day in the life of a happy worker* (pp. 25–40). Hove, UK: Psychology Press.
- Xanthopoulou, D., Bakker, A. B., & Fischbach, A. (2013). Work engagement among employees facing emotional demands: The role of personal resources. *Journal of Personnel Psychology, 12*(2), 74–84. doi:10.1027/1866-5888/a000085
- Xanthopoulou, D., Bakker, A. B., Heuven, E., Demerouti, E., & Schaufeli, W. B. (2008). Working in the sky: A diary study on work engagement among flight attendants. *Journal of Occupational Health Psychology, 13*(4), 345–356. doi:10.1037/1076-8998.13.4.345

Meaning and vigor as mediators within the challenge-hindrance framework

Elisabeth M. Riedl¹, Janusz Surzykiewicz^{2,3}, Joachim Thomas¹

¹Department of Psychological Assessment and Intervention, Faculty of Philosophy and Education, Catholic University of Eichstätt-Ingolstadt, Germany

²Chair of Social Pedagogy, Faculty of Philosophy and Education, Catholic University of Eichstätt- Ingolstadt, Germany

³Chair of Psychological Foundations of Pedagogy, Cardinal Stefan Wyszyński University, Poland

Abstract

Based on the integration of the challenge-hindrance framework into the job demands-resources theory, the aim of this experience sampling study was to examine the roles of meaning and vigor as mediators of the relationships among situational job resources and challenge and hindrance job demands with dedication. Ninety-five geriatric nurses participated in this study and provided 871 measurements. Multilevel path models showed positive indirect associations of situational job resources and challenge demands with dedication via meaning. For situational hindrance demands in terms of barriers to quality, a negative path via meaning was found. Furthermore, the indirect associations of job resources with dedication via vigor were positive, while the paths for challenge demands and barriers to quality were negative. The differential relationships between challenge demands and meaning, on the one hand, and vigor, on the other, can explain the apparent inconsistency of the relationships between challenge job demands and work engagement.

Keywords: Challenge and hindrance job demands, job resources, meaning at work, work engagement, experience sampling

Introduction

Bargagliotti (2012) states that “work engagement is the central issue for 21st century professionals” (p. 1414). Commonly defined as a “positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption” (Schaufeli, Salanova, González-Romá, & Bakker, 2002, p. 74), work engagement is associated with several key consequences such as organizational commitment, organizational citizenship behavior, intentions to quit (Saks, 2006) and task and contextual performance (Christian, Garza, & Slaughter, 2011). In light of the consequences of work engagement, it is important to investigate its antecedents. A prominent theory addressing this issue is the job demands-resources theory (JDR; Bakker & Demerouti, 2007; Bakker & Demerouti, 2017; Demerouti & Bakker, 2011), which proposes two different processes; in the health-impairment process, job demands, which are defined as environmental aspects that require effort and are associated with physiological or psychological costs, lead to strain and exhaustion due to the depletion of resources (Demerouti & Bakker, 2011). In contrast, the motivational process is supposed to be mainly determined by job resources that play intrinsic and extrinsic motivational roles and promote work engagement and performance (Demerouti & Bakker, 2011). While the role of job demands within the motivational process is limited to a moderation of job resources in the JDR (Demerouti & Bakker, 2011), it was later proposed to integrate the challenge-hindrance framework (LePine, Podsakoff, & LePine, 2005; Podsakoff, LePine, & LePine, 2007) into the JDR (Crawford, LePine, & Rich, 2010; Van den Broeck, De Cuyper, De Witte, & Vansteenkiste, 2010) assuming that job demands represent important independent predictors of motivational outcomes. Challenge demands, which are defined as stressors that are associated with potential gains in terms of personal growth, mastery and achievement, such as a high workload, are beneficial for work engagement,

while hindrance demands, such as role conflict, are detrimental to work engagement, as they interfere with gains (Podsakoff et al., 2007).

However, Demerouti and Bakker (2011) and Bakker (2014) concluded that the validity of the differentiation between these two types of job demands is still unknown. Recent studies taking a within-subject perspective of the challenge-hindrance framework have failed to find a positive main effect of challenge demands on motivational outcomes (Baethge, Vahle-Hinz, Schulte-Braucks, & van Dick, 2018; Bakker & Sanz-Vergel, 2013; Riedl & Thomas, 2019; Tadić, Bakker, & Oerlemans, 2015). The central aim of the present study among geriatric nurses is to investigate a possible explanation: inconsistent mediation, which refers to a constellation, in which one indirect effect of an independent variable X has a different sign than other indirect or direct effects (MacKinnon, Fairchild, & Fritz, 2007). When regarding the total effect of the variable X on the outcome variable Y, the divergent paths are summed, possibly resulting in a non-significant total effect of X on Y (MacKinnon et al., 2007). We propose inconsistent mediation as an explanation for the non-significant associations between challenge job demands and motivational outcomes: a positive indirect association of challenge demands with dedication via meaning is offset by a negative indirect association via vigor, resulting in the absence of a total effect of challenge demands on dedication. Schaufeli and Taris (2014) recommended investigating the question of why job demands and resources are associated with a certain outcome. Following this proposal, this experience sampling study examines whether the relationships between situational job resources and challenge and hindrance job demands, on the one hand, and dedication, on the other, can be explained by their relations to meaning and vigor. The findings regarding indirect effects offer insights into the psychological mechanisms, which play a role in the relationships proposed by theoretical models. Conceivably, such findings could also be used for

intervention approaches, as changing the role of a variable by addressing its associations with mediating variables may be possible.

This study makes a further contribution in that while there are significant between-subject differences related to work engagement, work engagement also has high within-person variability (for an overview of state work engagement, see Xanthopoulou & Bakker, 2013). Based on repeated questioning of the same individuals over time, experience sampling studies focus on the variability of variables from one occasion to another and investigate which characteristics of the working environment predict positive and negative discrepancies from the individual average (Fisher & To, 2012). Experience sampling studies are associated with high ecological validity and a reduction in memory biases, as data are collected in real time in natural environments (Fisher & To, 2012). Furthermore, knowledge about proximal relationships is important for intervention approaches, as interventions should be derived from theories that are applicable at the within-person level (Johnston et al., 2016). This knowledge may also reveal interesting starting points for interventions aimed at the promotion of positive states during the working day (Demerouti & Bakker, 2011). Recent studies that have taken a between-person perspective on mediation within the challenge-hindrance framework have highlighted the mediating role of need satisfaction (Albrecht, 2015; Olafsen & Frølund, 2018). Complementary to these findings, the present study focuses on within-person indirect associations of job resources and challenge and hindrance job demands via meaning and vigor.

Job Characteristics in Nursing and Geriatric Nursing

Quantitative job demands in terms of time pressure and workload and emotional demands emerging from contact with people represent the most frequently investigated job demands in studies about nursing (e. g. Bakker & Sanz-Vergel, 2013; Cho, Park, Jeon, Chang, & Hong, 2014) and geriatric nursing (Josefsson, 2012; Wirth, Ulusoy, Lincke, Nienhaus, & Schablon,

2017). Compared to other professions, geriatric nurses are exposed to these demand types to a greater extent (Josefsson, 2012). The importance of quantitative and emotional demands in geriatric care is further supported by qualitative findings (Jenull & Brunner, 2009). While within-subject quantitative and emotional demands are related to indicators of health-impairment among nurses (Riedl & Thomas, 2019), the results regarding their associations to motivational outcomes are ambiguous (Bakker & Sanz-Vergel, 2013; Riedl & Thomas, 2019). Another important job demand in geriatric nursing (Josefsson, 2012; Wirth et al., 2017) and nursing in general (Garrosa, Moreno-Jiménez, Rodríguez-Muñoz, & Rodríguez-Carvajal, 2011) are role conflicts, which are characterized by conflicting expectations or contradictory demands (Murphy & Gable, 1988). Role conflicts represent a typical hindrance job demand (LePine et al., 2005; Podsakoff et al., 2007), which, from a between-subject perspective, show positive associations to health-impairment indicators and negative relationships to motivational outcomes among nurses (Garrosa et al., 2011).

In this study, quantitative and emotional demands were conceived as challenge demands, which were opposed to the hindrance demand role conflict. Bakker and Sanz-Vergel (2013) found that work pressure, which is typically regarded as a challenge job stressor, instead represents a hindrance for nurses, while emotional demands were perceived more as a challenge demand. However, Riedl and Thomas (2019) recently noted that the classification of work pressure as a hindrance demand in nursing may hold particularly when compared to emotional demands, as the ratings of work pressure on both challenge indicators by Bakker and Sanz-Vergel (2013) were not far from the scale mean. Thus, compared to unequivocal hindrances, such as role conflicts, work pressure may represent a challenge. We assume that quantitative and emotional demands can positively influence the experience of meaning in a concrete working situation because higher than usual levels of these demand types will often reflect situations that are in line with geriatric nurses' professional identities, such as

emergencies, and will be less related to bureaucratic constraints that we assume to be more stable.

Regarding job resources, social support and job autonomy represent the most often investigated positive aspects of the nursing working environment (e. g. Clausen & Borg, 2011; Vera, Martínez, Lorente, & Chambel, 2016). For both, there are findings from within-subject studies indicating negative associations with job strain or negative affect (Johnston, Jones, Charles, McCann, & McKee, 2013; Riedl & Thomas, 2019) and positive associations with work engagement or positive affect (Johnston et al., 2013; Riedl & Thomas, 2019).

Mediating Role of Meaning

The challenge-hindrances framework predicts a positive association between challenge demands and motivational outcomes, while hindrance demands are meant to show a negative relationship (LePine et al., 2005), which is reasoned by the expectancy theory by Vroom (1964). People expect that they are more likely to meet challenge demands than hindrance demands, and they believe that successfully coping with challenge demands will more likely lead to positively valued outcomes than coping with hindrance demands. We propose another explanation for the motivational benefit of challenge demands in contrast to hindrance demands: the experience of meaning, which has been defined as a “general sense that work matters, makes sense, is significant, and is worth engaging in at a deep, personal level” (Steger & Dik, 2010, p. 132). Following the job characteristics model (JCM, Hackman & Oldham, 1976), meaning represents a critical psychological state (alongside experienced responsibility and knowledge of results) that mediates the relationships between work design characteristics and internal work motivation. In the meta-analysis by Humphrey, Nahrgang, and Morgeson (2007) about the JCM, meaning was the most important mediator compared to the other psychological states. The authors explained this finding by referring to self-determination theory (Deci & Ryan, 2000; Ryan & Deci, 2001): striving for meaning is

people's ultimate goal, and intrinsic motivation represents a path towards it. "Therefore, all of the motivational characteristics, which are theoretically and empirically linked to internal work motivation, should be expected to promote meaning" (Humphrey et al., 2007, p. 1346). Recently, the importance of meaning as a mediator of the relationships between adverse working conditions (such as a lack of resources) and turnover intentions was demonstrated in a between-subject study among a heterogeneous sample (Arnoux-Nicolas, Sovet, Lhotellier, Di Fabio, & Bernaud, 2016). While job demands in terms of work pressure were unrelated to meaning in the aforementioned study, in a study of geriatric care employees, Clausen and Borg (2011) found that—at the individual level—role ambiguity predicted lower meaning levels, whereas emotional demands and work pace showed positive longitudinal associations with meaning. Emotional demands also predicted higher levels of meaning at the workgroup level. Based on the presented theoretical and empirical arguments, we aimed to investigate whether the experience of meaning functions as a mediator of the relationships between situational job resources and challenge and hindrance job demands. The following hypotheses are proposed (see Figure 1 for a graphical illustration of the study hypotheses):

H1a: There is a positive indirect association of situational job resources with dedication that is mediated by meaning.

H1b: There is a positive indirect association of situational challenge demands with dedication that is mediated by meaning.

H1c: There is a negative indirect association of situational hindrance demands with dedication that is mediated by meaning.

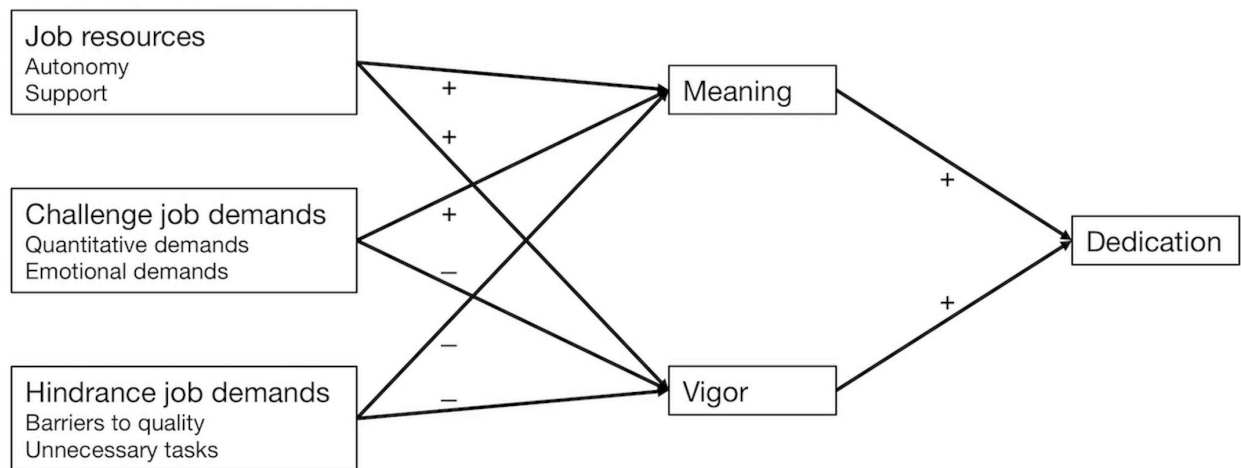


Figure 1. Hypothesized path model

Mediating Role of Vigor

Conflicting with the challenge-hindrance framework (LePine et al., 2005; Podsakoff et al., 2007), some experience sampling studies have failed to show a positive main effect of challenge demands on work engagement; in the nursing study of Bakker and Sanz-Vergel (2013), the main effect of weekly emotional demands on work engagement was negative, while work pressure did not show a significant association. The challenging character of emotional demands was observed only in interaction with weekly personal resources: when emotional demands were high, weekly personal resources were positively related to work engagement, while weekly personal resources did not relate to work engagement when emotional demands were low. Similarly, Tadic et al. (2015) did not find a main effect of daily challenge demands on work engagement once job resources were controlled but found a significant positive interaction with job resources, which boosted the relationship between daily challenge demands and work engagement. In a nursing study by Riedl and Thomas (2019), situational challenge demands in terms of emotional demands showed a negative association with vigor, which was buffered by low situational work pressure. Furthermore,

situational emotional demands did not show a main effect on dedication but were negatively related to dedication combined with high situational work pressure. In a study by Baethge, Vahle-Hinz et al. (2018), daily and weekly time pressure showed a significant positive association with work engagement only when strain was controlled.

Interestingly, Widmer, Semmer, Kälin, Jacobshagen, and Meier (2012) found evidence of an inconsistent mediation effect for time pressure from a between-subject perspective, which explained the lack of a direct relationship between time pressure and a positive attitude towards life: the negative indirect association of time pressure with a positive attitude towards life via strain contrasted with the positive indirect relationship via organization-based self-esteem. Similarly, Prem, Paškvan, Kubicek, and Korunka (2018) found that daily time pressure was positively related to both proactive work behavior and exhaustion. However, an indirect association of time pressure with task performance was supported only via proactive working behavior. Similar to hindrance demands but in contrast to job resources, challenge demands are positively related to job strain, indicating that all job demands require adaption and deplete energetic resources (Crawford et al., 2010). Based on the JDR definition, job demands necessitate effort (Bakker & Demerouti, 2007). Facing high job demands, individuals invest psychological and physiological resources to maintain their performance level (Hockey, 1993), which, following conservation of resources theory (Hobfoll, 2002), leads to stress and exhaustion. The energy-depleting role of challenge demands might explain those findings that conflict with the challenge-hindrance framework. The assumption of the motivational relevance of exhaustion is in line with the mediation model of job burnout by Leiter and Maslach (2005). They argue that exhaustion limits dedication because it triggers distancing, the opposite of involvement. In the present study, we investigate the mediating role of vigor as an indicator of exhaustion. Indeed, evidence from between-subject research supports the view that the core burnout and engagement dimensions, i. e., vigor and

exhaustion and depersonalization and dedication, can be seen as opposite poles of two distinct dimensions, i. e., energy and identification (González-Romá, Schaufeli, Bakker, & Lloret, 2006). Thus, some researchers have regarded vigor, a component of work engagement, as an indicator of job strain and exhaustion (Reis, Hoppe, Arndt, & Lischetzke, 2017). Based on these theoretical and empirical findings, we expect that vigor represents another important mediator of the effects of situational job resources and challenge and hindrance job demands on dedication. The following hypotheses are proposed:

H2a: There is a positive indirect association of situational job resources with dedication that is mediated by vigor.

H2b: There is a negative indirect association of situational challenge job demands with dedication that is mediated by vigor.

H2c: There is a negative indirect association of situational hindrance job demands with dedication that is mediated by vigor.

Method

Sample and Procedure

This study was conducted in six nursing homes at a Catholic institution in Germany. After a meeting in which the aims and the flowchart of the study were presented, the supervisors of the nursing homes distributed information sheets among their teams. Nurses who were willing to participate in the study noted the dates and times of four upcoming shifts on the information sheet, which was given to the study leader. Participating nurses received the study material via an anonymous participant number. The package contained instructions, a general questionnaire, a smartphone equipped with the movisensXS app (movisens GmbH, Karlsruhe, Germany), a charger and an envelope to return the materials. For each shift, three

alarms at random times were programmed, with a minimum of two hours between the alarm prompts.

Ninety-five participants completed the smartphone survey, answering a total of 871 smartphone questionnaires. On average, the questionnaire was answered 9.2 times (range: 2–12). The compliance rate was 81 % (some participants received fewer than 12 prompts; in total, 1,077 prompts were programmed). Sixty-eight of the nurses were female, and twelve nurses were male (the remaining participants did not return the questionnaire assessing demographic data). The mean age was 41 years ($SD = 12.20$). Thirty-eight participants were employed full-time, and 41 participants worked part-time.

Measures

Each item on the smartphone questionnaire was rated on a seven-point Likert scale ranging from *not at all* (1) to *to a great extent* (7).

Situational job resources. Based on the German version (Nübling, Stößel, Hasselhorn, Michaelis, & Hofmann, 2005) of the Copenhagen Psychosocial Questionnaire (COPSOQ; Kristensen, Borg, & Hannerz, 2002), social support was measured with the item “During the past two hours, I felt supported in my work”, and job autonomy was measured with the item “During the past two hours, I had great latitude in decision-making”.

Situational challenge demands. The items assessing challenge demands were also derived from the COPSOQ (Nübling et al., 2005). Quantitative demands were measured with the item “During the past two hours, I was under time pressure” and emotional demands were measured with the item “During the past two hours, my work demanded a lot of me emotionally”.

Situational hindrance demands. Hindrance job demands were measured in terms of intra-sender role conflict. Oriented towards the Abridged Role Conflict and Ambiguity Scales (Murphy & Gable, 1988), intra-sender role conflict was measured in terms of unnecessary

tasks (“During the past two hours, I had to work on unnecessary tasks”) and barriers to quality (“During the past two hours, I could care for the home residents the way I believe to be right”, inverse).

Mediator variables. Meaningfulness was measured with the following item adapted from the COPSOQ (Nübling et al., 2005): “During the past two hours, I experienced my work as meaningful and important”. Based on the German short version (Schaufeli, Bakker, & Salanova, 2006) of the Utrecht Work Engagement Scale (UWES; Schaufeli & Bakker, 2004), vigor was assessed with the item “At the moment, I feel strong and vigorous”.

Dedication. Dedication was measured with the item “At the moment, I am enthusiastic about my job” from the UWES (Schaufeli et al., 2006).

Data Analysis

As measurements were nested within individuals, this study shows a multilevel data structure. Table 1 presents the descriptive statistics, the within- and between-person correlations and the intraclass correlations of all variables. The intraclass correlations ranged from .31 to .59, indicating that 40 % to 70 % of the variance was located at the situational level. Null models showed significant within- and between-subject variances for all variables. Thus, a multilevel analysis procedure was necessary. Multilevel path models (Preacher, Zyphur, & Zhang, 2010) were preferred over multilevel mediation models because multilevel path models allow to include all variables simultaneously and to consider the correlations among the predictor variables and among the mediators. Another important advantage is that multilevel path models offer a separate and unbiased estimation of within- and between-subject effects (Preacher et al., 2010), which is important because of the clear within-subject focus of this study. An additional benefit is that model fit can be evaluated (Preacher et al., 2010).

The analyses were calculated with MPlus version 8.1.6 using the supplemental material for the article by Preacher et al. (2010). As all variables were assessed at the situational level, a 1-1-1 model was estimated. While the intercepts were allowed to vary randomly between the participants, the slopes were fixed to avoid unnecessary complications (Preacher et al., 2010). As the focus of this study is on the analysis of mediated relationships, it is highly important to account for the skewed sampling distribution of indirect effects (Preacher et al., 2010). Therefore, we applied a Bayesian approach, which flexibly handles non-normal distributions (Zyphur & Oswald, 2015), and provide the 95 % credibility intervals (*CRI*) based on the posterior probability distribution of the indirect effects.

The model included the direct effects of job resources and challenge and hindrance job demands with dedication, their indirect effects via meaning and vigor, and correlations among the predictor variables and among both mediators. The posterior predictive *p*-value of the model was greater than .01 (*PPP* = .50) and the confidence interval relating to the difference between the observed and generated data included zero (*CRI* 95 % [-44.13, 54.94]), which indicates good model fit (Zyphur & Oswald, 2015).

Table 1
Descriptive statistics of the study variables

Variable	M	SD _w	SD _b	ICC	1	2	3	4	5	6	7	8	9
1. Social support	5.09	1.34	1.29	.49		.26**	.13**	.09**	-.27**	.03	.54**	.26**	.32**
2. Autonomy	4.15	1.33	1.34	.50	.24*		.16**	.15**	-.25**	.09**	.28**	.20**	.27**
3. Quantitative demands	4.28	2.10	1.41	.40	-.05	.03		.45**	-.08*	.19**	.23**	-.08*	.03
4. Emotional demands	3.43	1.51	1.42	.49	-.09	-.01	.60**		-.14**	.16**	.15**	-.06	.04
5. Barriers to quality	3.79	1.58	0.98	.38	-.40**	-.31**	.03	.03		-.02	-.25**	-.18**	-.18**
6. Unnecessary tasks	1.94	1.29	0.60	.32	-.41**	-.16	.31**	.39**	.23*		.04	-.01	.06
7. Meaningfulness	5.61	1.18	1.06	.47	.63**	.33**	.01	-.06	-.34**	-.38**		.29**	.42**
8. Vigor	4.78	1.24	1.26	.51	.58**	.28**	-.31**	-.34**	-.43**	-.33**	.46**		.44**
9. Dedication	4.99	0.95	1.37	.59	.71**	.29**	-.25*	-.21*	-.43**	-.44**	.68**	.67**	

Note. N_2 (subjects) = 95, N_1 (number of observations) = 871.

Above the diagonal, the within-person correlations are reported, and below the diagonal, the between-person correlations based on aggregated data are shown. ICC = intraclass correlation. SD_w = within-subject standard deviation. SD_b = between-subject standard deviation. * $p < .05$; ** $p < .01$.

Results

Meaning and Vigor as Mediators of the Associations of Situational Job Resources with Dedication

Situational social support and job autonomy were positively associated with meaning (support: $\gamma = 0.42$, *CRI* 95 % [0.36, 0.47]; autonomy: $\gamma = 0.11$, *CRI* 95 % [0.05, 0.15]; see Table 2) and vigor (support: $\gamma = 0.20$, *CRI* 95 % [0.12, 0.27]; autonomy: $\gamma = 0.13$, *CRI* 95 % [0.05, 0.19]). The within-subject indirect effects via both meaning (support: $\gamma = 0.09$, *CRI* 95 % [0.07, 0.12]; autonomy: $\gamma = 0.02$, *CRI* 95 % [0.01, 0.04]) and vigor (support: $\gamma = 0.05$, *CRI* 95 % [0.03, 0.07]; autonomy: $\gamma = 0.03$, *CRI* 95 % [0.01, 0.05]) were significantly positive. Controlling for meaning and vigor, situational social support no longer predicted dedication ($\gamma = 0.04$, *CRI* 95 % [-0.003, 0.09]), indicating full mediation. For situational job autonomy, support for partial mediation was found, as situational job autonomy was still associated with higher dedication ($\gamma = 0.08$, *CRI* 95 % [0.03, 0.13]). Thus, there was support for hypotheses 1a and 2a.

Meaning and Vigor as Mediators of the Associations of Situational Challenge Job Demands with Dedication

As hypothesized, situational quantitative demands were positively associated with meaning ($\gamma = 0.11$, *CRI* 95 % [0.05, 0.17]). In addition, quantitative demands showed a negative relationship with vigor ($\gamma = -0.09$, *CRI* 95 % [-0.16, -0.03]). In the mediation model, situational quantitative demands were unrelated to dedication ($\gamma = -0.04$, *CRI* 95 % [-0.09, 0.01]). As there was a positive within-subject indirect association of quantitative demands via meaning ($\gamma = 0.02$, *CRI* 95 % [0.01, 0.04]) and a negative within-subject indirect

association via vigor ($\gamma = -0.02$, *CRI* 95 % [-0.04, -0.01]), the results are in line with the hypothesis of inconsistent mediation (hypotheses 1b and 2b).

Situational emotional demands, however, neither showed a significant association with meaning ($\gamma = 0.02$, *CRI* 95 % [-0.04, 0.09]) nor with vigor ($\gamma = -0.06$, *CRI* 95 % [-0.13, 0.01]). However, there was a strong correlation between situational quantitative demands and situational emotional demands ($r = .45$). As the overlapping variance may explain the lacking effects of emotional demands, we re-run the multilevel path model without situational quantitative demands. When excluding quantitative demands, situational emotional demands showed a significant positive indirect association to dedication mediated by meaning ($\gamma = 0.01$, *CRI* 95 % [0.003, 0.03]) and a significant negative indirect association via vigor ($\gamma = -0.03$, *CRI* 95 % [-0.05, -0.01]).

Meaning and Vigor as Mediators of the Associations of Situational Hindrance Job Demands with Dedication

In line with hypotheses 1c and 2c, the hindrance job demand barriers to quality showed negative within-subject associations with both meaning ($\gamma = -0.06$, *CRI* 95 % [-0.11, -0.02]) and vigor ($\gamma = -0.08$, *CRI* 95 % [-0.14, -0.03]). Controlling for meaning and vigor, situational role conflict was no longer related to dedication ($\gamma = -0.01$, *CRI* 95 % [-0.05, 0.04]), indicating full mediation of the relationship between this type of situational role conflict and dedication by meaning ($\gamma = -0.01$, *CRI* 95 % [-0.03, -0.003]) and vigor ($\gamma = -0.02$, *CRI* 95 % [-0.03, -0.01]). Thus, for barriers to quality, hypotheses 1c and 2c were supported.

However, for the second hindrance demand, the role conflict unnecessary tasks, associations with meaning ($\gamma = -0.01$, *CRI* 95 % [-0.08, 0.06]) or vigor ($\gamma = 0.004$, *CRI* 95 % [-0.07, 0.07]) were absent.

Table 2
Multilevel path model estimates (within-subject)

Fixed effects	Independent variable	Meaning		Vigor		Dedication	
		Estimates [95 % <i>CRJ</i>]	Estimates [95 % <i>CRJ</i>]	Estimates [95 % <i>CRJ</i>]	Estimates [95 % <i>CRJ</i>]		
Job resources	Social support	0.42 [0.36; 0.47]	0.20 [0.12; 0.27]	0.04 [-0.003; 0.09]			
	Autonomy	0.11 [0.05; 0.15]	0.13 [0.05; 0.19]	0.08 [0.03; 0.13]			
Challenges	Quantitative demands	0.11 [0.05; 0.17]	-0.09 [- 0.16; -0.03]	-0.04 [-0.09; 0.01]			
	Emotional demands	0.02 [-0.04; 0.09]	-0.06 [-0.13; 0.01]	0.01 [-0.04; 0.06]			
Hindrances	Barriers to quality	-0.06 [- 0.11; -0.02]	-0.08 [- 0.14; -0.03]	-0.01 [-0.05; 0.04]			
	Unnecessary tasks	-0.01 [-0.08; 0.06]	0.004 [-0.07; 0.07]	0.04 [-0.02; 0.08]			
	Meaning			0.22 [0.16; 0.27]			
	Vigor			0.25 [0.20; 0.29]			

Note. The 95 % credibility intervals that do not contain 0 are in bold.

Discussion

Results and Interpretations

This experience sampling study among geriatric nurses aimed to gain insights into the psychological mechanisms that play a role in the relationships between situational challenge and hindrance job demands and job resources, on the one hand, and the motivational outcome dedication, on the other. In line with the hypotheses, situational job resources in terms of social support and job autonomy exhibited positive associations with meaning and vigor, which mediated the positive relationships of situational social support and job autonomy with dedication. In contrast, for the role conflict barriers to quality as a hindrance job demand, there were negative situational paths via meaning and vigor. Unnecessary tasks, however, neither showed associations to meaning nor to vigor. This job demand showed a noticeably low mean and a smaller variance than the other measured job characteristics suggesting that unnecessary tasks are less relevant within geriatric nursing compared to support, autonomy, quantitative and emotional demands and barriers to quality. As expected, situational quantitative demands showed inconsistent mediation as the paths via meaning and vigor had different signs: like job resources, situational quantitative demands were positively related to meaning. However, like the role conflict barriers to quality, they were associated with decreased vigor. Situational emotional demands showed these relationships only when quantitative demands were excluded suggesting that the missing support of indirect associations for emotional demands can be explained by the overlapping variance with quantitative demands. Overall, the opposite paths via meaning and vigor provide an explanation for the lack of challenge effects of situational challenge demands in terms of positive main effects on motivational outcomes (Baethge, Vahle-Hinz et al., 2018; Bakker & Sanz-Vergel, 2013; Riedl & Thomas, 2019; Tadić et al., 2015)—the positive path to affective

work engagement via meaning is canceled out by the negative path via vigor, the physical-energetical component of work engagement (Schaufeli, 2013).

These findings support the view that it is important to differentiate both major components of work engagement. Conducting a multilevel factor analysis about state and trait work engagement, Breevaart, Bakker, Demerouti, and Hetland (2012) recommended using the combined measure only when the three factors are not expected to show different relationships to other variables. While the use of the total score is more common than a separate analysis of the components, the present study suggests that it is important to separately consider vigor and dedication when job demands are investigated.

Although the findings were in line with those of Bakker and Sanz-Vergel (2013) and Riedl and Thomas (2019), showing that situational challenge demands were unrelated to dedication when job resources and hindrance demands were controlled, the differential relationships of job resources and challenge and hindrance job demands with meaning and vigor support the differentiation of challenge and hindrance job demands within the JDR (Crawford et al., 2010; Van den Broeck et al., 2010) from a within-subject perspective.

Overall, the results were in line with the hypotheses. This study supports a meaning-based conceptualization of situational challenge and hindrance job demands: while situational challenge job demands—although unrelated to dedication—mediated a sense of meaning, for unequivocal hindrance stressors in terms of barriers to quality, the reverse was true. Thus, we assume that every job demand that mediates a sense of meaning within an occupational group should be theoretically regarded as a challenge job demand. Hindrance job demands, in contrast, should be conceptualized as job stressors that are associated with a decrease in the experience of meaning.

Practical Recommendations

The findings of this study suggest that situational challenge demands show motivational potential via meaning. This path should be strengthened, for example, by communicative means. Busse, Kwon, Kloep, Ghosh, and Warner (2018) emphasize the role of consistent, inspirational, trustful and appreciative leadership in the experience of meaning in the workplace. In line with this finding, Breevaart and Bakker (2018) showed that daily challenge demands were positively related to work engagement when transformational leadership was high, while the negative association of hindrance demands with work engagement could be buffered by high transformational leadership behavior. However, Wassermann, Hoppe, Reis, and von Uthmann (2014) note that meaningfulness can also be perceived as a personal resource to attribute meaning to strain and to actively search for positive aspects of a situation that generate a sense of significance (Van den Heuvel, Demerouti, Schreurs, Bakker, & Schaufeli, 2009). Wassermann et al. (2014) found that between-individual levels of this personal resource were positively associated with vigor and moderated the relationship between time pressure and vigor. They conclude that—supplementing organizational interventions—trainings strengthening personal resources may be effective.

In this study, among geriatric nurses, there were strong negative associations between situational quantitative demands and vigor. Ensuring that employees regularly take recreative rest breaks, which have been found to show a positive relationship with quantitative and qualitative performance and well-being (Wendsche, Lohmann-Haislah, & Wegge, 2016), could be a way to reduce the energy-depleting role of challenge demands. Furthermore, employees should be supported in detaching from work during their leisure time, as psychological detachment has been identified as a negative mediator of the positive association between job demands and fatigue (Kinnunen, Feldt, Siltaloppi, & Sonnentag,

2011). Applying a 12-month longitudinal design, Sonnentag, Binnewies, and Mojza (2010) showed that detachment buffered the negative association between job demands and work engagement. Baethge and Vahle-Hinz et al. (2018) provided evidence that it is important to consider the time frame of exposure to job demands: controlling for strain, day- and week-level time pressure showed positive associations with work engagement, but at six to eight weeks, this relationship became negative. Thus, employers should avoid long-term exposure to elevate challenge demands. Furthermore, employees should be trained to use resource-saving coping strategies. Recently, Baethge, Deci, Dettmers, and Rigotti (2019) showed in an experience sampling study that two predictable actions that employees facing high situational time pressure may undertake—working faster and working longer—represent maladaptive coping strategies that should be limited.

Additionally, hindrance job demands and job resources represent promising starting points for interventions. Hindrance demands should be identified and eliminated, as they are associated with reduced dedication mediated by decreased vigor and meaning. However, we acknowledge that this will not be feasible in every case. Job resources, such as autonomy and social support, on the other hand, constitute readily accessible job characteristics that should be fostered, as they mediate meaning and energy, thus promoting dedication.

Limitations

Supporting the applicability of the within-subject findings on other occupational groups, this study investigated job demands and resources that are important for many professions and separated the average level of job conditions from their momentary presence. However, it is conceivable that the chronic nature of some job demands plays a moderating role in their within-subject associations with work engagement. In this respect, it is important to note that geriatric nurses and nurses in general are exposed to a variety of job demands to a greater extent than workers in other professions (BAuA, 2014). Elfering et al. (2005) investigated a

moderating role of chronic job stressors, but they did not find significant cross-level moderation effects. More evidence is needed about this important research question.

In this study, the focus was on conditions of the working environment of geriatric nurses. Individual characteristics were not considered. However, another important predictor for work engagement among nurses are personal resources such as self-efficacy and optimism (Tadić Vujčić, 2019), which have been found to predict work engagement mediated by job crafting behavior (Tadić Vujčić, 2019). This means that nurses high in personal resources tend to shape their working environment in a way that encourages high work engagement. Furthermore, Nielsen and Jørgensen (2016) showed in their qualitative study among outpatient nurses that—depending on the nurses' work orientation—three different ways to experience meaning at work can be differentiated: While “nurturers” emphasize prosocial activities and empathy, for “professionals”, the professional side of nursing including challenging tasks and maintaining personal distance is essential. “Workers”, on the contrary, derive their work engagement from job security and having an important job from a societal perspective. Future investigations should address the moderating role of such different work orientations or personal resources in the relationships between characteristics of the working environment and meaning and vigor.

While we argue that the results of this study provide interesting and important insights into the psychological mechanisms of job demands and resources, we must point to the fact that it is not possible to draw causal conclusions from the study findings. Future studies should apply a lagged design to reveal the situational processes that lead to changes in motivational outcomes.

To avoid overburdening the participants during the repeated measurement, all constructs were measured only by single items, which is a potential limitation. However, in the context of the experience sampling method, single-item measures are considered acceptable when the

face, content and construct validity in terms of reasonable correlations with other variables are given (Fisher & To, 2012). From our point of view, our items meet these requirements.

Conclusion

This experience sampling study aimed to gain insights into the psychological mechanisms that play a role in the situational associations of job resources and challenge and hindrance job demands with dedication. The key finding of this study concerns inconsistent mediation regarding situational challenge demands: a positive indirect association with dedication via meaning contrasted a negative indirect association via vigor. These differential relationships of challenge demands with meaning and vigor can explain why some studies have failed to find a challenge effect of challenge demands in terms of a positive association with motivational outcomes. As both paths from situational job resources showed positive signs, while the paths from situational hindrance demands in terms of barriers to quality were negative, this study's findings support the integration of the challenge-hindrance framework into the JDR, which proposes a differentiation between job resources and challenge and hindrance stressors. From a practical perspective, both paths may represent interesting starting points for intervention: it may be possible to strengthen the indirect path via meaning, for example, by communicative means, and to reduce the indirect path via vigor, for example, by providing rest breaks.

Disclosure of Interest

The authors report no conflicts of interest.

References

- Albrecht, S. L. (2015). Challenge demands, hindrance demands, and psychological need satisfaction. *Journal of Personnel Psychology, 14*, 70–79. 10.1027/1866-5888/a000122
- Arnoux-Nicolas, C., Sovet, L., Lhotellier, L., Di Fabio, A., & Bernaud, J.-L. (2016). Perceived work conditions and turnover intentions: The mediating role of meaning of work. *Frontiers in Psychology, 7*, 704. doi:10.3389/fpsyg.2016.00704
- Baethge, A., Deci, N., Dettmers, J., & Rigotti, T. (2019). ‘Some days won’t end ever’: Working faster and longer as a boundary condition for challenge versus hindrance effects of time pressure. *Journal of Occupational Health Psychology, 24*, doi:10.1037/ocp0000121
- Baethge, A., Vahle-Hinz, T., Schulte-Braucks, J., & van Dick, R. (2018). A matter of time? Challenging and hindering effects of time pressure on work engagement. *Work & Stress, 32*, 228–247. doi:10.1080/02678373.2017.1415998
- Bakker, A. B. (2014). Daily fluctuations in work engagement: An overview and current directions. *European Psychologist, 19*, 227–236. doi:10.1027/1016-9040/a000160
- Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology, 22*, 309–328. doi:10.1108/02683940710733115
- Bakker, A. B., & Demerouti, E. (2017). Job demands-resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology, 22*, 273–285. doi:10.1037/ocp0000056
- Bakker, A. B., & Sanz-Vergel, A. I. (2013). Weekly work engagement and flourishing: The role of hindrance and challenge job demands. *Journal of Vocational Behavior, 83*, 397–409. doi:10.1016/j.jvb.2013.06.008
- Bargagliotti, A. L. (2012). Work engagement in nursing: A concept analysis. *Journal of Advanced Nursing, 68*, 1414–1428. doi:10.1111/j.1365-2648.2011.05859.x

- BAuA (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, 2014). *Arbeit in der Pflege—Arbeit am Limit? Arbeitsbedingungen in der Pflegebranche* [Care work—working at the limit? Working conditions in the care sector], available at:
<http://www.baua.de/dok/6505548> (accessed 21 March 2019).
- Breevaart, K., & Bakker, A. B. (2018). Daily job demands and employee work engagement: The role of daily transformational leadership behavior. *Journal of Occupational Health Psychology, 23*, 338–349. doi:10.1037/ocp0000082
- Breevaart, K., Bakker, A. B., Demerouti, E., & Hetland, J. (2012). The measurement of state work engagement: A multilevel factor analytic study. *European Journal of Psychological Assessment, 28*, 305–312. doi:10.1027/1015-5759/a000111
- Busse, R., Kwon, S., Kloep, H.-A., Ghosh, K., & Warner, M. (2018). Toward a ‘meaningful self’ at the workplace: Multinational evidence from Asia, Europe, and North America. *Journal of Leadership & Organizational Studies, 25*, 63–75.
doi:10.1177/1548051817709009
- Christian, M. S., Garza, A. S., & Slaughter, J. E. (2011). Work engagement: A quantitative review and test of its relations with task and contextual performance. *Personnel Psychology, 64*, 89–136. doi:10.1111/j.1744-6570.2010.01203.x
- Cho, S.-H., Park, M., Jeon, S. H., Chang, H. E., & Hong, H.-J. (2014). Average hospital length of stay, nurses’ work demands, and their health and job outcomes. *Journal of Nursing Scholarship, 46*, 199–206. doi:10.1111/jnu.12066
- Clausen, T. & Borg, V. (2011). Job demands, job resources and meaning at work. *Journal of Managerial Psychology, 26*, 665–681. doi:10.1108/02683941111181761
- Crawford, E. R., LePine, J. A., & Rich, B. L. (2010). Linking job demands and resources to employee engagement and burnout: A theoretical extension and meta-analytic test. *Journal of Applied Psychology, 95*, 834–848. doi:10.1037/a0019364

- Deci, E. L., & Ryan, R. M. (2000). The 'what' and 'why' of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*, 227–268.
doi:10.1207/S15327965PLI1104_01
- Demerouti, E., & Bakker, A. B. (2011). The job demands-resources model: Challenges for future research. *South African Journal of Industrial Psychology, 37*, 1–9.
doi:10.4102/sajip.v37i2.974
- Elfering, A., Grebner, S., K. Semmer, N., Kaiser-Freiburghaus, D., Lauper-Del Ponte, S., & Witschi, I. (2005). Chronic job stressors and job control: Effects on event-related coping success and well-being. *Journal of Occupational and Organizational Psychology, 78*, 237–252. doi:10.1348/096317905X40088
- Fisher, C. D., & To, M. L. (2012). Using experience sampling methodology in organizational behavior. *Journal of Organizational Behavior, 33*, 865–877. doi:10.1002/job.1803
- Frankl, V. E. (1985). *Man's search for meaning*. Washington, NY: Washington Square Press.
- Garrosa, E., Moreno-Jiménez, B., Rodríguez-Muñoz, A., & Rodríguez-Carvajal, R. (2011). Role stress and personal resources in nursing: A cross-sectional study of burnout and engagement. *International Journal of Nursing Studies, 48*, 479–489.
doi:10.1016/j.ijnurstu.2010.08.004
- González-Romá, V., Schaufeli, W. B., Bakker, A. B., & Lloret, S. (2006). Burnout and work engagement: Independent factors or opposite poles? *Journal of Vocational Behavior, 62*, 165–174. doi:10.1016/j.jvb.2005.01.003
- Hackman, J. R., & Oldham, G. R. (1976). Motivation through the design of work: Test of a theory. *Organizational Behavior and Human Performance, 16*, 250–279.
doi:10.1016/0030-5073(76)90016-7
- Hobfoll, S. E. (2002). Social and psychological resources and adaptation. *Review of General Psychology, 6*, 307–324. doi:10.1037//1089-2680.6.4.307

- Hockey, G. R. J. (1993). Cognitive-energetical control mechanisms in the management of work demands and psychological health. In A. Baddeley, & L. Weiskrantz (Eds.), *Attention: Selection, awareness, and control* (pp. 328–345). Oxford, UK: Clarendon Press.
- Humphrey, S. E., Nahrgang, J. D., & Morgeson, F. P. (2007). Integrating motivational, social, and contextual work design features: A meta-analytic summary and theoretical extension of the work design literature. *Journal of Applied Psychology, 92*, 1332–1356. doi:10.1037/0021-9010.92.5.1332
- Jenull, B., & Brunner, E. (2009). Macht Altenpflege krank? Eine qualitative Studie zu Arbeitserfahrungen, Coping und Gesundheitsverhaltensweisen bei Pflegekräften [Makes geriatric care sick? A qualitative study on working experiences, coping and health behavior among caregivers]. *Zeitschrift für Gerontopsychologie & -psychiatrie, 22*, 5–10. doi:10.1024/1011-6877.22.1.5
- Johnston, D., Bell, C., Jones, M., Farquharson, B., Allan, J., Schofield, P., ... Johnston, M. (2016). Stressors, appraisal of stressors, experienced stress and cardiac response: A real-time, real-life investigation of work stress in nurses. *Annals of Behavioral Medicine, 50*, 187–197. doi:10.1007/s12160-015-9746-8
- Johnston, D. W., Jones, M. C., Charles, K., McCann, S. K., & McKee, L. (2013). Stress in nurses: Stress-related affect and its determinants examined over the nursing day. *Annals of Behavioral Medicine, 45*, 348–356. doi:10.1007/s12160-012-9458-2
- Josefsson, K. (2012). Registered nurses' health in community elderly care in Sweden. *International Nursing Review, 59*, 409–415. doi:10.1111/j.1466-7657.2012.00984.x
- Kinnunen, U., Feldt, T., Siltaloppi, M., & Sonnentag, S. (2011). Job demands-resources model in the context of recovery: Testing recovery experiences as mediators. *European Journal of Work and Organizational Psychology, 20*, 805–832. doi:10.1080/1359432X.2010.524411

- Kristensen, T., Borg, V., & Hannerz, H. (2002). Socioeconomic status and psychosocial work environment: Results from a Danish national study. *Scandinavian Journal of Public Health, 30*, 41–48. doi:10.1177/14034948020300032401
- Leiter, M. P., & Maslach, C. (2005). A mediation model of job burnout. In A. S. G. Antoniou, & C. L. Cooper (Eds.), *Research companion to organizational health psychology* (pp. 544–564). Cheltenham, UK: Edward Elgar.
- LePine, J. A., Podsakoff, N. P., & LePine, M. A. (2005). A meta-analytic test of the challenge stressor-hindrance stressor framework: An explanation for inconsistent relationships among stressors and performance. *Academy of Management Journal, 48*, 764–775. doi:10.5465/AMJ.2005.18803921
- MacKinnon, D. P., Fairchild, A. J., & Fritz, M. S. (2007). Mediation analysis. *Annual Review of Psychology, 58*, 593–614. doi:10.1146/annurev.psych.58.110405.085542
- Murphy, C. A., & Gable, R. K. (1988). Validity and reliability of the original and abridged role conflict and ambiguity scales. *Educational and Psychological Measurement, 48*, 743–751. doi:10.1177/0013164488483023
- Nielsen, M. S., & Jørgensen, F. (2015). Meaning creation and employee engagement in home health caregivers. *Scandinavian Journal of Caring Sciences, 30*, 57–64. doi:10.1111/scs.12221
- Nübling, M., Stöbel, U., Hasselhorn, H.-M., Michaelis, M., & Hofmann, F. (2005). *Methoden zur Erfassung psychischer Belastungen: Erprobung eines Messinstrumentes (COPSOQ)* [Methods for the assessment of psychological strain: Test of a measuring instrument (COPSOQ)]. Schriftenreihe der Bundesanstalt für Arbeitsschutz und Arbeitsmedizin [publication series of the Bundesanstalt für Arbeitsschutz und Arbeitsmedizin]. Bremerhaven, Germany: Wirtschaftsverlag NW. Available at: <https://www.copsoq->

- network.org/assets/Uploads/BUCH-coposq-dt-baua-2005-Fb1058.pdf (accessed 21 March 2019).
- Olafsen, A. H., & Frølund, C. W. (2018). Challenge accepted! Distinguishing between challenge- and hindrance demands. *Journal of Managerial Psychology*, *33*, 345–357. doi:10.1108/JMP-04-2017-0143
- Prem, R., Paškvan, M., Kubicek, B., & Korunka, C. (2018). Exploring the ambivalence of time pressure in daily working life. *International Journal of Stress Management*, *25*, 35–43. doi:10.1037/str0000044
- Podsakoff, N. P., LePine, J. A., & LePine, M. A. (2007). Differential challenge stressor-hindrance stressor relationships with job attitudes, turnover intentions, turnover, and withdrawal behavior: A meta-analysis. *Journal of Applied Psychology*, *92*, 438–454. doi:10.1037/0021-9010.92.2.438
- Preacher, K. J., Zyphur, M. J., & Zhang, Z. (2010). A general multilevel SEM framework for assessing multilevel mediation. *Psychological Methods*, *15*, 209–233. doi:10.1037/a0020141
- Reis, D., Hoppe, A., Arndt, C., & Lischetzke, T. (2017). Time pressure with state vigour and state absorption: Are they non-linearly related? *European Journal of Work and Organizational Psychology*, *26*, 94–106. doi:10.1080/1359432X.2016.1224232
- Riedl, E. M., & Thomas, J. (2019). The moderating role of work pressure on the relationships between emotional demands and tension, exhaustion, and work engagement: An experience sampling study among nurses. *European Journal of Work and Organizational Psychology*. doi:10.1080/1359432X.2019.1588251
- Ryan, R. M. & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology*, *52*, 141–166. doi:10.1146/annurev.psych.52.1.141

- Saks, A. M. (2006). Antecedents and consequences of employee engagement. *Journal of Managerial Psychology, 21*, 600–619. doi:10.1108/02683940610690169
- Schaufeli, W.B. (2013). What is engagement? In C. Truss, K. Alfes, R. Delbridge, A. Shantz, & E. Soane (Eds.), *Employee engagement in theory and practice* (pp. 15–35). London: Routledge.
- Schaufeli, W. B., & Bakker, A. (2004). *Utrecht Work Engagement Scale: Preliminary manual*. Available at: http://www.wilmarschaufeli.nl/publications/Schaufeli/Test%20Manuals/Test_manual_UWES_English.pdf (accessed 21 March 2019).
- Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and Psychological Measurement, 66*, 701–716. doi:10.1177/0013164405282471
- Schaufeli, W. B., Salanova, M., González-Romá, V., & Bakker, A. B. (2002). The measurement of engagement and burnout: A two sample confirmative factor analytic approach. *Journal of Happiness Studies, 3*, 71–92. doi:10.1023/A:1015630930326
- Schaufeli, W. B., & Taris, T. W. (2014). A critical review of the job demands-resources model: Implications for improving work and health. In G. F. Bauer, & O. Hämmig (Eds.), *Bridging occupational, organizational and public health: A transdisciplinary approach* (pp. 43–68). Dordrecht, Netherlands: Springer.
- Sonnentag, S., Binnewies, C., & Mojza, E. J. (2010). Staying well and engaged when demands are high: The role of psychological detachment. *Journal of Applied Psychology, 95*, 965–976. doi:10.1037/a0020032
- Steger, M. F., & Dik, B. J. (2010). Work as meaning: Individual and organizational benefits of engaging in meaningful work. In P. A. Linley (Ed.), *Oxford handbook of positive psychology and work* (pp. 131–142). Oxford, UK: Oxford University Press.

- Tadić, M., Bakker, A. B., & Oerlemans, W. G. M. (2015). Challenge versus hindrance job demands and well-being: A diary study on the moderating role of job resources. *Journal of Occupational and Organizational Psychology, 88*, 702–725. doi:10.1111/joop.12094
- Tadić Vujčić, M. (2019). Personal resources and work engagement: A two-wave study on the role of job resources crafting among nurses. *Drustvena Istrazivanja, 28*, 5–24. doi:10.5559/di.28.1.01
- Van den Broeck, A., De Cuyper, N., De Witte, H., & Vansteenkiste, M. (2010). Not all job demands are equal: Differentiating job hindrances and job challenges in the Job Demands-Resources model. *European Journal of Work and Organizational Psychology, 19*, 735–759. doi:10.1080/13594320903223839
- Van den Heuvel, M., Demerouti, E., Schreurs, B. H., Bakker, A. B., & Schaufeli, W. B. (2009). Does meaning-making help during organizational change? Development and validation of a new scale. *Career Development International, 14*, 508–533. doi:10.1108/13620430910997277
- Vera, M., Martínez, I. M., Lorente, L., & Chambel, M. J. (2016). The role of co-worker and supervisor support in the relationship between job autonomy and work engagement among Portuguese nurses: a multilevel study. *Social Indicators Research, 126*, 1143–1156. doi:10.1007/s11205-015-0931-8
- Vroom, V. H. (1964). *Work and motivation*. Wiley, New York, NY.
- Wassermann, M., Hoppe, A., Reis, D., & von Uthmann, L. (2014). Sinnstiftung als persönliche Ressource bei Altenpflegekräften: Zu direkten und moderierenden Effekten von Sinnstiftung auf emotionale Erschöpfung und Vitalität [Meaning-making as a personal resource among elderly care nurses: Direct and moderating effects on emotional exhaustion and vigor]. *Zeitschrift für Arbeits- und Organisationspsychologie, 58*, 51–63. doi:10.1026/0932-4089/a000142

- Wendsche, J., Lohmann-Haislah, A., & Wegge, J. (2016). The impact of supplementary short rest breaks on task performance – A meta-analysis. *sozialpolitik.ch*, 2, 1–24.
doi:10.18753/2297-8224-75
- Widmer, P. S., Semmer, N. K., Kälin, W., Jacobshagen, N., & Meier, L. L. (2012). The ambivalence of challenge stressors: Time pressure associated with both negative and positive well-being. *Journal of Vocational Behavior*, 80, 422–433.
doi:10.1016/j.jvb.2011.09.006
- Wirth, T., Ulusoy, N., Lincke, H.-J., Nienhaus, A., & Schablon, A. (2017). Psychosoziale Belastungen und Beanspruchungen von Beschäftigten in der stationären und ambulanten Altenpflege: Ergebnisse einer Querschnittsstudie [Psychosocial demands and strain among employees in stationary and ambulatory geriatric care: Results of a cross-sectional study]. *Arbeitsmedizin Sozialmedizin Umweltmedizin*, 52, 662–669. doi:10.17147/ASU2017-09-01-01
- Xanthopoulou, D., & Bakker, A. B. (2013). State work engagement: The significance of within- person fluctuations. In A. B. Bakker, & K. Daniels (Eds.), *A day in the life of a happy worker* (pp. 25–40). Hove, UK: Psychology Press.
- Zyphur, M. J., & Oswald, F. L. (2015). Bayesian estimation and inference: A user's guide. *Journal of Management*, 41, 390–420. doi:10.1177/0149206313501200

The spillover-crossover model: An examination of within-couple processes

Elisabeth M. Riedl¹, Janusz Surzykiewicz^{2 3}, Ilona Skoczeń³, Marek Kulesza³, Joachim Thomas¹

¹Department of Psychological Assessment and Intervention, Faculty of Philosophy and Education, Catholic University of Eichstätt-Ingolstadt, Germany

²Chair of Social Pedagogy, Faculty of Philosophy and Education, Catholic University of Eichstätt-Ingolstadt, Germany

³Chair of Psychological Foundations of Pedagogy, Cardinal Stefan Wyszyński University, Poland

Abstract

The purpose of this study is to examine the spillover-crossover model from a within-couple perspective. Enriching paths in terms of the effects of actors' job resources (autonomy and support) on actors' and partners' satisfaction at home and conflicting paths of actors' job demands (workload and problem-solving demands in terms of encountering difficulties) on actors' and partners' tension at the end of the day were considered simultaneously. Two mediational paths were tested: 1) Affective well-being in terms of tension and satisfaction at the end of the working day and 2) marital interaction represented by communication and care for partners. The sample consisted of 211 couples that provided measurements for 1530 working days. Multilevel path models showed that daily difficulties at work—serially mediated by actors' tension and marital interaction reported by both partners—predicted actors' and partners' tension at the end of the working day. Originating from support and autonomy at work, there were positive indirect effects on actors' and partners' satisfaction at home via actors' satisfaction at work and actors' and partners' reported marital interaction. The key finding of this study is that positive crossover—similar to the negative path—is mediated by mood spillover and marital interaction in terms of communication and care for partners. The theoretical and practical implications of the findings are discussed.

Keywords: Positive and negative spillover and crossover, work-to-family, care for partner, communication, mediation, experience sampling

Introduction

In light of the societal change from the male breadwinner model to the dual-earner model (Hofäcker, 2009), a growing number of couples are confronted with increased challenges to balance work and family life. Multiple roles played by both partners are associated with higher stress, work-family conflict and overload (Elloy & Smith, 2003). On the other hand, role accumulation can also be a source of satisfaction and well-being (Greenhaus & Powell, 2006). A prominent model integrating positive and negative aspects of the dual-earner model is the spillover-crossover model (SCM, Bakker & Demerouti, 2013), which makes two central assumptions: 1) Experiences in the work domain spill over to home; and 2) in the course of social interactions at home, these experiences cross over to the partner.

While many studies have examined negative spillover and crossover, the positive part of the SCM has received less attention (Steiner & Krings, 2016, for a review). In particular, the role of marital interaction as a mediator of positive crossover processes represents an important issue for future research (Steiner & Krings, 2016). Additionally, research addressing both positive and negative spillover and crossover from work to family simultaneously is rare (Amstad & Semmer, 2011). Against this background, this study considers both negative and positive spillover and crossover processes from job demands and resources to well-being at home serially mediated by work-related well-being and marital interaction in terms of care for partner and communication. While many previous studies applied a cross-sectional design, in this study, the assessment of work-related variables and family-life variables was temporally separated. We further contribute to the literature by taking a within-couple perspective. Focusing on daily variations, this study addresses the question of which changes in actors' and partners' working environments, work-related well-being and reported marital interactions predict increases or decreases in actors' and partners' daily well-being at the end of day.

Negative Work-to-Family Spillover and Crossover from a Within-Subject Perspective

Bakker and Demerouti (2013) define negative spillover as a within-person, across-domain transmission of strain. They argue that high job demands lead to impaired functioning in the family role (i. e., work-family conflict), as—according to the role scarcity hypothesis (Edwards & Rothbard, 2000)—job demands consume the same resources that are needed in family life. Indeed, there is strong evidence from experience sampling studies that negative well-being in terms of negative affect (Ilies et al., 2007; Judge & Ilies, 2004; Klumb, Voelkle, & Siegler, 2017; Lavee & Ben-Ari, 2007, Sonnentag & Binnewies, 2013), anger and anxiety (Matjasko & Feldman, 2006), and ego depletion (Germeys & De Gieter, 2018) is brought home via mood spillover. The job demands that have been found to provoke negative spillover from work to home are job stress (Debrot, Siegler, Klumb, & Schoebi, 2018), workload (Ilies et al., 2007), situational constraints (Unger, Sonnentag, Niessen, & Kuonath, 2017), self-control demands (Germeys & De Gieter, 2018; Gombert, Rivkin, & Schmidt, 2018), negative social interactions at work, interpersonal conflicts (Lim, Ilies, Koopman, Christoforou, & Arvey, 2018; Martinez-Corts, Demerouti, Bakker & Boz, 2015; Klumb et al., 2017; Sanz-Vergel, Rodríguez-Muñoz & Nielsen, 2015; Story & Repetti, 2006; Zhou, Meier, & Spector, 2019), and task conflicts (Martinez-Corts et al., 2015). Furthermore, surface acting at work has been found to spill over into the family domain, leading to surface acting at home and impaired well-being (Sanz-Vergel, Rodríguez-Muñoz, Bakker, & Demerouti, 2012).

It is comprehensible that when an employee leaves work after a stressful working day, her/his negative well-being will affect the interaction with his/her partner and therefore also influence the partner's well-being. This phenomenon of an interpersonal contagion of stress is called stress crossover (Bolger, DeLongis, Kessler, & Wethington, 1989), which can be defined as a cross-domain transmission of strain from one area of life to the life of another

person in the same social environment. Westman (2006) proposed three mechanisms for crossover processes: The first mechanism is related to a direct empathetic crossover in which people share the feelings of their partners by feeling into the situation of her/his partner (Lazarus, 1991). In the second mechanism, partners are confronted with common stressors, which can explain why the strain levels of both partners rise simultaneously (Westman, 2006). The third mechanism is an indirect process in which strain is transferred to the partner by social interaction; Westman (2006) discusses the role of communication, social support and social undermining. The SCM (Bakker & Demerouti, 2013) admits the first and third mechanisms and assumes that the spillover of negative affect from work to home affects the partner directly and indirectly via marital interaction. It is proposed that strain fosters social undermining behaviors in terms of hostile marital interactions and decreases the social support offered to the partner and—due to the reciprocated nature of support—the support the actor receives. Such aspects of marital interaction in turn represent important predictors of actors' and partners' well-being at home and therefore—following strain—mediate the relationships between actors' job demands and actors' and partners' well-being at home (Bakker & Demerouti, 2013).

These assumptions are supported by some studies that have applied the experience sampling method. Regarding the effects of job demands on marital interaction, Sanz-Vergel et al. (2015) showed that actors' interpersonal conflicts at work predict their interpersonal conflicts at home, which crossed over to their partners' perceptions of interpersonal conflict. In the study by Lavee and Ben-Ari (2007), dyadic closeness reported by both partners was predicted by actors' and partners' negative moods, which in turn was positively associated with actor work stress. Germeys and de Gieter (2018) showed that actors' ego depletion at home following high self-control demands at work not only predicted reduced support provided by the actor and actor-initiated conflict but also crossed over to the partners' ego

depletion and led to reduced support provided by the partner and increased partner-initiated conflict.

Relating to the effects of daily job demands on well-being outcomes, Debrot et al. (2018) found that actors' work stress predicted not only actors' but also partners' relationship satisfaction. Sanz-Vergel et al. (2012) report a direct crossover of surface acting at home and well-being. It should be noted, however, that some researchers failed to find crossover effects: In the study by Klumb et al. (2017), crossover processes of low- and high-arousal negative affect at work on the low- and high-arousal negative affect of partners at home were absent. Furthermore, high-arousal negative affect did not predict negative couple interactions.

Positive Work-to-Family Spillover and Crossover from a Within-Subject Perspective

The positive form of spillover processes is supposed to originate from job resources such as social support and job autonomy, which lead to positive experiences at work and spill over to home (i. e. work-family enrichment; Bakker & Demerouti, 2013). According to Greenhaus and Powell (2006), there are two paths to enrichment: Within the instrumental path, resources that are developed in or provided by a role promote functioning in another role. An example could be that job autonomy facilitates the performance of family responsibilities. The second path is the association between resources and mood: Richness of resources promotes the affective well-being of a role holder that spills over to other roles (Greenhaus & Powell, 2006). For example, when an employee experiences high support and autonomy at work, she/he will leave work contented. Indeed, there is broad evidence for a daily emotional transmission of positive mood and satisfaction from work to home (Heller & Watson, 2005; Ilies, Wilson, & Wagner, 2009; Judge & Ilies, 2004; Matjasko & Feldman, 2006; Rodríguez-Muñoz, Sanz-Vergel, Demerouti, & Bakker, 2014; Sanz-Vergel & Rodríguez-Muñoz, 2013; Sonnentag & Binnewies, 2013).

Similarly to the negative process of spillover and crossover, the SCM (Bakker & Demerouti, 2013) assumes that positive experiences at work spill over to home and cross over to the partner directly and indirectly mediated by marital interaction. Two experience sampling studies provide evidence for a bidirectional positive crossover of well-being at home (Rodríguez-Muñoz et al., 2014; Sanz-Vergel & Rodríguez-Muñoz, 2013). Furthermore, they show that actors' well-being at work indirectly relates to partners' well-being at home mediated by actors' well-being at home (Rodríguez-Muñoz et al., 2014; Sanz-Vergel & Rodríguez-Muñoz, 2013). The role of marital interaction in positive crossover processes, however, represents an issue for future research (Steiner & Krings, 2016). Cross-sectionally and from a between-subject perspective, Liu, Ngo, & Cheung (2016) showed that for wives and husbands increased social support and decreased social undermining, respectively, were mediators of the relationship between actors' work-family enrichment and partners' marital satisfaction. Applying a similar research design, van Steenbergen, Kluwer, and Karney (2014) found that husbands' work-family enrichment was positively related to the marital positivity reported by their wives, which in turn showed a positive association with wives' marital satisfaction. Thus, there is preliminary evidence that the same mechanisms mediate positive and negative crossover of work experiences.

The Aim and Hypotheses of the Present Study

Simultaneously considering both the positive and negative pathways, the aim of the present study is to investigate the SCM (Bakker & Demerouti, 2013) from a within-couple perspective. Furthermore, the mediating role of marital interaction in terms of communication and care for partners within the positive and the negative process is addressed.

Two job demands and two job resources were included: workload (e.g. Xanthopoulou et al., 2007), problem-solving demands in terms of confrontation with problems (e.g. Cullinane, Bosak, Flood, & Demerouti, 2014), social support and job autonomy (e.g. Bakker,

Demerouti, & Euwema, 2005; Xanthopoulou et al., 2007). These job demands and resources previously have been investigated within the job demands-resources theory (Bakker & Demerouti, 2017; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001), which represents the basis for the work-related part of the SCM (Bakker & Demerouti, 2013).

Drawing on the mood spillover phenomenon (Judge & Ilies, 2004), tension and satisfaction at the end of the working day were chosen as affective mediators of the spillover effects of job demands and job resources on well-being at home. Tension and satisfaction represent two distinctive outcome variables of the job demands-resources theory (Bakker & Demerouti, 2017; Demerouti et al., 2001).

The second mediational part was represented by the two marital interaction variables of communication and care for partner. From a between-subject perspective, both support (Bakker, Demerouti, & Burke, 2009; Liu et al., 2016) and communication (Carroll, Hill, Yorgason, Larson, & Sandberg, 2013) have been shown to be important mediators in the associations of work-family conflict or work-family enrichment and relationship satisfaction. Communication can be either positive and competent or negative (Theunissen, van Vuuren, & Visser, 2003), while positive communication includes disclosing or revealing private thoughts and feelings (Hendrick, 1981), empathy and spending time talking and discussing (Strong & Cohen, 2017). Positive communication promotes cooperation, mutuality and understanding and contributes to the need-fulfillment of both partners (Pepitone-Rockwell, 1980). Following this view, communication and support represent closely linked constructs. Figure 1 illustrates the proposed research model.

On the basis of the SCM (Bakker & Demerouti, 2013), we propose the following hypotheses:

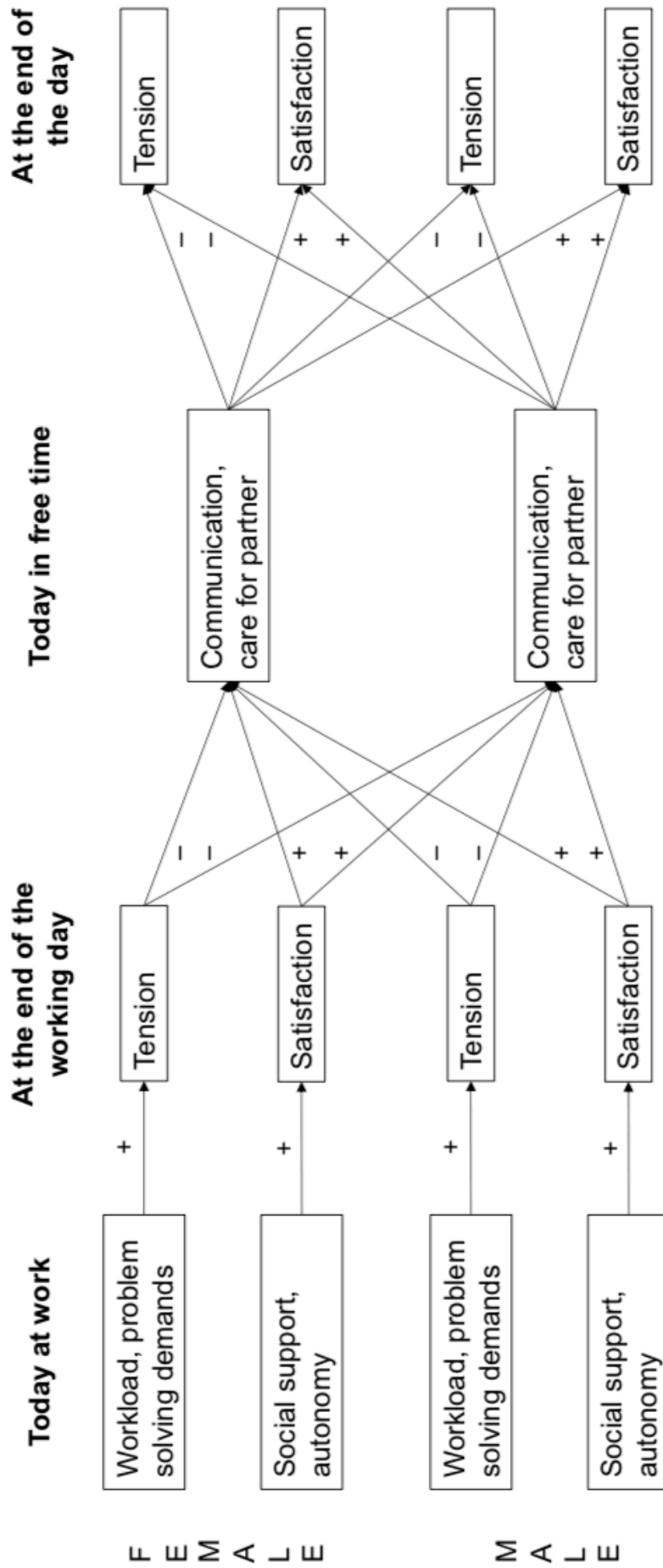


Figure 1. Hypothesized spillover-crossover model

H1: Mediated by actors' tensions at the end of the working day and marital interactions in terms of communication and care for partners at home (perceived by both partners), workload and difficulties at the actors' work are positively related to their tension at the end of the working day.

H2: Mediated by actors' tensions at the end of the working day and marital interactions in terms of communication and care for partners at home (perceived by both partners), workload and difficulties at the actors' work are positively related to their partners' tensions at the end of the working day.

H3: Mediated by actors' satisfaction at the end of the working day and marital interaction in terms of communication and care for partners at home (perceived by both partners), the support at work and job autonomy experienced by actors are positively related to their satisfaction at the end of the working day.

H4: Mediated by actors' satisfaction at the end of the working day and marital interaction in terms of communication and care for partners at home (perceived by both partners), the support at work and job autonomy experienced by actors are positively related to their partners' satisfaction at the end of the working day.

Method

Sample and Procedure

This study was conducted among heterosexual couples recruited by a Polish market research company. Eligibility criteria were both partners being employed, living in large cities over 500 000 inhabitants and caring for at least one child below 12 years. At the start of the data collection, the participants were asked about their schedules (when they usually finish work and go to bed), and these individual schedules were used to set the time for

alarms. The first notification appeared within the last two working hours, and the second alarm occurred within the last two hours before going to bed.

First, the data were corrected by applying the following criteria: 1) At least a one hour window was required between the work questionnaire and the home questionnaire of the actor and partner (to assure a lagged analysis), and 2) at least two valid measurements of both partners were required. The final sample consisted of 211 couples that provided measurements for 1530 working days. For each day and each couple, there were four measurements (work and home questionnaire of the female and male partner). The compliance rate was 80 % for female participants and 81 % for male participants. On average, the time lag between the females' work and home questionnaire was 3.07 hours ($SD = 1.38$). For the male participants, the average time lag was 2.53 hours ($SD = 1.04$).

The female participants were between 21 and 49 years old ($M = 33.09$, $SD = 5.87$), and their male partners were between 21 and 55 ($M = 34.67$, $SD = 6.01$). The majority of the participants were married (85 %). The couples had between one and four children ($M = 1.25$, $SD = 0.50$). Fifty-one percent of the female participants and 55 % of the male participants were white collar workers, e.g., administrative employees, attorneys, managers. The second largest group comprised blue collar workers performing physical work, e. g., driver or warehouse worker (women: 32 %, men: 41 %). In the group of pink collar workers performing social work, e.g., nursing and teaching, female participants were much more prevalent (14 %) than male participants (1 %). Finally, 3 % of the female and male participants were freelancers or self-employed.

Measures

Work questionnaire. The questionnaire at the end of the working day included questions relating to job characteristics and momentary affective well-being. Social support was measured with the item “Today, I felt supported in my work”, and job autonomy was measured with the item “Today, I had great latitude in decision-making”, which was derived from the German version (Nübling et al., 2005) of the Copenhagen Psychosocial Questionnaire (COPSOQ; Kristensen, Borg, & Hannerz, 2002). Two types of job demands were assessed: Workload and difficulties at work. Oriented to the quantitative workload inventory (Spector & Jex, 1998), workload was measured with the item “Today, at work, there was a great deal to be done”. Difficulties were measured with the item “Today, at work, I encountered difficulties”, which was adapted from the problem-solving demand scale proposed by Wall, Jackson, and Mullarkey (1995). The job characteristics were rated on a five-point Likert scale ranging from *I strongly disagree* (1) to *I totally agree* (5). The work questionnaire further included two items measuring affective well-being at the end of the working day. For the negative process, the variable tension was chosen, which was measured with the bipolar item “At the moment, I feel tense vs. relaxed” (Wilhelm & Schoebi, 2007). Positive outcomes were represented by satisfaction, which was measured with the item “At the moment, I feel satisfied vs. unsatisfied” (Wilhelm & Schoebi, 2007). The affective well-being items were rated on seven-point scales.

Home questionnaire. The questionnaire at the end of the day assessed the couples’ interactions and well-being. Oriented towards the short form (PFB-K, Kliem et al., 2012) of the partnership questionnaire (Hahlweg, 1996), supportive spouse interaction was measured in terms of support and communication with the items “Today, in my free time, I cared about the needs of my partner” and “Today, in my free time, I had good communication with my

partner” on a five-point Likert scale. Affective well-being at home was assessed in terms of tension and satisfaction as in the questionnaire at the end of the working day.

Data Analysis

The data show a three-level structure with measurements nested within individuals belonging to couples. However, the second analysis level concerning the male and the female partner is saturated, as—once a couple is sampled—the two partners are determined (Laurenceau & Bolger, 2005). Therefore, a two-level actor-partner interdependence model was estimated, where situational measurements of the male and the female partners were nested within couples (Laurenceau & Bolger, 2012). We conducted multilevel path models that were calculated with MPlus version 8.1.6. Considering the strong within-subject focus of this study, it is important to clearly separate the within-subject level from the between-subject level. We followed Laurenceau and Bolger (2012) and estimated an unconfined model in which the variables were decomposed into their within- and between-subject parts. The within-subject parts of the variables were centered on the person mean, and the between-subject parts were centered on the grand mean (Laurenceau & Bolger, 2012).

Due to the focus on mediated relationships, we applied a Bayesian approach, which flexibly handles the non-normal distributions of indirect effects (Preacher, Zyphur, & Zhang, 2010; Zyphur & Oswald, 2015) and provide 95 % credibility intervals (*CRI*) based on the posterior probability distribution of the indirect effects. While the intercepts were allowed to vary randomly between the participants, the slopes were fixed to avoid unnecessary complications (Preacher et al., 2010). All variables in a single part of the model were allowed to correlate (i. e., the four aspects regarding the conditions of working environment, tension and satisfaction at the end of the working day, care for the partner and communication at home, and tension and satisfaction at the end of the day). Furthermore, the corresponding dependencies among female and male variables were included.

Autocorrelations were tested within a residual dynamic structural equation model (Asparouhov & Muthen, 2019). As the residuals of adjacent time points of the dependent variables showed very small and insignificant correlations (tension home female: $r = .04$, *CRI* 95 % [-.02, .11], tension home male: $r = -.01$, *CRI* 95 % [-.08, .07], satisfaction home female: $r = .03$, *CRI* 95 % [-.03, .09], satisfaction home male: $r = .04$, *CRI* 95 % [-.03, .10]), we decided to use the two-level model instead of the RDSEM model.

Results

Descriptive Statistics and Preliminary Analyses

The descriptive statistics of the variables obtained from null models are shown in Table 1. The intraclass correlations ranged from .10 to .27, indicating that 73 % to 90 % of the variance was located at the situational level. All variables showed significant within- and between-subject variances for all variables. There were no significant mean differences between female and male subjects regarding the aggregated variables. Supporting the interdependence assumption, significant positive correlations among both partners were present for all variables at both the between-couple level and the within-couple level. With a posterior predictive p -value of .129 and a confidence interval relating to the difference between the observed and generated data of -15.76 and 117.81, the model showed a good model fit (Zyphur & Oswald, 2015).

Table 1
Descriptive statistics of the within-subject variables

Variable	Female			Male			Couple			
	<i>M</i>	<i>SD_w</i>	<i>SD_b</i>	<i>ICC</i>	<i>M</i>	<i>SD_w</i>	<i>SD_b</i>	<i>ICC</i>	<i>r_w</i>	<i>r_b</i>
1. Workload	3.80	1.04	0.37	.11	3.73	1.09	0.37	.10	.11	.11
2. Difficulties	2.72	1.19	0.43	.11	2.76	1.21	0.41	.10	.23	.11
3. Support	3.84	0.94	0.52	.24	3.84	0.94	0.57	.27	.19	.15
4. Autonomy	3.88	0.99	0.46	.18	3.94	1.00	0.43	.16	.21	.08
5. Tension at work	3.66	1.31	0.56	.16	3.62	1.23	0.61	.20	.55	.18
6. Satisfaction at work	4.76	1.25	0.55	.16	4.71	1.17	0.57	.19	.57	.20
7. Communication	4.16	0.94	0.42	.16	4.18	0.90	0.43	.18	.50	.12
8. Care for partner	4.21	0.97	0.35	.12	4.11	0.98	0.49	.20	.41	.12
9. Tension at home	3.46	1.38	0.53	.13	3.48	1.26	0.67	.22	.74	.24
10. Satisfaction at home	4.79	1.32	0.48	.12	4.73	1.25	0.59	.18	.87	.18

Note. N_2 (couples) = 211, N_1 (observations) = 1404 for women, 1415 for men.

The possible range of the affective well-being variables is 1–7. For the other variables, the possible range is 1–5.

SD_w = within-subject standard deviation. SD_b = between-subject standard deviation. ICC = intraclass correlation. r_w = within-couple correlation. r_b = between-couple correlation. All correlations are significant at $p < .01$.

Negative Spillover and Crossover Effects

Workload during the working day did not affect tension at the end of the day (see Table 2 and Table 3), the interaction variables or tension at home. Spillover and crossover effects of workload were absent. For female difficulties at work, however, there were significant indirect effects on female tension at home serially mediated by female tension at the end of the working day, female-experienced communication ($\gamma = 0.004$, *CRI* 95 % [0.001, 0.007]) and female care for partner ($\gamma = 0.003$, *CRI* 95 % [0.001, 0.005]). Similarly, male difficulties at work affected male tension at home mediated by male tension at the end of the working day, communication experienced by the male partner ($\gamma = 0.003$, *CRI* 95 % [0.001, 0.007]) and communication experienced by the female partner ($\gamma = 0.003$, *CRI* 95 % [0.001, 0.006]).

Female difficulties at work crossed over to male tension at home mediated by female tension at the end of the working day and female ($\gamma = 0.002$, *CRI* 95 % [0.000, 0.004]) and male ($\gamma = 0.002$, *CRI* 95 % [0.000, 0.003]) experienced communication. Male difficulties at work affected female tension at home mediated by male tension at the end of the working day, which in turn resulted in the experience of poor communication by the female partner ($\gamma = 0.006$, *CRI* 95 % [0.003, 0.010]) and reduced female care for partner ($\gamma = 0.003$, *CRI* 95 % [0.000, 0.006]). While female difficulties at work were still associated with female tension at home, other direct associations of difficulties at work were absent. In summary, there was support for the hypotheses of a negative spillover and crossover from experienced difficulties at work to home (H1 and H2), as suggested by the SCM.

Table 2
Multilevel path model estimates for female tension and satisfaction at home

Standardized within-couple fixed effects	Female tension at work	Female satisfaction at work	Female communication	Female care for partner	Female tension at home	Female satisfaction at home
Female workload	-.05 [-.09; .01]	-.05 [-.09; -.00]	.01 [-.04; .06]	-.01 [-.05; .04]	-.03 [-.07; .02]	.04 [-.01; .08]
Female difficulties	.12 [.07; .17]	-.15 [-.20; -.11]	-.04 [-.08; .01]	-.02 [-.07; .04]	.05 [.00; .10]	-.03 [-.08; .02]
Female support	-.28 [-.33; -.23]	.31 [.25; .36]	.18 [.11; .24]	.12 [.06; .18]	-.03 [-.09; .02]	.01 [-.04; .06]
Female autonomy	-.16 [-.21; -.11]	.13 [.08; .18]	.02 [-.04; .08]	.05 [-.01; .10]	.01 [-.04; .06]	.01 [-.04; .06]
Male workload			.02 [-.04; .07]	-.00 [.06; .05]	.02 [-.02; .06]	-.01 [-.05; .04]
Male difficulties			-.09 [-.15; -.04]	-.10 [-.16; -.05]	-.02 [-.07; .03]	.03 [-.02; .07]
Male support			.06 [-.00; .13]	.03 [-.03; .10]	.03 [-.02; .09]	.01 [-.04; .06]
Male autonomy			.01 [-.05; .06]	.05 [-.02; .11]	-.03 [-.09; .02]	.00 [-.05; .05]
Female tension at work			-.10 [-.17; -.04]	-.09 [-.16; -.03]	.12 [.05; .17]	-.06 [-.11; -.00]
Female satisfaction at work			.11 [.03; .18]	.06 [-.01; .13]	-.06 [-.12; .00]	.12 [.07; .18]
Male tension at work			-.12 [-.19; -.06]	-.07 [-.15; -.00]	.06 [-.01; .11]	-.09 [-.15; -.03]
Male satisfaction at work			.09 [.02; .16]	.08 [.00; .16]	-.04 [-.10; .02]	.05 [-.01; .12]
Female communication					-.25 [-.31; -.19]	.24 [.18; .30]
Female care for partner					-.20 [-.26; -.15]	.21 [.16; .26]
Male communication					-.03 [-.10; .03]	.06 [-.00; .12]
Male care for partner					-.05 [-.11; .01]	.09 [.03; .14]

Note. N_2 (couples) = 211, N_1 (observations) = 1404 for women, 1415 for men.

The 95 % credibility intervals that do not contain 0 are in bold.

Table 3
Multilevel path model estimates for male tension and satisfaction at home

Standardized within-couple fixed effects	Male tension at work	Male satisfaction at work	Male communication	Male care for partner	Male tension at home	Male satisfaction at home
Male workload	-.03 [-.08; .02]	.02 [-.03; .06]	.00 [-.06; .05]	.02 [-.03; .07]	-.04 [-.09; .00]	.01 [-.03; .06]
Male difficulties	.16 [.11; .21]	-.27 [-.32; -.22]	-.06 [-.12; -.02]	-.09 [-.14; -.04]	.03 [-.02; .08]	-.04 [-.09; .01]
Male support	-.24 [-.30; -.19]	.26 [.21; .31]	.08 [.01; .14]	.12 [.06; .17]	-.03 [-.09; .03]	.04 [-.01; .09]
Male autonomy	-.15 [-.20; -.09]	.09 [.03; .14]	.06 [.00; .12]	.03 [-.03; .09]	.00 [-.05; .05]	.03 [-.02; .07]
Female workload			.00 [-.05; .06]	-.01 [-.06; .04]	-.02 [-.06; .03]	.03 [-.01; .08]
Female difficulties			-.02 [-.08; .04]	-.04 [-.10; .01]	.04 [-.01; .09]	-.04 [-.08; .01]
Female support			.12 [.05; .18]	.13 [.07; .19]	-.05 [-.11; .00]	.03 [-.02; .08]
Female autonomy			.05 [-.01; .11]	.02 [-.03; .08]	.00 [-.05; .06]	.00 [-.05; .06]
Male tension at work			-.13 [-.19; -.06]	-.04 [-.11; .02]	.12 [.06; .18]	-.10 [-.16; -.05]
Male satisfaction at work			.10 [.03; .16]	.17 [.10; .23]	-.10 [-.17; -.05]	.14 [.08; .20]
Female tension at work			-.08 [-.14; -.01]	-.04 [-.11; .03]	-.00 [-.06; .06]	-.03 [-.08; .04]
Female satisfaction at work			.08 [.00; .14]	.10 [.04; .17]	-.02 [-.08; .05]	.04 [-.03; .10]
Male communication					-.16 [-.21; -.10]	.16 [.10; .22]
Male care for partner					-.16 [-.21; -.10]	.12 [.06; .17]
Female communication					-.13 [-.19; -.07]	.15 [.10; .21]
Female care for partner					-.05 [-.11; .01]	.06 [.00; .12]

Note. N_2 (couples) = 211, N_1 (observations) = 1404 for women, 1415 for men.

The 95 % credibility intervals that do not contain 0 are in bold.

Positive Spillover and Crossover Effects

Female support and autonomy at work positively influenced female satisfaction at home mediated by female satisfaction at the end of the working day, which in turn showed positive associations with female-experienced communication (support: $\gamma = 0.011$, *CRI* 95 % [0.003, 0.020]; autonomy: $\gamma = 0.004$, *CRI* 95 % [0.001, 0.008]) and male care for partner (support: $\gamma = 0.004$, *CRI* 95 % [0.001, 0.008]; autonomy: $\gamma = 0.001$, *CRI* 95 % [0.000, 0.003]). Next to male-experienced communication (support: $\gamma = 0.005$, *CRI* 95 % [0.000, 0.011]; autonomy: $\gamma = 0.002$, *CRI* 95 % [0.000, 0.005]), these mechanisms contributed to a positive crossover effect of female support and autonomy at work on male satisfaction at home (support/female communication: $\gamma = 0.006$, *CRI* 95 % [0.002, 0.013]; support/male care for partner; $\gamma = 0.005$, *CRI* 95 % [0.002, 0.010]; autonomy/female communication: $\gamma = 0.002$, *CRI* 95 % [0.001, 0.005]; autonomy/male care for partner: $\gamma = 0.002$, *CRI* 95 % [0.000, 0.004]).

Male support and autonomy at work were positively associated with male satisfaction at the end of the working day, which—mediated by male care for partner (support: $\gamma = 0.007$, *CRI* 95 % [0.003, 0.012]; autonomy: $\gamma = 0.002$, *CRI* 95 % [0.000, 0.004]) and male (support: ($\gamma = 0.005$, *CRI* 95 % [0.002, 0.010]; autonomy: $\gamma = 0.002$, *CRI* 95 % [0.000, 0.004]) and female-experienced communication (support: $\gamma = 0.005$, *CRI* 95 % [0.001, 0.010]; autonomy: $\gamma = 0.001$, *CRI* 95 % [0.000, 0.003])—spilled over to male satisfaction at home. Furthermore, male autonomy and support at work showed significant crossover effects on female satisfaction at home mediated by female (support: $\gamma = 0.006$, *CRI* 95 % [0.000, 0.013]; autonomy: $\gamma = 0.002$, *CRI* 95% [0.000, 0.005]) and male care for partner (support: $\gamma = 0.005$, *CRI* 95 % [0.002, 0.010]; autonomy: $\gamma = 0.001$, *CRI* 95 % [0.000, 0.004]) and female-experienced communication (support: $\gamma = 0.008$, *CRI* 95 % [0.002, 0.015]; autonomy: $\gamma = 0.002$, *CRI* 95 % [0.000, 0.006]). Supporting full mediation, female and male autonomy

and support at work did not show associations with female and male satisfaction at home. In summary, there was support for positive spillover and crossover effects of support and autonomy at work (H3 and H4).

Sex Differences

By setting model constraints, the central associations of the path model (see Figure 1) were investigated for sex differences. Of these 20 parameters, only three differed significantly between female and male partners. The association between satisfaction at work and provided care for partners was stronger for male than for female participants ($\gamma = -0.10$, *CRI* 95 % [-0.17, -0.01]). Furthermore, tension at home depended more strongly on self-experienced communication for female than for male partners ($\gamma = -0.15$, *CRI* 95 % [-0.28, -0.03]). Finally, there was a stronger relationship between provided care for partners and satisfaction at home for women than for men ($\gamma = 0.14$, *CRI* 95 % [0.04, 0.25]).

Discussion

This experience sampling study aimed to investigate a full SCM (Bakker & Demerouti, 2013) from a within-couple perspective: Both positive and negative processes originating from daily variations in job demands and resources were considered, and additionally, the role of marital interaction in terms of support and communication in the negative and positive process was addressed. In line with the predictions of the SCM (Bakker & Demerouti, 2013), difficulties at work, which were positively associated with tension at the end of the working day, spilled over to tension at home. While communication, which depended both on actors' and partners' tension at the end of the working day, played an important role in these processes for both partners, only female care for partner mediated negative spillover and crossover effects via female tension. Another difference between the sexes was that female difficulties at work still predicted female tension at the end of the day, while for men, the

association was fully mediated by couple communication. This may be explained by the higher tendency of women to ruminate than that of men (Johnson & Whisman, 2013).

Workload, however, was not related to tension at the end of the working day, marital interaction, or tension at home. Similarly, in the study by Unger et al. (2017), only situational constraints, but not workload, predicted self-regulatory resources. Workload can be perceived as both challenging and hindering (Webster, Beehr, & Love, 2011), and research indicates important individual (Searle & Auton, 2015) and occupational differences (Bakker & Sanz-Vergel, 2013) regarding the appraisal of quantitative demands in terms of time pressure and workload. Furthermore, tension of the end of the working day may depend more on the question of whether workload was successfully met than on the question of how much work had to be done. Previous research also indicated that workload is not related to task completion (Claessens, van Eerde, Rutte, & Roe, 2010).

Regarding positive spillover and crossover processes, the perception of an increase in job resources of female partners contributed to their own satisfaction at home serially mediated by female satisfaction at the end of the working day, female-experienced communication and male care for partner. Both these mechanisms and male-experienced communication contributed to a positive crossover of female job resources to male satisfaction at home. Regarding the relationships between male job resources and male satisfaction at home, there were mediational paths via male satisfaction at the end of the working day and mutually experienced communication and male care for partners. Positive crossover processes originating from male job resources were mediated by female and male care for partners and perceived communication of the female partner.

In summary, our study supports the SCM (Bakker & Demerouti, 2013) from a within-subject perspective: Job demands in terms of encountering difficulties at work and resources in terms of support and autonomy not only predict actors' but also partners' well-being at the

end of the day. Well-being at the end of the working day in terms of tension and satisfaction and marital interaction in terms of communication and care for partner fully or partially mediated the effects of job demands and resources on actors' and partners' well-being for both sexes. Thus, the same marital interaction mechanisms were shown to be important for positive as well as negative spillover and crossover processes.

Interestingly, for both partners, actors' provided care showed significant relationships with tension and satisfaction at the end of the day, while partners' provided care predicted only satisfaction. Furthermore, providing care was equally important for affective well-being at the end of the day as perceived communication. This finding is in line with research showing that supportive behavior pays dividends for one's own affective well-being. For example, a recent study showed that helping others decreased depression, mediated by the use of reappraisal (Doré, Morris, Burr, Picard, & Ochsner, 2017).

Regarding sex differences, there were more similarities than differences, which is in line with other studies investigating the SCM (e.g., Bakker et al., 2009; Debrot et al., 2018; Klumb et al., 2017). However, female-experienced communication was a stronger predictor of female tension at home than male-experienced communication was for men. Research has shown that women react more sensitively to marital conflict and other negative relationship aspects than men (Wanic & Kulik, 2011, for a review). Additionally, providing care for the partner was more important for satisfaction at the end of the day for women than for men. This difference can be associated with sex differences regarding communion-related self-presentations (Diehl, Owen, & Jungblade, 2004). Finally, male care for partner was more strongly dependent on actor satisfaction at work than was female care for partner. From all variables, female care for partner was the variable with the least explained variance. As women are still more involved in family chores (Cerrato & Cifre, 2018), their care for their

partners may generally depend more on family issues than on characteristics of the working day.

Practical Recommendations

This study showed that female and male affective well-being at home is predicted by daily variations in female and male working experiences. Research addressing the interference of family with work has shown that there is a “thin line between work and home” (Sanz-Vergel et al., 2015, p. 1). Family-work conflicts, which are associated with family conflicts, family stress, family support and family-related duties (Ford, Heinen, & Langkamer, 2007), increase the risk for daily interpersonal conflicts with colleagues (Sanz-Vergel et al., 2015) and impair daily job performance (Nohe, Michel, & Sonntag, 2014). Due to the reciprocal influence of work and family, employers should be interested in the effect of negative and positive work processes on families. This study suggests that working days should be designed in a way that employees leave work with low tension and high satisfaction. High problem-solving demands in terms of encountering difficulties should be avoided or scheduled earlier in the working day to promote psychological detachment before leaving work. Additionally, social support and autonomy were both very important predictors of satisfaction and tension at the end of the working day. Thus, both support and autonomy represent helpful approaches to prevent work-family conflicts and promote work-family enrichment.

Some studies highlight the role of psychological detachment in spillover and crossover processes (Debrot et al., 2018; Germeys & De Gieter, 2018; Gombert et al., 2018). Gombert and colleagues (2018) showed that daily psychological detachment buffers the effect of self-control demands on ego depletion. As this personal resource can be promoted, employers should offer such training (Hahn, Binnewies, Sonnentag, & Mojza, 2011).

Strengths, Limitations and Future Directions

An important advantage of the present study is that we investigated a full SCM (Bakker & Demerouti, 2013) and considered both negative and positive spillover and crossover processes from job demands and job resources to well-being at home serially mediated by work-related well-being and marital interaction in terms of social support and communication. Therefore, we applied a lagged design and temporally separated experiences at work from experiences at home. However, experiences during the working day and during free time were only verbally separated from the experiences at the end of the working day and at the end of the day.

The experience sampling method offers the advantages of high ecological validity (Reis, 2012) and low proneness to retrospective biases (Schwarz, 2012). By focusing on the question, *when* (Johnston et al., 2016) do individuals experience higher or lower tension and higher or lower satisfaction at home, the results of this study supplement between-subject research about the SCM by adding more dynamic knowledge of micro-processes (Xanthopoulou & Bakker, 2013). The repeated measurements, however, burden the participants. To keep the smartphone questionnaire as short as possible, we used single-item measures, which may be applied in experience sampling studies when the face, content and construct validity in terms of reasonable correlations with other variables are given (Fisher & To, 2012). Therefore, we believe that our items meet these requirements.

While the variables that were chosen to represent each part of the SCM (Bakker & Demerouti, 2013) proved to be important, some direct paths originating from working conditions and affective well-being at the end of the working day were still significant predictors for marital interaction and affective well-being at home. This indicates that other affective states, such as the energy level after work, and other aspects of marital interaction, as well as variables outside the intimate relationship, play a mediating role.

As in other studies (Debrot et al., 2018; Du, Derks, & Bakker, 2018; Klumb et al., 2017; Timmons, Arbel, & Margolin, 2017), our sample was made up of couples who had at least one child. While some studies have focused on the impact of working experiences on parenting behavior (e.g., Malinen, Rönkä, Sevón, & Schoebi, 2017), it would be interesting to investigate how childcare moderates situational spillover and crossover processes in terms of a cross-level interaction.

Conclusion

The growing dissemination of the dual-earner model goes along with challenges in balancing work and family life for a growing number of couples. While one's work role can interfere with one's role as a partner and a parent, it simultaneously may be enriching for family life. Addressing this two-edged sword, this study showed that—mediated by affective well-being at work and marital interaction—both situational variations in actors' job demands and job resources predicted affective well-being at home for both actors and partners. Importantly, the mediating role of marital interaction in terms of communication and mutual care for partners was at least equally important within the positive process as it was for negative spillover and crossover.

Disclosure of Interest

The authors report no conflicts of interest.

References

- Amstad, F. T., & Semmer, N. K. (2011). Spillover and crossover of work- and family-related negative emotions in couples. *Psychologie des Alltagshandelns*, 4(1), 43–55.
- Asparouhov, T., & Muthén, B. (2019). Comparison of models for the analysis of intensive longitudinal data. *Structural Equation Modeling: A Multidisciplinary Journal*. doi:10.1080/10705511.2019.1626733
- Bakker, A. B., & Demerouti, E. (2013). The spillover-crossover model. In J. G. Grzywacz, & E. Demerouti (Eds.), *New frontiers in work and family research*. (pp. 55–70). Hove, UK: Psychology Press.
- Bakker, A. B., & Demerouti, E. (2017). Job demands-resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology*, 22(3), 273–285. doi:10.1037/ocp0000056
- Bakker, A. B., & Sanz-Vergel, A. I. (2013). Weekly work engagement and flourishing: The role of hindrance and challenge job demands. *Journal of Vocational Behavior*, 83(3), 397–409. doi:10.1016/j.jvb.2013.06.008
- Bakker, A. B., Demerouti, E., & Burke, R. (2009). Workaholism and relationship quality: A spillover-crossover perspective. *Journal of Occupational Health Psychology*, 14(1), 23–33. doi:10.1037/a0013290
- Bakker, A. B., Demerouti, E., & Euwema, M. C. (2005). Job Resources Buffer the Impact of Job Demands on Burnout. *Journal of Occupational Health Psychology*, 10(2), 170–180. doi:10.1037/1076-8998.10.2.170
- Bolger, N., DeLongis, A., Kessler, R. C., & Wethington, E. (1989). The contagion of stress across multiple roles. *Journal of Marriage and the Family*, 51(1), 175–183. doi:10.2307/352378

- Carroll, S. J., Hill, E. J., Yorgason, J. B., Larson, J. H., & Sandberg, J. G. (2013). Couple communication as a mediator between work-family conflict and marital satisfaction. *Contemporary Family Therapy: An International Journal*, *35*(3), 530–545. doi:10.1007/s10591-013-9237-7
- Cerrato, J., & Cifre, E. (2018). Gender inequality in household chores and work-family conflict. *Frontiers in Psychology*, *9*, 1330. doi:10.3389/fpsyg.2018.01330
- Claessens, B. J. C., Van Eerde, W., Rutte, C. G., & Roe, R. A. (2010). Things to do today...: A daily diary study on task completion at work. *Applied Psychology: An International Review*, *59*(2), 273–295. doi:10.1111/j.1464-0597.2009.00390.x
- Cullinane, S.-J., Bosak, J., Flood, P. C., & Demerouti, E. (2014). Job design under lean manufacturing and the quality of working life: A job demands and resources perspective. *The International Journal of Human Resource Management*, *25*(21), 2996–3015. doi:10.1080/09585192.2014.948899
- Debrot, A., Siegler, S., Klumb, P. L., & Schoebi, D. (2018). Daily work stress and relationship satisfaction: Detachment affects romantic couples' interactions quality. *Journal of Happiness Studies: An Interdisciplinary Forum on Subjective Well-Being*, *19*(8), 2283–2301. doi:10.1007/s10902-017-9922-6
- Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology*, *86*(3), 499–512. doi:10.1037/0021-9010.86.3.499
- Diehl, M., Owen, S. K., & Youngblade, L. M. (2004). Agency and communion attributes in adults' spontaneous self-representations. *International Journal of Behavioral Development*, *28*(1), 1–15. doi:10.1080/01650250344000226
- Doré, B. P., Morris, R. R., Burr, D. A., Picard, R. W., & Ochsner, K. N. (2017). Helping others regulate emotion predicts increased regulation of one's own emotions and

- decreased symptoms of depression. *Personality and Social Psychology Bulletin*, 43(5), 729–739. doi:10.1177/0146167217695558
- Du, D., Derks, D., & Bakker, A. B. (2018). Daily spillover from family to work: A test of the work-home resources model. *Journal of Occupational Health Psychology*, 23(2), 237–247. doi:10.1037/ocp0000073
- Edwards, J. R., & Rothbard, N. P. (2000). Mechanisms linking work and family: Clarifying the relationship between work and family constructs. *The Academy of Management Review*, 25(1), 178–199. doi:10.2307/259269
- Elloy, D. F., & Smith, C. R. (2003). Patterns of stress, work-family conflict, role conflict, role ambiguity and overload among dual career couples: An Australian study. *Cross Cultural Management*, 10(1), 55–66. doi:10.1108/13527600310797531
- Fisher, C. D., & To, M. L. (2012). Using experience sampling methodology in organizational behavior. *Journal of Organizational Behavior*, 33(7), 865–877. doi:10.1002/job.1803
- Ford, M. T., Heinen, B. A., & Langkamer, K. L. (2007). Work and family satisfaction and conflict: A meta-analysis of cross-domain relations. *Journal of Applied Psychology*, 92(1), 57–80. doi:10.1037/0021-9010.92.1.57
- Germeys, L., & De Gieter, S. (2018). A diary study on the role of psychological detachment in the spillover of self-control demands to employees' ego depletion and the crossover to their partner. *European Journal of Work and Organizational Psychology*, 27(1), 140–152. doi:10.1080/1359432X.2017.1417259
- Gombert, L., Rivkin, W., & Schmidt, K.-H. (2018). Indirect effects of daily self-control demands on subjective vitality via ego depletion: How daily psychological detachment pays off. *Applied Psychology: An International Review*. doi:10.1111/apps.12172

- Greenhaus, J. H., & Powell, G. N. (2006). When work and family are allies: A theory of work-family enrichment. *The Academy of Management Review*, *31*(1), 72–92.
doi:10.2307/20159186
- Hahlweg, K. (1996). Fragebogen zur Partnerschaftsdiagnostik (FPD) [Partnership diagnostics questionnaire]. Göttingen: Hogrefe.
- Hahn, V. C., Binnewies, C., Sonnentag, S., & Mojza, E. J. (2011). Learning how to recover from job stress: Effects of a recovery training program on recovery, recovery-related self-efficacy, and well-being. *Journal of Occupational Health Psychology*, *16*(2), 202–216.
doi:10.1037/a0022169
- Heller, D., & Watson, D. (2005). The dynamic spillover of satisfaction between work and marriage: The role of time and mood. *Journal of Applied Psychology*, *90*(6), 1273–1279.
doi:10.1037/0021-9010.90.6.1273
- Hendrick, S. S. (1981). Self-disclosure and marital satisfaction. *Journal of Personality and Social Psychology*, *40*(6), 1150–1159. doi:10.1037/0022-3514.40.6.1150
- Hofäcker, D. (2009). Vom Ernährer- zum Zweiverdienermodell—Bestandsaufnahme und internationale Perspektiven [From the breadwinner to the dual earner model—stocktaking and international perspectives]. In T. Mühling, & H. Rost (Eds.), *ifb-Familienreport Bayern 2009: Schwerpunkt: Familie in Europa [ifb-family report Bavaria 2009: Focus: Family in Europe]* (pp. 65–97). Munich, Germany: Bayerisches Staatsministerium für Arbeit und Sozialordnung, Familie und Frauen.
- Ilies, R., Schwind, K. M., Wagner, D. T., Johnson, M. D., DeRue, D. S., & Ilgen, D. R. (2007). When can employees have a family life? The effects of daily workload and affect on work-family conflict and social behaviors at home. *Journal of Applied Psychology*, *92*(5), 1368–1379. doi:10.1037/0021-9010.92.5.1368

- Ilies, R., Wilson, K. S., & Wagner, D. T. (2009). The spillover of daily job satisfaction onto employees' family lives: The facilitating role of work-family integration. *Academy of Management Journal*, *52*(1), 87–102. doi:10.5465/AMJ.2009.36461938
- Johnson, D. P., & Whisman, M. A. (2013). Gender differences in rumination: A meta-analysis. *Personality and Individual Differences*, *55*(4), 367–374. doi:10.1016/j.paid.2013.03.019
- Johnston, D., Bell, C., Jones, M., Farquharson, B., Allan, J., Schofield, P., ... Johnston, M. (2016). Stressors, appraisal of stressors, experienced stress and cardiac response: A real-time, real-life investigation of work stress in nurses. *Annals of Behavioral Medicine*, *50*(2), 187–197. doi:10.1007/s12160-015-9746-8
- Judge, T. A., & Ilies, R. (2004). Affect and job satisfaction: A study of their relationship at work and at home. *Journal of Applied Psychology*, *89*(4), 661–673. doi:10.1037/0021-9010.89.4.661
- Kliem, S., Job, A.-K., Kröger, C., Bodenmann, G., Stöbel-Richter, Y., Hahlweg, K., & Brähler, E. (2012). Entwicklung und Normierung einer Kurzform des Partnerschaftsfragebogens (PFB-K) an einer repräsentativen deutschen Stichprobe [Development and standardization of a short form of the partnership questionnaire (PFB-K) among a representative German sample]. *Zeitschrift für Klinische Psychologie und Psychotherapie*, *41*(2), 81–89. doi:10.1026/1616-3443/a000135
- Klumb, P. L., Voelkle, M. C., & Siegler, S. (2017). How negative social interactions at work seep into the home: A prosocial and an antisocial pathway. *Journal of Organizational Behavior*, *38*(5), 629–649. doi:10.1002/job.2154
- Kristensen, T., Borg, V., & Hannerz, H. (2002). Socioeconomic status and psychosocial work environment: Results from a Danish national study. *Scandinavian Journal of Public Health*, *30*(59), 41–48. doi:10.1177/14034948020300032401

- Laurenceau, J.-P., & Bolger, N. (2005). Using diary methods to study marital and family processes. *Journal of Family Psychology, 19*(1), 86–97. doi:10.1037/0893-3200.19.1.86
- Laurenceau, J.-P., & Bolger, N. (2012). Analyzing diary and intensive longitudinal data from dyads. In M. R. Mehl, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 3–21). New York, NY: Guilford Press.
- Lavee, Y., & Ben-Ari, A. (2007). Relationship of dyadic closeness with work-related stress: A daily diary study. *Journal of Marriage and Family, 69*(4), 1021–1035. doi:10.1111/j.1741-3737.2007.00428.x
- Lazarus, R. S. (1991). *Emotion and adaptation*. New York, NY: Oxford University Press.
- Lim, S., Ilies, R., Koopman, J., Christoforou, P., & Arvey, R. D. (2018). Emotional mechanisms linking incivility at work to aggression and withdrawal at home: An experience-sampling study. *Journal of Management, 44*(7), 2888–2908. doi:10.1177/0149206316654544
- Liu, H., Ngo, H. Y., & Cheung, F. M. (2016). Work-family enrichment and marital satisfaction among Chinese couples: A crossover-spillover perspective. *International Journal of Stress Management, 23*(2), 209–231. doi:10.1037/a0039753
- Malinen, K., Rönkä, A., Sevón, E., & Schoebi, D. (2017). The difficulty of being a professional, a parent, and a spouse on the same day: Daily spillover of workplace interactions on parenting, and the role of spousal support. *Journal of Prevention & Intervention in the Community, 45*(3), 156–167. doi:10.1080/10852352.2016.1198121
- Martinez-Corts, I., Demerouti, E., Bakker, A. B., & Boz, M. (2015). Spillover of interpersonal conflicts from work into nonwork: A daily diary study. *Journal of Occupational Health Psychology, 20*(3), 326–337. doi:10.1037/a0038661

- Matjasko, J. L., & Feldman, A. F. (2006). Bringing work home: The emotional experiences of mothers and fathers. *Journal of Family Psychology, 20*(1), 47–55. doi:10.1037/0893-3200.20.1.47
- Nohe, C., Michel, A., & Sonntag, K. (2014). Family-work conflict and job performance: A diary study of boundary conditions and mechanisms. *Journal of Organizational Behavior, 35*(3), 339–357. doi:10.1002/job.1878
- Nübling, M., Stöbel, U., Hasselhorn, H.-M., Michaelis, M., & Hofmann, F. (2005). *Methoden zur Erfassung psychischer Belastungen: Erprobung eines Messinstrumentes (COPSOQ)* [Methods for the assessment of psychological strain: Test of a measuring instrument (COPSOQ)]. Schriftenreihe der Bundesanstalt für Arbeitsschutz und Arbeitsmedizin [publication series of the Bundesanstalt für Arbeitsschutz und Arbeitsmedizin]. Bremerhaven, Germany: Wirtschaftsverlag NW.
- Pepitone-Rockwell, F. (1980). *Dual career couples*. London, UK: Sage.
- Preacher, K. J., Zyphur, M. J., & Zhang, Z. (2010). A general multilevel SEM framework for assessing multilevel mediation. *Psychological Methods, 15*(3), 209–233. doi:10.1037/a0020141
- Reis, E. L. (2012). Why researchers should think ‘real-world’: A conceptual rationale. In M. R. Mehl, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 3–21). New York, NY: Guilford Press.
- Rodríguez-Muñoz, A., Sanz-Vergel, A. I., Demerouti, E., & Bakker, A. B. (2014). Engaged at work and happy at home: A spillover-crossover model. *Journal of Happiness Studies: An Interdisciplinary Forum on Subjective Well-Being, 15*(2), 271–283. doi:10.1007/s10902-013-9421-3

- Sanz-Vergel, A. I., & Rodríguez-Muñoz, A. (2013). The spillover and crossover of daily work enjoyment and well-being: A diary study among working couples. *Journal of Work and Organizational Psychology, 29*(3), 179–185. doi:10.5093/tr2013a24
- Sanz-Vergel, A. I., Rodríguez-Muñoz, A., Bakker, A., & Demerouti, E. (2012). The daily spillover and crossover of emotional labor: Faking emotions at work and at home. *Journal of Vocational Behavior, 81*(2), 209–217. doi:10.1016/j.jvb.2012.07.003
- Sanz-Vergel, A. I., Rodríguez-Muñoz, A., & Nielsen, K. (2015). The thin line between work and home: The spillover and crossover of daily conflicts. *Journal of Occupational and Organizational Psychology, 88*(1), 1–18. doi:10.1111/joop.12075
- Schwarz, E. L. (2012). Why researchers should think ‘real-time’: A cognitive rationale. In M. R. Mehl, & T. S. Conner (Eds.), *Handbook of research methods for studying daily life* (pp. 22–43). New York, NY, US: Guilford Press.
- Searle, B. J., & Auton, J. C. (2015). The merits of measuring challenge and hindrance appraisals. *Anxiety, Stress, & Coping, 28*(2), 121–143. doi:10.1080/10615806.2014.931378
- Sonnentag, S., & Binnewies, C. (2013). Daily affect spillover from work to home: Detachment from work and sleep as moderators. *Journal of Vocational Behavior, 83*(2), 198–208. doi:10.1016/j.jvb.2013.03.008
- Spector, P. E., & Jex, S. M. (1998). Development of four self-report measures of job stressors and strain: Interpersonal conflict at work scale, organizational constraints scale, quantitative workload inventory, and physical symptoms inventory. *Journal of Occupational Health Psychology, 3*(4), 356–367. doi:10.1037/1076-8998.3.4.356
- Steiner, R. S., & Krings, F. (2016). How was your day, darling? A literature review of positive and negative crossover at the work-family interface in couples. *European Psychologist, 21*(4), 296–315. doi:10.1027/1016-9040/a000275

- Story, L. B., & Repetti, R. (2006). Daily occupational stressors and marital behavior. *Journal of Family Psychology, 20*(4), 690–700. doi:10.1037/0893-3200.20.4.690
- Strong, B., & Cohen, T. F. (2017). *The marriage and family experience: Intimate relationships in a changing society*. Boston, MA: Cengage Learning.
- Theunissen, B., Van Vuuren, L. J., & Visser, D. (2003). Communication of job-related information and work-family conflict in dual-career couples. *South African Journal of Industrial Psychology, 29*(1), 18–25. doi:10.4102/sajip.v29i1.81
- Timmons, A. C., Arbel, R., & Margolin, G. (2017). Daily patterns of stress and conflict in couples: Associations with marital aggression and family-of-origin aggression. *Journal of Family Psychology, 31*(1), 93–104. doi:10.1037/fam0000227
- Unger, D., Sonnentag, S., Niessen, C., & Kuonath, A. (2017). Love won't tear us apart but work might: How job stressors relate to constructive and destructive reactions to one's romantic partner's negative behavior. *International Journal of Stress Management, 24*(Suppl 1), 74–97. doi:10.1037/str0000034
- van Steenbergen, E. F., Kluwer, E. S., & Karney, B. R. (2014). Work-family enrichment, work-family conflict, and marital satisfaction: A dyadic analysis. *Journal of Occupational Health Psychology, 19*(2), 182–194. doi:10.1037/a0036011
- Wall, T. D., Jackson, P. R., & Mullarkey, S. (1995). Further evidence on some new measures of job control, cognitive demand and production responsibility. *Journal of Organizational Behavior, 16*(5), 431–455. doi:10.1002/job.4030160505
- Wanic, R., & Kulik, J. (2011). Toward an understanding of gender differences in the impact of marital conflict on health. *Sex Roles: A Journal of Research, 65*(5–6), 297–312. doi:10.1007/s11199-011-9968-6

- Webster, J. R., Beehr, T. A., & Love, K. (2011). Extending the challenge-hindrance model of occupational stress: The role of appraisal. *Journal of Vocational Behavior, 79*(2), 505–516. doi:10.1016/j.jvb.2011.02.001
- Westman, M. (2006). Crossover of stress and strain in the work-family context. In F. Jones, R. J. Burke, & M. Westman (Eds.), *Work-life balance: A psychological perspective* (pp. 163–184). New York, NY: Psychology Press.
- Wilhelm, P., & Schoebi, D. (2007). Assessing mood in daily life: Structural validity, sensitivity to change, and reliability of a short-scale to measure three basic dimensions of mood. *European Journal of Psychological Assessment, 23*(4), 258–267. doi:10.1027/1015-559.23.4.258
- Xanthopoulou, D., & Bakker, A. B. (2013). State work engagement: The significance of within-person fluctuations. In A. B. Bakker, & K. Daniels (Eds.), *A day in the life of a happy worker* (pp. 25–40). Hove, UK: Psychology Press.
- Xanthopoulou, D., Bakker, A. B., Dollard, M. F., Demerouti, E., Schaufeli, W. B., Taris, T. W., & Schreurs, P. J. G. (2007). When do job demands particularly predict burnout? The moderating role of job resources. *Journal of Managerial Psychology, 22*(8), 766–786. doi:10.1108/02683940710837714
- Zhou, Z. E., Meier, L. L., & Spector, P. E. (2019). The spillover effects of coworker, supervisor, and outsider workplace incivility on work-to-family conflict: A weekly diary design. *Journal of Organizational Behavior, 40*(9–10), 1000–1012. doi:10.1002/job.2401
- Zyphur, M. J., & Oswald, F. L. (2015). Bayesian estimation and inference: A user's guide. *Journal of Management, 41*(2), 390–420. doi:10.1177/0149206313501200

Zusammenfassende Diskussion

Zielsetzung der drei vorgestellten Studien war es, einen Beitrag zur Überprüfung bzw. Weiterentwicklung aktueller arbeitspsychologischer Theorien zu leisten. In der ersten Studie (Krankenpflegestudie) wurden Interaktionen zwischen situationsbezogenen emotionalen Anforderungen und Arbeitsdruck untersucht. Bezüglich des Health-Impairment Prozesses der Job Demands-Resources Theorie (JDR; Bakker & Demerouti, 2007; Bakker & Demerouti, 2017) zeigte sich, dass hoher situativer Arbeitsdruck den positiven Zusammenhang zwischen emotionalen Anforderungen und emotionaler Erschöpfung verstärkt. Für die abhängigen Variablen des motivationalen Prozesses Vitalität und Hingabe ergab sich dagegen eine Pufferwirkung niedrigen Arbeitsdrucks: Erhöhte emotionale Anforderungen waren nur mit reduzierter Vitalität und Hingabe verbunden, wenn gleichzeitig ein erhöhter Arbeitsdruck vorlag. Während die drei Moderatoreffekte in der Krankenpflege-Studie die Annahme von Interaktionen zwischen Anforderungen stützen, stimmen die Befunde bzgl. des motivationalen Prozesses jedoch eher mit den Hypothesen zum Health-Impairment Prozess überein, da – entgegen der Integration des Challenge-Hindrance Modells in die JDR Theorie (Crawford, LePine, & Rich, 2010; Van den Broeck, De Cuyper, De Witte, & Vansteenkiste, 2010) – selbst bei niedrigem Arbeitsdruck emotionale Anforderungen kein motivationales Potenzial im Sinne positiver Zusammenhänge mit Vitalität und Hingabe zeigten. Auch andere Studien aus Innersubjekt-Perspektive fanden keine Haupteffekte von Herausforderungs-Stressoren im motivationalen Prozess (Baethge, Vahle-Hinz, Schulte-Braucks, & van Dick, 2018; Bakker & Sanz-Vergel, 2013; Riedl & Thomas, 2019; Tadić, Bakker, & Oerlemans, 2015).

Deshalb wurde in einer Studie an Altenpflegekräften eine mögliche Erklärung für die fehlenden Haupteffekte von Herausforderungs-Stressoren untersucht: Inkonsistente Mediation. In Übereinstimmung mit den Hypothesen zeigten sowohl situative Ressourcen als

auch Herausforderungs-Stressoren vermittelt über das Bedeutungserleben positive indirekte Zusammenhänge mit der Hingabe, während sich für situative Hindernis-Stressoren im Sinne von Rollenkonflikten ein negativer indirekter Pfad über das Bedeutungserleben ergab. Vermittelt über die Vitalität zeigten Herausforderungs-Stressoren jedoch ebenso wie Hindernis-Stressoren negative indirekte Assoziationen mit der Hingabe, während für die Ressourcen auch der Pfad über die Vitalität ein positives Vorzeichen hatte. Die beiden inkonsistenten Pfade der Herausforderungs-Stressoren – der positive Pfad über das Bedeutungserleben und der negative über die Vitalität – können erklären, weshalb einige Studien keine Haupteffekte von Herausforderungs-Stressoren im motivationalen Prozess finden konnten (Baethge et al., 2018; Bakker & Sanz-Vergel, 2013; Riedl & Thomas, 2019; Tadić et al., 2015). Alle drei Typen von Merkmalen der Arbeitsumgebung – Ressourcen, Herausforderungs-Stressoren, und Hindernis-Stressoren – zeigten eigene Beziehungsmuster über die Mediatoren: Für Ressourcen waren beide indirekten Pfade positiv, für Hindernis-Stressoren negativ und für Herausforderungs-Stressoren positiv bzgl. des Bedeutungserlebens und negativ bzgl. der Vitalität. Aufgrund dieser distinktiven Muster stützt die Altenpflege-studie die Integration des Challenge-Hindrancel Modells in die JDR Theorie (Crawford et al., 2010; Van den Broeck et al., 2010).

In der dritten Studie wurde das Spillover-Crossover Modell (Bakker & Demerouti, 2013) aus einer Innersubjekt-Perspektive untersucht. Dabei wurden bereichernde Effekte ausgehend von situativen Ressourcen auf die Zufriedenheit beider Partner zu Hause ebenso berücksichtigt, wie konflikthafte Pfade ausgehend von situativen Anforderungen auf das häusliche Erleben von Anspannung. Zwei serielle vermittelnde Pfade wurden getestet: 1) Affektives Wohlbefinden im Sinne von Anspannungserleben und Zufriedenheit am Ende des Arbeitstages, und 2) partnerschaftliche Interaktionen repräsentiert durch Kommunikation und gegenseitige Unterstützung. In Übereinstimmung mit dem Spillover-Crossover Modell

(Bakker & Demerouti, 2013) zeigten Problemlöseanforderungen im Sinne einer Konfrontation mit Schwierigkeiten am Arbeitsplatz – seriell vermittelt über das Anspannungserleben des Akteurs am Ende des Arbeitstages und die Wahrnehmung partnerschaftlicher Interaktionen aus Sicht beider Partner – positive Zusammenhänge mit dem Erleben von Anspannung beider Partner am Tagesende. Unterstützung und Autonomie am Arbeitsplatz wiesen positive indirekte Effekte auf die häusliche Zufriedenheit beider Partner auf. Diese Zusammenhänge wurden seriell über die Zufriedenheit des Akteurs am Arbeitsplatz und die von beiden Partner berichteten partnerschaftlichen Interaktionen vermittelt. Der besondere Beitrag dieser Arbeit ist darin zu sehen, dass erstmals in einer Innersubjekt-Studie die vermittelnde Rolle partnerschaftlicher Interaktionen sowohl für konflikthafte als auch für bereichernde Spillover- und Crossover-Effekte untersucht wurden. Selbst aus Zwischensubjekt-Perspektive gibt es kaum Studien zur vermittelnden Rolle partnerschaftlicher Interaktionen im Kontext von Work-Family Enrichment (Steiner & Krings, 2016).

Mit Werten zwischen 32 % (Hingabe in der Krankenpflegestudie) und 88 % (freizeitbezogene Zufriedenheit von Frauen in der Spillover-Crossover Studie) wiesen alle drei Studien eine hohe Variabilität von Arbeitsbedingungen und Wohlbefinden innerhalb der Personen auf. Wenn ein Drittel bis fast 90 % der Varianz eines Konstruktes auf Befindensfluktuationen von einer Situation zur anderen zurückzuführen ist, ist es von großer Bedeutung, im Rahmen von Innersubjekt-Studien zu untersuchen, welche Umgebungsmerkmale diese intraindividuellen Schwankungen vorhersagen. Auch für die Arbeitsbedingungen zeigte sich, dass diese keineswegs als stabil innerhalb von Personen aufzufassen sind. Während diese Ergebnisse eindeutig den Wert von Innersubjekt-Untersuchungen stützen, fällt dennoch die große Heterogenität der Intraklassenkorrelationen zwischen der Spillover-Crossover Studie und den beiden Pflegestudien ins Auge. Auch in der Meta-

Analyse von Podsakoff und Kollegen (Podsakoff, Spoelma, Chawla & Gabriel, 2019) zeigte sich eine große Spannweite der Innersubjekt-Varianzanteile, welche z. B. beim Affekt von .17 bis .92 und bei Stressoren von .19 bis .99 lagen. Die Untersuchung möglicher Einflussfaktoren durch Podsakoff und Kollegen (2019) ergab die Relevanz des Antwortformates (niedrigerer Innersubjekt-Varianzanteil bei Häufigkeits- und Zustimmungsskalen), der Anzahl der Fragebögen pro Tag (zunehmender Innersubjekt-Varianzanteil), der Verwendung eines täglichen Bezugspunktes (abnehmender Innersubjekt-Varianzanteil verglichen mit einem momentanem oder mittelfristigen Bezugspunkt), sowie der geographischen Lage der Stichprobe (höherer Innersubjekt-Varianzanteil in amerikanischen Stichproben verglichen mit asiatischen Teilnehmern/innen). Die Anzahl der Skalenstufen und die Dauer der Untersuchung beeinflusste die Höhe der Innersubjekt-Varianzanteile dagegen nicht. In der Spillover-Crossover Studie lagen die Innersubjekt-Varianzanteile in auffälliger Weise höher als in den beiden Pflegestichproben. Über die Befunde von Podsakoff et al. (2019) lässt sich dieses Ergebnis jedoch nicht begründen. Eine Erklärung könnte sein, dass aufgrund der chronisch hohen Arbeitsbelastung von Beschäftigten in der Alten- und Krankenpflege (BAuA, 2014) die intraindividuelle Varianz der Bewertung von Arbeitsbedingungen und Indikatoren des Belastungserlebens niedriger ausfällt als in anderen Berufsgruppen. Aufbauend auf der Arbeit von Podsakoff et al. (2019) sollten weitere Studien zu diesem Thema durchgeführt werden, um die Innersubjekt-Varianzanteile ambulanter Assessments besser einordnen zu können.

Als Kritikpunkt an allen drei Studien lässt sich anführen, dass die Konstrukte ausnahmslos über Selbstberichte erhoben wurden, was die Frage nach dem Common Method Bias aufwirft. Der Common Method Bias bezeichnet die Verzerrung eines empirischen Zusammenhangskoeffizienten zwischen zwei Variablen aufgrund dessen, dass beide Variablen mit der gleichen Methode, z. B. über Selbstbericht, erhoben wurden (Gabriel et al.,

2019). Um einen Innersubjekt-Fokus zu erreichen, wurden alle ambulant erhobenen Variablen am individuellen Personenmittelwert zentriert (Nezlek, 2011), wodurch all diejenigen Quellen für Verzerrungen aufgrund derselben Methode effektiv kontrolliert werden, welche innerhalb der Personen stabil sind, z. B. Persönlichkeit, soziale Erwünschtheit und andere Antwortstile (Gabriel et al., 2019). Über ihre inhaltliche Bedeutsamkeit hinaus bringt eine Innersubjekt-Perspektive somit noch einen wichtigen methodischen Vorteil mit sich: Die Reduktion des Common Method Bias (Beal, 2015). Einige interessante methodische Ansätze kombinieren ambulante Assessments mit objektiven Indikatoren, z. B. kann bei Verwendung von Sensor-Triggern in Abhängigkeit vom Eintreten objektiver Ereignisse das Sampling gesteuert werden. Giurgiu und Kollegen (2019) verwendeten beispielsweise in ihrer Studie zum Zusammenhang zwischen Sitzverhalten und affektivem Wohlbefinden Beschleunigungssensoren, welche über einen sitzverhaltens-abhängigen Algorithmus die Selbstbericht-Fragebögen triggerten.

In allen drei Studien liegt der Fokus auf der theoretischen Ausrichtung. Dennoch lassen sich u. U. aus den Ergebnissen praktische Empfehlungen ableiten. Für die praktische Anwendbarkeit der Studien spricht insbesondere die realitätsnahe Erfassung des Erlebens und Verhaltens am Arbeitsplatz bzw. in der Freizeit. In allen drei Studien zeigten Ressourcen am Arbeitsplatz günstige Auswirkungen: Ein erhöhtes Erleben von Autonomie und Unterstützung fördert das Arbeitsengagement, reduziert das Belastungserleben, und wirkt sich günstig auf das Wohlbefinden nicht nur der Person selbst, sondern auch des Partners bzw. der Partnerin zu Hause aus. Vor allem die Unterstützung zeigte sehr bedeutsame Effekte. Folglich sollten Rahmenbedingungen geschaffen werden, welche die Zusammenarbeit im Team optimal fördern. Andererseits sollten Anforderungen, insbesondere Hindernis-Anforderungen weitestgehend reduziert werden. Bei Herausforderungs-Anforderungen legen die Ergebnisse der Altenpflegestudie nahe, dass

diese ihr motivationales Potenzial über das Bedeutsamkeitserleben entfalten. Dieser Pfad kann u. U. durch kommunikative Mittel und Führungsaspekte gefördert werden (Breevaart & Bakker, 2018; Busse, Kwon, Kloep, Ghosh, & Warner, 2018). Darüber hinaus sollten Wege gefunden werden, den Zusammenhang zwischen Herausforderungs-Anforderungen und Erschöpfung zu reduzieren, z. B. durch regelmäßige, erholsame Pausen (Wendsche, Lohmann-Haislah, & Wegge, 2016) und die Förderung der psychischen Abgrenzung von der Arbeit (Kinnunen, Feldt, Sitaloppi, & Sonnentag, 2011). Darüber hinaus sollte darauf geachtet werden, Beschäftigte nicht gleichzeitig mit verschiedenen Anforderungstypen zu konfrontieren. Interessanterweise wird die Methode des ambulanten Assessments zunehmend auch direkt im Bereich der Prävention und Intervention eingesetzt, um Beschäftigte innerhalb ihres natürlichen Arbeitsumfeldes dabei zu unterstützen, Stress am Arbeitsplatz besser zu bewältigen (Villani et al., 2013), achtsamer zu sein (Bostock, Crosswell, Prather, & Steptoe, 2019) und energetische Ressourcen zu mobilisieren (Lanaj, Foulk, & Erez, 2019).

Literatur

- Beal, D. J. (2015). ESM 2.0: State-of-the-art and the future potential of experience sampling methods in organizational research. *Annual Review of Organizational Psychology and Organizational Behavior*, 2, 383–407. doi:10.1146/annurev-orgpsych-032414-111335
- Baethge, A., Vahle-Hinz, T., Schulte-Braucks, J., & van Dick, R. (2018). A matter of time? Challenging and hindering effects of time pressure on work engagement. *Work & Stress*, 32(3), 228–247. doi:10.1080/02678373.2017.1415998
- Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, 22(3), 309–328. doi:10.1108/02683940710733115
- Bakker, A. B., & Demerouti, E. (2013). The spillover-crossover model. In J. G. Grzywacz, & E. Demerouti (Eds.), *New frontiers in work and family research* (pp. 55–70). Hove, UK: Psychology Press.
- Bakker, A. B., & Demerouti, E. (2017). Job demands-resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology*, 22(3), 273–285. doi:10.1037/ocp0000056
- Bakker, A. B., & Sanz-Vergel, A. I. (2013). Weekly work engagement and flourishing: The role of hindrance and challenge job demands. *Journal of Vocational Behavior*, 83(3), 397–409. doi:10.1016/j.jvb.2013.06.008
- BAuA (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, 2014). *Arbeit in der Pflege – Arbeit am Limit? Arbeitsbedingungen in der Pflegebranche* [Care work – working at the limit? Working conditions in the care sector]. Retrieved from <http://www.baua.de/dok/6505548>
- Bostock, S., Crosswell, A.D., Prather, A.A., & Steptoe, A. (2019). Mindfulness On-The-Go: Effects of a Mindfulness Meditation App on Work Stress and Well-Being. *Journal of Occupational Health Psychology*, 24(1), 127-138.

- Breevaart, K., & Bakker, A. B. (2018). Daily job demands and employee work engagement: The role of daily transformational leadership behavior. *Journal of Occupational Health Psychology, 23*(3), 338–349. doi:10.1037/ocp0000082
- Busse, R., Kwon, S., Kloep, H.-A., Ghosh, K., & Warner, M. (2018). Toward a ‘meaningful self’ at the workplace: Multinational evidence from Asia, Europe, and North America. *Journal of Leadership & Organizational Studies, 25*(1), 63–75. doi:10.1177/1548051817709009
- Crawford, E. R., LePine, J. A., & Rich, B. L. (2010). Linking job demands and resources to employee engagement and burnout: A theoretical extension and meta-analytic test. *Journal of Applied Psychology, 95*(5), 834–848. doi:10.1037/a0019364
- Gabriel, A. S., Podsakoff, N. P., Beal, D. J., Scott, B. A., Sonnentag, S., Trougakos, J. P., & Butts, M. M. (2019). Experience sampling methods: A discussion of critical trends and considerations for scholarly advancement. *Organizational Research Methods, 22*(4), 969–1006. doi:10.1177/1094428118802626
- Giurgiu, M., Koch, E. D., Ottenbacher, J., Plotnikoff, R. C., Ebner-Priemer, U.W., & Reichert, M. (2019). Sedentary behavior in everyday life relates negatively to mood: An ambulatory assessment study. *Scandinavian Journal of Medicine & Science in Sports, 29*(9), 1340–1351. doi:10.1111/sms.13448
- Kinnunen, U., Feldt, T., Siltaloppi, M., & Sonnentag, S. (2011). Job demands-resources model in the context of recovery: Testing recovery experiences as mediators. *European Journal of Work and Organizational Psychology, 20*(6), 805–832. doi:10.1080/1359432X.2010.524411
- Lanaj, K., Foulk, T., & Erez, A. (2019). Energizing leaders via self-reflection: A within-person field experiment. *Journal of Applied Psychology, 104*(1), 1–18. doi:10.1037/apl0000350

- Nezlek, J. B. (2011). *Multilevel modeling for social and personality psychology*. Thousand Oaks, CA: Sage.
- Podsakoff, N. P., Spoelma, T. M., Chawla, N., & Gabriel, A. S. (2019). What predicts within-person variance in applied psychology constructs? An empirical examination. *Journal of Applied Psychology, 104*(6), 727–754. doi:10.1037/apl0000374
- Riedl, E. M., & Thomas, J. (2019). The moderating role of work pressure on the relationships between emotional demands and tension, exhaustion, and work engagement: An experience sampling study among nurses. *European Journal of Work and Organizational Psychology, 28*(3), 414–429. doi:10.1080/1359432X.2019.1588251
- Steiner, R. S., & Krings, F. (2016). How was your day, darling? A literature review of positive and negative crossover at the work-family interface in couples. *European Psychologist, 21*(4), 296–315. doi:10.1027/1016-9040/a000275
- Tadić, M., Bakker, A. B., & Oerlemans, W. G. M. (2015). Challenge versus hindrance job demands and well-being: A diary study on the moderating role of job resources. *Journal of Occupational and Organizational Psychology, 88*(4), 702–725. doi:10.1111/joop.12094
- Van den Broeck, A., De Cuyper, N., De Witte, H., & Vansteenkiste, M. (2010). Not all job demands are equal: Differentiating job hindrances and job challenges in the Job Demands-Resources model. *European Journal of Work and Organizational Psychology, 19*(6), 735–759. doi:10.1080/13594320903223839
- Villani, D., Grassi, A., Cognetta, C., Toniolo, D., Cipresso, P., & Riva, G. (2013). Self-help stress management training through mobile phones: An experience with oncology nurses. *Psychological Services, 10*(3), 315–322. doi:10.1037/a0026459

Wendsche, J., Lohmann-Haislah, A., & Wegge, J. (2016). The impact of supplementary short rest breaks on task performance – A meta-analysis. *sozialpolitik.ch*, 2, 1–24.

doi:10.18753/2297-8224-75