universität wien

DISSERTATION / DOCTORAL THESIS

Titel der Dissertation / Title of the Doctoral Thesis

„Grenzenlos und unvorhersehbar: Psychologische Implikationen zeitgenössischer Wissensarbeit“

verfasst von / submitted by

Julia Schöllbauer

angestrebter akademischer Grad / in partial fulfilment of the requirements for the degree of

Doktorin der Philosophie (Dr. phil.)

Wien, 2022 / Vienna, 2022

Studienkennzahl lt. Studienblatt / degree programme code as it appears on the student record sheet:	UA 796 310 298
Dissertationsgebiet lt. Studienblatt / field of study as it appears on the student record sheet:	Psychologie
Betreut von / Supervisor:	Univ.-Prof. Dr. Christian Korunka

eingereicht zur Begutachtung an / submitted to:

Univ.-Prof. MMag. Dr. Bettina Kubicek

(Professorin für Arbeits- und Organisationspsychologie, Karl-Franzens-Universität Graz)

Univ.-Prof. Dr. Jürgen Glaser

(Professor für Angewandte Psychologie, Leopold-Franzens-Universität Innsbruck)

Vorwort

Diese kumulative Dissertation mit dem Titel "Grenzenlos und unvorhersehbar: Psychologische Implikationen zeitgenössischer Wissensarbeit" basiert auf vier teilweise veröffentlichten und noch nicht veröffentlichten (i.e., eingereichten) wissenschaftlichen Arbeiten: Drei Artikel zur Publikation in Fachzeitschriften und ein Buchkapitel. Manuskripte 1 und 2 berichten die Ergebnisse eines systematischen Literaturreviews, Manuskript 3 die einer Paar-Tagebuchstudie und Manuskript 4 die einer Tagebuchstudie.

Da alle vorgestellten Arbeiten mit Co-Autoren veröffentlicht wurden bzw. werden, stelle ich diese unter Verwendung des Pluralpronomens “wir” vor. Dieses Vorgehen steht im Einklang mit den Veröffentlichungsrichtlinien der American Psychological Association. In der übergreifenden Einleitung und Diskussion spreche ich von der alle Einzelarbeiten verbindenden Idee meiner Dissertation. Demnach verwende ich in Einleitung und Diskussion das Singularpronomen “ich”.

Danksagung

Ich möchte allen Personen danken, die mich in meinem Werdegang unterstützt haben. Allen voran mein Doktorvater Prof. Korunka, der mich nicht nur gefordert (nein, ich habe die ö-Striche nicht vergessen), sondern mit seinem Wissen und seiner humanistischen Lebenseinstellung inspiriert hat, eine Karriere in diesem Fach zu forcieren. Roman Prem, Sabine Sonnentag, Sara Tement und Martina Hartner-Tiefenthaler möchte ich für das Teilen ihres reichen Wissens und viele bereichernde Gespräche herzlich danken. Auch meinen praedoc-Kommilitonen Edo, Dominik, Benjamin, Ada, Lars, Vera, Katja, Irina und Johanna danke ich für viele bereichernde Gespräche, Diskussionen, Blödeleien und einen ganzen Haufen emotionaler Unterstützung.

Vielen Dank meiner Schwester Marina, meinen Eltern und meinen Freundinnen Birgit, Bibi und Hanni für ihr Interesse an meinen Studien und für die Möglichkeit, auch außerhalb der Uni über meine Forschung zu sprechen.

Großer Dank gebührt meinem perfekten Mann Noman für die große Unterstützung und Geduld während meines Master- und Doktoratsstudiums. Ich danke auch unserem Sohn Jakob für die langen Tagesschläfchen und die relativ erholsamen Nächte. Ich bin dir auch nicht böse, dass deinetwegen meine Dissertation ein Jahr länger gedauert hat. Wobei das Coronavirus hier auch nicht unschuldig war… An mir lag´s jedenfalls bestimmt nicht…

Überblick über wissenschaftliche Manuskripte

Manuskript 1 (am 26.10.2021 nach Peer-Review publiziertes Buchkapitel)[1]:

Schöllbauer, J., Hartner-Tiefenthaler, M., & Kelliher, C. (2021). ICT-enabled work extension and its consequences: A paradoxical situation between high performance and low wellbeing [IKT-gestützte Arbeitserweiterung und ihre Folgen: Eine paradoxe Situation zwischen hoher Leistung und geringem Wohlbefinden]. In C. Korunka (Hrsg.), *Flexible Working Practices and Approaches [Flexible Arbeits-praktiken und -ansätze]* (S. 149–165). Springer International Publishing. https://doi.org/10.1007/978-3-030-74128-0_8

Manuskript 2 (am 8.1.2022 bei Zeitschrift eingereicht, wartet auf Peer-Review)[2]:

Schoellbauer, J., Hartner-Tiefenthaler, M., & Kelliher, C. (eingereicht). Gain vs. strain: A systematic literature review on continuous vs. recurring technology-based work extending behaviours and their implications for wellbeing [Gewinn vs. Belastung: Ein systematischer Literaturreview über kontinuierliche bzw. wiederkehrende technologiegestützte arbeitserweiternde Verhaltensweisen und ihre Auswirkungen auf das Wohlbefinden]. *Journal of Occupational and Organizational Psychology*.

[1] 50% Eigenanteil an der Studienkonzeption, 80% bei Studiendurchführung, 80% bei Datenanalyse und 70% bei Manuskripterstellung.

[2] 50% Eigenanteil an der Studienkonzeption, 80% bei Studiendurchführung, 80% bei Datenanalyse und 80% bei Manuskripterstellung.

Manuskript 3 (am 10.3.2021 bei Zeitschrift eingereicht, seither im Peer-Review)[3]:

Schoellbauer, J., Tement, S., & Korunka, C. (im Review[4]). Honey, there's something on my mind... Adverse consequences of negative and positive work rumination on attention to the partner, and the advantage of talking about it [Schatz, ich habe etwas auf dem Herzen... Negative Folgen von negativem und positivem Grübeln über die Arbeit für die Aufmerksamkeit gegenüber dem Partner und der Vorteil, darüber zu sprechen]. *Journal of Happiness Studies.*

Manuskript 4 (am 8.10.2021 nach Peer-Review publizierter Zeitschriftenartikel)[5]:

Schoellbauer, J., Sonnentag, S., Prem, R., & Korunka, C. (2021). I'd rather know what to expect... Work unpredictability as contemporary work stressor with detrimental implications for employees' daily wellbeing [Ich würde lieber wissen, was mich erwartet... Unvorhersehbarkeit der Arbeit als zeitgemäßer Arbeitsstressor mit nachteiligen Auswirkungen auf das tägliche Wohlbefinden der Beschäftigten.]. *Work & Stress*. Online-Veröffentlichung. https://doi.org/10.1080/02678373.2021.1976881

---

[3] 50% Eigenanteil an der Studienkonzeption, 70% bei Studiendurchführung, 100% bei Datenanalyse und 80% bei Manuskripterstellung.

[4] Dieses Manuskript wurde am 25.8.2020 bereits beim Journal of Vocational Psychology zur Veröffentlichung eingereicht wo es nach dem Peer-Review zu einer Wiedereinreichung nach Überarbeitung eingeladen wurde. Nach der Wiedereinreichung am 9.12.2020 wurde es am 15.2.2021 abgelehnt.

[5] 50% Eigenanteil an der Studienkonzeption, 70% bei Studiendurchführung, 100% bei Datenanalyse und 80% bei Manuskripterstellung.

Inhaltsverzeichnis

Einleitung

Wissensarbeit ist durch Schaffung und Einsatz von Wissen charakterisiert. Sie ist die „Kopfarbeit“ im Gegensatz zur „Handarbeit“, die mittels körperlichen Einsatzes verrichtet wird (Beerheide & Katenkamp, 2011). Wissensarbeit wird in Dienstleistungsberufen geleistet, in denen mit Wissen Probleme identifiziert (e.g., Beratung, Marketing) oder gelöst werden (e.g., Forschung, Konstruktion) sowie in strategischen und finanziellen Dienstleistungsberufen, die problemidentifizierende und problemlösende Berufe vermitteln (Reich, 1996). Bis in die 1950er Jahre, als der Industriesektor am stärksten die Wirtschaft prägte, bestand sie primär aus der Verwaltung der Arbeitskräfte, die „Handarbeit“ leisteten (Allvin et al., 2011). In postindustriellen Gesellschaften, die vom Dienstleistungssektor dominiert werden, ist Wissensarbeit nun direkte Quelle für die Schaffung von Wohlstand (Pyöriä, 2005).

Seit den 1990er Jahren hat sich Wissensarbeit gewandelt. Mit neuen Informations- und Kommunikationstechnologien kamen auch neue Möglichkeiten, Wissen zu sammeln, aufzuarbeiten und zu verbreiten (Beerheide & Katenkamp, 2011). Dies ging mit großen Veränderungen für Wissensarbeiter/innen einher (Korunka & Hoonakker, 2014; Mazmanian et al., 2013). Ermöglicht durch die Nutzung neuer Technologien und die fortschreitende Digitalisierung von Arbeit (e.g., Allvin et al., 2013; Cascio & Montealegre, 2016; Korunka & Hoonakker, 2014) zeigen sich in den letzten Jahrzehnten organisationale Trends der Flexibilisierung (e.g., Allvin et al., 2011; Kalleberg, 2001) und Projektifizierung von Arbeit (e.g., Lundin & Söderholm, 1995; Schoper et al., 2018). Sowohl durch zeitliche und räumliche Flexibilität der Wissensarbeit (Allvin et al., 2011; Korunka & Kubicek, 2017) als auch durch die (Neu-)Gruppierung der Arbeitsaufgaben in

einzigartige Projekten (March, 1991; Schoper et al., 2018) sollen Organisationen befähigt werden, dem ökonomischen Druck standzuhalten und auf dynamische Marktgegebenheiten schnell reagieren zu können. Dabei bedeuten Arbeitsflexibilisierung und Projektifizierung jedoch auch, dass die Arbeitsbedingungen für die Beschäftigten in Wissensberufen erheblich umgestaltet wurden.

Umgestaltungen von Arbeitsbedingungen verändern das Erleben und Verhalten der Beschäftigten in ihrem Arbeitsalltag (Prem, 2017). Meine kumulative Dissertation umfasst vier wissenschaftliche Texte, in denen ich Ergebnisse dreier Studien berichte. Diese untersuchen zeitgenössische psychologische Phänomene und Zustände im Zusammenhang mit moderner Wissensarbeit und ihre psychologischen Implikationen. In Manuskript 1, 2 und 3 geht es um die zunehmende Entgrenzung von Arbeit und Freizeit, die vor allem auf den Trend der Arbeitsflexibilisierung zurückzuführen ist (Duxbury & Smart, 2011; Schier et al., 2011). In Manuskript 4 postuliere ich, dass der Arbeitstrend der Projektifizierung einen neuen Arbeitsstressor hervorgebracht hat: die Arbeitsunvorhersehbarkeit.

Das erste Thema meiner Dissertation ist die Entgrenzung zwischen Arbeit und Freizeit. Wenn Orte und Zeiten im Leben von Beschäftigten nicht mehr eindeutig Arbeit oder Freizeit bzw. beruflichen und privaten Aktivitäten zugewiesen werden können, verschwimmen die Grenzen dieser zwei großen Lebensbereiche (Ashforth et al., 2000; Nippert-Eng, 1996). Diese Entgrenzung von Arbeit und Freizeit brachte das Phänomen des Arbeitens in der Freizeit hervor (Ďuranová & Ohly, 2016; Duxbury & Smart, 2011; Kelliher & Anderson, 2010). Da sie mittels portabler technologischer Geräte stets auf Arbeitsinhalte zugreifen oder Kolleginnen und Kollegen kontaktieren können, arbeiten immer mehr Beschäftigte in der Freizeit. Dieses Verhalten wird als kritisch und gefährdend aufgefasst, da es gerade in einer Zeitspanne, in der sich Beschäftigten eigentlich von ihrem Arbeitseinsatz erholen sollten, zusätzlich zu ihrer Erschöpfung beiträgt (Krause et al.,

2015; Rau & Göllner, 2019). Zahlreiche Studien untersuchten, wie sich Arbeiten in der Freizeit auf das Wohlbefinden der Beschäftigten auswirkt, lieferten jedoch inkonsistente Ergebnisse. In Manuskript 1 (Schöllbauer, Hartner-Tiefenthaler, & Kelliher, 2021[6]) und Manuskript 2 (Schoellbauer, Hartner-Tiefenthaler, & Kelliher, eingereicht) präsentiere ich Ergebnisse eines systematischen Literaturreviews der der Frage nachging, *was für psychologische Konsequenzen unterschiedliche Ausprägungen des komplexen Phänomens Arbeiten in der Freizeit für Beschäftigte haben*. Gemeinsam mit meinen Ko-Autorinnen versuche ich so eine Erklärung für die unklare Ergebnislage früherer Forschung zu liefern.

Weiters zeigen flexibel arbeitende, entgrenzte Wissensarbeiter/innen die Tendenz, in der Freizeit mehr über ihre Arbeit nachzudenken (Pravettoni et al., 2007; Prem et al., 2021). Negatives Grübeln über die Arbeit in der Freizeit ist bekannt als nachteilig für das Wohlbefinden von Beschäftigten (Querstret & Cropley, 2013; Weigelt et al., 2019). Darüber hinaus wurde eine mangelnde gedankliche Distanzierung von der Arbeit mit einer geringeren Beziehungszufriedenheit der Beschäftigten und ihrer Partner/innen in Verbindung gebracht (Debrot et al., 2018; Rodríguez-Muñoz et al., 2018). Dabei fehlen bisher noch Erkenntnisse zu den psychologischen Mechanismen, wie das Grübeln einer Person die Beziehungszufriedenheit beeinflussen kann, und ob negative als auch positive Gedanken Einfluss auf die Beziehungszufriedenheit haben. Mit Manuskript 3 (Schoellbauer, Tement, & Korunka, eingereicht) schließe ich diese Wissenslücken ein Stück weit: In einer Paar-Tagebuchstudie ging ich der Frage nach, *wie sich das negative*

[6] Um die Manuskripte der Dissertation hier übersichtlich mit allen Ko-Autoren darzustellen, weichen deren Zitierungen im Klammertext absichtlich von den jüngsten Richtlinien der American Psychological Association (APA, 7. Ausgabe) ab.

und positive Grübeln über die Arbeit in der Freizeit Beschäftigten auf die Beziehungszufriedenheit von Beschäftigten und ihrer Partner/innen auswirkt.

Das zweite Thema meiner Dissertation ist die Unvorhersehbarkeit von Arbeit die auf eine zunehmende Projektifizierung von Arbeit zurückzuführen ist. Projekte sind einmalige Erlebnisse, die nicht aus ihrem spezifischen Kontext herausgelöst werden können (Midler, 1995) und, je nach Marktsituation, dynamisch und kurzfristig wechseln (Mohr & Wolfram, 2010). Projektifizierung von Arbeit bewirkt, dass die Arbeitstätigkeiten zu einem immer geringer werdenden Anteil aus regelmäßig wiederkehrenden Aufgaben (i.e., Routinearbeit) und zu einem immer höher werdenden Anteil aus situationsabhängigen, einmaligen Aufgaben bestehen (Schoper et al., 2018). Ich argumentiere, dass laufend wechselnde Arbeitsaufgaben und mangelnde Routine durch deren Einmaligkeit es Beschäftigten schwer macht vorauszusehen, welche Arbeitsaufgaben vor ihnen liegen, wie diese durchzuführen sind, wie lange die Durchführung dauert und welche Probleme während der Durchführung auftreten könnten. Es gibt bereits ein paar wenige Untersuchungen zur Vorhersehbarkeit von Arbeit als Arbeitsressource mit positiver Auswirkung auf Beschäftigte und deren Wohlbefinden von Beschäftigten (Flovik et al., 2019; Mohr & Wolfram, 2010; Rosen et al., 2020), jedoch wurde die Rolle der Arbeitsunvorhersehbarkeit bisher vernachlässigt. In Manuskript 4 ging ich der Frage nach, *ob Arbeitsunvorhersehbarkeit ein zeitgenössischer Stressor ist, der das Wohlbefinden von Beschäftigten negativ beeinflusst*.

Arbeitsflexibilisierung und die Entgrenzung von Arbeit und Freizeit

Mit der Vorherrschaft des industriellen Sektors, in dem Arbeit zu fixen Zeiten an fixen Orten verrichtet wird, war eine klare Abgrenzung von Arbeit und Freizeit bis Ende des 20. Jahrhunderts die Norm (Altreiter et al., 2016; Duxbury & Smart, 2011; Poethke et al., 2019; Praeg & Bauer, 2017). Der Großteil der Arbeit, die innerhalb unserer Gesellschaft verrichtet wurde, fand somit stets zeitlich und örtlich getrennt von privaten Aktivitäten, die mit Freizeit assoziiert sind, statt. Erst die vierte industrielle Revolution (Stichwort Arbeit 4.0), die mit der Verbreitung des Internets eingeleitet wurde, brachte die Entgrenzung von Arbeit und Freizeit für viele Wissensarbeiter/innen, die ihre Arbeit technologiegestützt zeit- und ortsunabhängig ausführen können (Praeg & Bauer, 2017).

Arbeitsflexibilisierung ist der Prozess, der die Ausführung von Arbeit zeitunabhängig macht (Allvin et al., 2011) und von einem festgelegten, physischen Ort entkoppelt (Flecker & Schönauer, 2016). Flexible Arbeitszeiten und -orte sind freilich nicht neu, in gewissen Berufen wurde Gleitzeit[7] bereits in den 1960er Jahren (Bocher 1974, zitiert nach

[7] Beschäftigte können innerhalb eines bestimmten Rahmens den Start- und Endzeitpunkt ihrer vertraglich festgelegten täglichen Arbeitsstunden selbst bestimmen (Springer Fachmedien Wiesbaden, 2013). Eine Arbeitspflicht besteht nur während der Kernzeit, die in neueren Modellen jedoch entfallen kann (Fauth-Herkner, 2004).

Thoemmes, 2013) und Telearbeit[8] bereits in den 1980er Jahren eingeführt (Messenger & Gschwind, 2016). Die heutige technologiegestützte Flexibilität der Wissensarbeit unterscheidet sich von den alten Konzepten Gleitzeit und Telearbeit durch die heutige ständige Konnektivität der Beschäftigten mit ihrer Arbeit (Holtgrewe, 2014; Messenger & Gschwind, 2016). Mit der Verschmelzung von Telekommunikation und Informationstechnologien und der Verbreitung von mobilen Geräten sind „Daten, multimediale Inhalte, soziale Netzwerke und Computerleistung von immer mehr Orten und Situationen aus zugänglich“ (Holtgrewe, 2014). Portable technologische Geräte ermöglichen demnach zu jeder Zeit und an jedem Ort auf viele berufliche und private Inhalte zugreifen zu können (Messenger & Gschwind, 2016), was die zeitlichen und räumlichen Grenzen zwischen Arbeit und Freizeit zunehmend verwässert (Duxbury et al., 2014; Duxbury & Smart, 2011; Zimmer & Ziehmer, 2019).

Als Konsequenz wird in den Arbeitswissenschaften seit den 1990er-Jahren das Konzept der Entgrenzung diskutiert (Zimmer & Ziehmer, 2019) welches das Verschwimmen der Grenze zwischen den zwei großen komplementären Lebensbereichen Arbeit und Freizeit thematisiert (Krenn et al., 2003). „Vereinfacht gesagt, beschreibt Entgrenzung eine Situation, in der ein Arbeitsalltag nicht mehr mit dem Verlassen des Büros zu einer vorgeschriebenen Zeit endet“ (Praeg & Bauer, 2017, S. 171). Für meine Dissertation untersuchte ich zwei mit Entgrenzung assoziierte Phänomene und ihre

[8] Telearbeit bedeutet wortwörtlich „Fernarbeit“. Arbeit findet in Telearbeitsmodellen dort statt, wo es Sinn macht zu arbeiten, etwa beim Kunden oder auf Reisen. Eine spezielle Form der Telearbeit ist das Homeoffice, bei welchem die Beschäftigten Arbeit zuhause verrichten (Praeg & Bauer, 2017).

psychologischen Implikationen für Beschäftigte: Das Arbeiten in der Freizeit und das Grübeln über die Arbeit in der Freizeit.

Arbeiten in der Freizeit (Studie 1)

Arbeitsflexibilität erweitert das klassische Konzept der Arbeitsautonomie, das den Entscheidungsspielraum der Beschäftigten hinsichtlich Durchführung ihrer Arbeitsaufgaben beschreibt (Hackman & Oldham, 1976), um deren Entscheidungs-spielraum hinsichtlich der zeitlichen und örtlichen Rahmenbedingungen, unter welchen ihre Arbeit stattfindet (Meyer et al., 2021). Kelliher und Anderson (2010) argumentieren auf Basis der Theorie des sozialen Austauschs (Social exchange theory; Emerson, 1976), dass Beschäftigte auf gewährte Flexibilität bzw. Autonomie mit gesteigerter Leistung reagieren: Ohne es oft selbst zu merken, streben sie danach, dem/der Arbeitgeber/in einen Nutzen zu bringen und „etwas zurückzugeben“. Und wenn die Arbeitsstunden nicht ausreichen, um die Arbeitsleistung merklich steigern zu können, nutzen Beschäftigte ihre ständige virtuelle Verbindung zur Arbeit und arbeiten in ihrer Freizeit (Bowen et al., 2018; Glavin & Schieman, 2012; Senarathne Tennakoon et al., 2013).

Die COVID-19-Pandemie hat die Einführung von flexibler Arbeit im Dienstleistungs-sektor beschleunigt (Eurofound, 2021), jedoch war der Trend zum Arbeiten in der Freizeit schon früher zu erkennen. Laut der 6. European Working Conditions Survey (European Foundation for the Improvement of Living and Working Conditions, 2017) erfüllte im Jahr 2015 fast ein Viertel der europäischen unselbständig Beschäftigten mehrmals pro Monat Arbeitsanforderungen in der arbeitsfreien Zeit. Drei Jahre später wurde berichtet, dass fast zwei Drittel aller Erwerbstätigen im Alter von 25 bis 54 Jahren zumindest in irgendeiner Form in ihrer Freizeit arbeiten (Institut zur Zukunft der Arbeit (IZA) & XING, 2018). Und zusätzlich zum tatsächlichen Erledigen von Arbeitsaufgaben in der Freizeit geben fast drei

Viertel der Beschäftigten an, sich in ihrer Freizeit zumindest teilweise für die Arbeit verfügbar zu halten, wobei Beschäftigte die gegenseitige Erreichbarkeit durchaus auch erwarten (Feuchtl et al., 2016).

Arbeiten in der Freizeit wird meist als gesundheitsgefährdend aufgefasst, da Beschäftigte dadurch in einer Zeit, in der sie sich eigentlich von ihren Arbeitsanstrengungen erholen sollten, zusätzliche Arbeitsanstrengungen leisten (Arlinghaus & Nachreiner, 2013; Krause et al., 2015; Rau & Göllner, 2019). Zahlreiche Studien beschäftigten sich mit Arbeiten in der Freizeit und seinem Einfluss auf das Wohlbefinden der Beschäftigten, lieferten—zumindest auf den ersten Blick—jedoch inkonsistente Ergebnisse. Manche empirische Ergebnisse verknüpfen Arbeiten in der Freizeit mit einem erhöhten Gefühl der Erschöpfung (e.g., Park et al., 2020; Xie et al., 2017), während andere keinen derartigen Zusammenhang fanden (e.g., Day et al., 2012; Piszczek, 2017). Auch Untersuchungen des Zusammenhangs von Arbeiten in der Freizeit mit positivem Affekt (e.g., Kinnunen et al., 2016; Schlachter, 2017) und Schlafqualität (e.g., Bowen et al., 2018; Lanaj et al., 2016) brachten inkonsistente Ergebnisse. Andere Studien brachten sogar Hinweise, dass Arbeiten in der Freizeit eine Bereicherung für das Leben der Beschäftigten sein könnte (e.g., Kim & Hollensbe, 2017; Senarathne Tennakoon, 2011), jedoch konnten nicht alle diesen Zusammenhang feststellen (Pangert & Schüpbach, 2014; Wan et al., 2019). Schlachter et al. (2018) kommen in ihrem narrativen Literaturreview zu „freiwilliger Technik-Nutzung für die Arbeit außerhalb der Arbeitszeit“ zu dem Schluss, dass diese „von Natur aus weder "gut" noch "schlecht" ist, sondern eine komplexe Angelegenheit“ (S. 840), die differenzierter betrachtet werden muss.

Gemeinsam mit meinen Ko-Autorinnen Dr. Martina Hartner-Tiefenthaler der TU Wien und Professor Dr. Clare Kelliher der Cranefield University (Bedfordshire, England) führte ich einen systematischen Literaturreview durch, der die einzelnen Ausprägungen des

Phänomens Arbeiten in der Freizeit, die in empirischen Studien untersucht wurden, offenlegt und ihre psychologischen Implikationen getrennt voneinander betrachtet. In Manuskript 1 (Schöllbauer, Hartner-Tiefenthaler, & Kelliher, 2021) kontrastieren wir Befunde, die sich auf das tatsächliche Verhalten der Beschäftigten beziehen und solche, die sich auf die von den Beschäftigten subjektiv wahrgenommene Erwartung anderer an ihre Verfügbarkeit für die Arbeit in ihrer Freizeit beziehen (siehe Kästchen 1).

Kästchen 1. Überblick über Manuskript 1 (Schöllbauer, Hartner-Tiefenthaler, & Kelliher, 2021). Einzelheiten sind dem Nachdruck im Anhang zu entnehmen.

Ziel der Studie: Das Ziel des ersten Manuskripts meiner Dissertation ist es zu klären, ob das Wohlbefinden der Beschäftigten nachweislich leidet, wenn sie in ihrer Freizeit arbeiten. Dafür analysierten wir die Ergebnisse aller uns zugänglichen empirischen Studien seit 2007 (in diesem Jahr wurde das iPhone als das erste massentaugliche Smartphone in den Markt eingeführt; cnet.com, 2017), welche die Auswirkungen von technologiegestütztem Arbeiten in der Freizeit auf das Wohlbefinden von Beschäftigten untersuchten.

Methode: Zur Beantwortung der Forschungsfrage führten wir einen systematischen Literaturreview durch. In einem reproduzierbaren und transparenten Prozess (Centre for Reviews and Dissemination, University of York, 2009) ermittelten und analysierten wir 68 wissenschaftliche Publikationen, die zwischen 2007 und 2019 nach einem Peer-Review veröffentlicht wurden. Diese berichten empirische Studien zum technologiegestütztem Arbeiten in der Freizeit und 20 Indikatoren für das allgemeine Wohlbefinden der Beschäftigten (i.e., Erholung, affektives Wohlbefinden, körperliche Gesundheit und Gleichgewicht zwischen Arbeit

und Privatleben) sowie deren Wohlbefinden in Bezug zur Arbeit (i.e., selbst wahrgenommene Arbeitsleistung und emotionale Verbundenheit mit der Arbeit).

Die einbezogenen Studien operationalisierten das Phänomen entweder als Verhalten selbst oder als die subjektiv wahrgenommenen Erwartungen an die Verfügbarkeit der Beschäftigten für ihre Arbeit in ihrer Freizeit. Da dies zwei unterschiedliche Qualitäten der Wahrnehmung dieses Phänomens sind—die auch unterschiedliche Auswirkungen auf die Beschäftigten haben können—stellen wir die Ergebnisse, die sich auf das Verhalten von und auf die Erwartungen an die Beschäftigten beziehen, einander gegenüber.

Ergebnisse: Unsere Ergebnisse offenbaren eine negative Assoziation von Verfügbarkeitserwartungen mit Erholung, affektivem Wohlbefinden und dem Gleichgewicht zwischen Arbeit und Privatleben. Zudem besteht eher keine Verbindung zwischen Verfügbarkeitserwartungen und der emotionalen Verbundenheit mit der Arbeit, es gibt jedoch einen Befund zu einer positiven Verbindung mit Leistung. Die Ergebnislage zu Arbeiten in der Freizeit als Verhalten offenbart diese paradoxe Situation deutlicher: Das Verhalten hängt einerseits mit weniger Erholung, schlechterem affektiven Wohlbefinden, weniger körperlicher Gesundheit sowie weniger Gleichgewicht zwischen Arbeit und Privatleben zusammen, andererseits jedoch auch mit höherer Arbeitsleistung und mehr emotionaler Verbundenheit mit der Arbeit. Dies ist insofern paradox, als Wohlbefinden und Arbeitsleistung in positivem Zusammenhang zueinander stehen (e.g., Cotton & Hart, 2003): Mentale Erholung von der Arbeit beeinflusst die zukünftige Arbeitsleistung positiv (Meijman & Mulder, 1998) und umgekehrt wirkt sich auch Arbeitsleistung positiv auf das Wohlbefinden

der Beschäftigten aus, vermittelt etwa direkt über das Kompetenzerleben (Deci et al., 2017) oder über die Wertschätzung von und Belohnung durch andere (Siegrist, 1996).

Die Unterscheidung zwischen Arbeiten in der Freizeit als Verhalten und als Verfügbarkeitserwartungen in Manuskript 1 (siehe Kästchen 1) konnte die uneindeutigen Befunde empirischer Studien nur teilweise aufklären. Unsere Ergebnisse klären einerseits auf, dass nur das tatsächliche Verhalten zu positiven Arbeitserlebnissen und so auch zu einer Bereicherung des Lebens von Beschäftigten führen kann (e.g., Kim & Hollensbe, 2017; Senarathne Tennakoon, 2011), während die Verfügbarkeitserwartungen dies nicht tun (Pangert & Schüpbach, 2014). Andererseits bleibt die Befundlage zum Verhältnis von Arbeiten in der Freizeit als Verhalten zu anderen Wohlbefindensindikatoren so wie Affekt und Schlafqualität jedoch weiterhin uneindeutig (siehe auch Tabelle 1).

Die unklaren Befunde hinsichtlich bestimmter Wohlbefindensindikatoren könnten darauf zurückzuführen sein, dass unterschiedliche Verhaltensmuster der Beschäftigten auch unterschiedlich auf ihr Wohlbefinden wirken. Da bei der Untersuchung von Verhaltensphänomenen Zeit immer ein relevanter Faktor ist (Navarro et al., 2015; Roe, 2008), analysierten wir die gesammelten Studien erneut, nun jedoch mit dem Fokus auf zwei zeitliche Muster des Arbeitens in der Freizeit: als kontinuierliches Verhalten mit einer gewissen Dauer und als wiederkehrendes Verhalten mit einer bestimmten Häufigkeit. Die Ergebnisse dieser Analyse, welche in Kästchen 2 zusammengefasst sind, veröffentlichen wir in Manuskript 2.

Kästchen 2. Überblick über Manuskript 2 (Schoellbauer, Hartner-Tiefenthaler und Kelliher, eingereicht). Einzelheiten sind dem Nachdruck im Anhang zu entnehmen.

Ziel der Studie: Das Ziel des zweiten Manuskripts meiner Dissertation ist es zu klären, ob unterschiedliche zeitliche Muster des Arbeitens in der Freizeit auch unterschiedliche Implikationen für das Wohlbefinden der Beschäftigten haben. Auf Basis der in den Studien verwendeten Messinstrumente für das Phänomen differenzieren wir in dieser zweiten Analyse des systematischen Reviews konkret zwischen kontinuierlichem Arbeitsverhalten von einer gewissen Dauer (i.e., Arbeitstätigkeiten in der Freizeit werden direkt hintereinander und ohne deutliche Pausen dazwischen erledigt, zum Beispiel am Abend noch eine Stunde nehmen um offene Arbeits-E-Mails zu beantworten) und wiederkehrendem Arbeitsverhalten mit einer gewissen Häufigkeit (i.e., mit Pausen dazwischen kommt es immer wieder zu Arbeitstätigkeiten in der Freizeit, zum Beispiel jede halbe Stunde zu checken, ob neue Arbeits-E-Mails hereingekommen sind).

Arbeiten in der Freizeit wurde als Unterbrechung der privaten Aktivitäten der Beschäftigten beschrieben (Kossek et al., 2012), und Unterbrechungen gelten als Stressoren (Blank et al., 2020; Van Den Berg et al., 1996). Da wiederkehrendes Arbeiten mehr Unterbrechungen von privaten Aktivitäten bedeutet, gehen wir davon aus, dass wiederkehrendes Arbeiten in der Freizeit ungünstiger auf das Wohlbefinden der Beschäftigten wirkt als kontinuierliches Arbeiten.

Methode: Zur Beantwortung der Forschungsfrage analysierten wir die im Zuge eines systematischen Literaturreviews gesammelte Literatur (siehe Manuskript 1). Dabei analysierten wir die Ergebnisse von 81 Studien, die zwischen 2007 und 2020 in insgesamt 75 wissenschaftlichen Artikeln publiziert wurden. Die Ergebnisse

gruppierten wir nun anhand der beiden Verhaltensmuster (kontinuierliches und wiederkehrendes Arbeiten in der Freizeit). Die in den Studien untersuchten Wohlbefindensindikatoren gruppierten wir in die folgende Bereiche: Zeitressourcen für Arbeit und Freizeit, negativer Affekt, positiver Affekt, subjektive Lebensqualität und kognitive Ressourcen.

Ergebnisse: Unsere Ergebnisse lassen drei Effekte des Arbeitens in der Freizeit auf das Wohlbefinden vermuten: Erstens einen Zeitverlusteffekt, der besagt, dass sowohl kontinuierliches als auch wiederkehrendes Arbeiten in der Freizeit Zeitressourcen in Anspruch nimmt, die folglich für Privatleben und Erholung fehlen. Dies führt etwa zu einem Konflikt zwischen Arbeit und Privatleben, zu weniger Schlafstunden sowie zu weniger Stunden, an denen nicht an die Arbeit gedacht wird (was relevant für die mentale Erholung der Beschäftigten von ihrer Arbeit ist; (Sonnentag & Fritz, 2007, 2015). Zweitens fanden wir Hinweise auf einen „Belastungseffekt“ wiederkehrenden Arbeitens in der Freizeit, welcher mit mehr negativem Affekt (e.g., Gefühle von Stress und Erschöpfung) und einer schlechteren Lebensqualität (e.g., Schlafqualität, körperliche Gesundheit) der Beschäftigten verbunden ist. Drittens weisen Studienergebnisse auf einen „Gewinneffekt“ kontinuierlichen Arbeitens in der Freizeit hin, der mit einer Zunahme kognitiver Ressourcen verbunden ist (e.g., professionelle Selbstwirksamkeitserwartung).

Auf Basis der Datenlage sehen wir unsere Hypothese bestätigt, dass sich wiederkehrendes Arbeiten in der Freizeit im Vergleich zu kontinuierlichem Arbeiten insgesamt ungünstiger auf das Wohlbefinden der Beschäftigten auswirkt.

Die Unterscheidung zwischen zwei Verhaltensmustern beim Arbeiten in der Freizeit konnte die undeutliche empirische Befundlage weiter aufklären. Obwohl es leider deutlich

mehr Studien zu wiederkehrendem als zu kontinuierlichem Arbeiten in der Freizeit gibt, deuten die Ergebnisse der zweiten Auswertung unseres systematischen Reviews (für Manuskript 2) darauf hin, dass unterschiedliche Zeitmuster des Phänomens potenziell unterschiedliche psychologische Konsequenzen für die Beschäftigten haben. Die Wohlbefindensindikatoren mit der deutlichsten Veränderung der Anzahl der signifikant negativen, positiven und nicht signifikanten Zusammenhänge zwischen Arbeiten in der Freizeit und speziellen Wohlbefindensindikatoren nach Differenzierung zwischen zwei Verhaltensmustern sind in Tabelle 1 dargestellt.

Tabelle 1. Veränderung der Anzahl der signifikant negativen, positiven und nicht signifikanten Zusammenhänge zwischen Arbeiten in der Freizeit und speziellen Wohlbefindensindikatoren nach Differenzierung zwischen zwei Verhaltensmustern

	Alle Verhaltensweisen			wiederkehrendes Arbeiten in *der Freizeit*			kontinuierliches Arbeiten in *der Freizeit*		
Wohlbefindensindikator	-	N.S.	+	-	N.S.	+	-	N.S.	+
Gefühl von Stress	0	4	16	0	3	16	0	1	0
Gefühl der Erschöpfung	1	11	16	0	5	16	1	6	0
Schlafqualität	7	5	0	7	2	0	0	3	0
Professionelle Selbstwirksamkeitserwartung	0	2	2	0	2	0	0	0	2
Kognitive Fähigkeiten	0	1	2	0	1	1	0	0	1

Datengrundlage bieten die Studien, die in Manuskript 2 analysiert wurden. In der Spalte – steht die Summe der Ergebnisse, die auf einen signifikant negativen Zusammenhang hinweisen, in der Spalte + steht die Summe der Ergebnisse, die auf einen signifikant positiven Zusammenhang hinweisen, und in der Spalte n.s. steht die Summe der Ergebnisse, die auf keinen signifikanten Zusammenhang hinweisen.

Grübeln über die Arbeit in der Freizeit (Studie 2)

Ich argumentiere, dass Grübeln über die Arbeit in der Freizeit eine kognitive Ausprägung der Entgrenzung zwischen Arbeit und Freizeit ist, da durch das Grübeln die Arbeit gedanklich über ihre (vormaligen) zeitlichen und räumlichen Grenzen hinweg auf die Beschäftigten einwirkt, während sie es beim Arbeiten in der Freizeit durch deren Verhalten tut. Martin und Tesser (1996) beschreiben ruminative Gedanken (auf Deutsch auch Grübeln genannt) als Gedanken im Zusammenhang mit einem Lebenskontext, in dem sich die betroffene Person gerade nicht befindet. Zum Grübeln kommt es im Falle einer negativen oder positiven Diskrepanz zwischen Erwartungen und dem tatsächlich Erlebtem (Martin & Tesser, 1996). So führt etwa ein unerwarteter Misserfolg zu negativem Grübeln, assoziiert mit negativen Gedanken, und ein unerwarteter Erfolg zu positivem Grübeln über die Arbeit in der Freizeit, gespickt von positiven Gedanken.

Wissensarbeiter/innen grübeln deutlich öfter in der Freizeit über ihre Arbeit als Industriearbeiter/innen (Pravettoni et al., 2007). Das Grübeln der Wissensarbeiter/innen könnte durch Arbeitsflexibilisierung gesteigert werden, denn diese wurde mit mehr negativem und positivem Grübeln über die Arbeit in Verbindung gebracht (Prem et al., 2021). Die Autorinnen und Autoren führen weiters aus, dass Beschäftigte in flexiblen Wissensberufen—zusätzlich zu ihren regulären Arbeitsaufgaben—die Anforderungen erleben ihre Arbeitszeiten und -orte zu planen, ihre Arbeitsaufgaben zu strukturieren und sich mit Kolleginnen und Kollegen, die oft auch flexibel arbeiten, abzustimmen. In anderen Worten: Es kommt in flexiblen Wissensberufen zu einer Arbeitsintensivierung (Kelliher & Anderson, 2010) was bedeutet, dass Beschäftigte mehr Aufgaben in der gleichen Zeit zu erledigen haben (Kubicek et al., 2015). Ein hohes Arbeitsvolumen erhöht die Wahrscheinlichkeit, dass einige der

Aufgaben nach einem Arbeitstag unerledigt bleiben (Sonnentag & Bayer, 2005), und unerledigte Aufgaben haben ein hohes Potenzial, die Aufmerksamkeit einer Person auf sich zu ziehen und diese zum Grübeln zu bringen (Smit & Barber, 2016).

Negative Gedanken an die Arbeit in der Freizeit werden als Nachteil für das Wohlbefinden von Beschäftigten beschrieben, positive als Vorteil. Negatives Grübeln über die Arbeit in der Freizeit ist „ein vielversprechender Frühindikator für Stress in Wissensberufen" (Pravettoni et al., 2007, S. 1931). Es wurde mit erhöhten Angstgefühlen (Kirkegaard Thomsen, 2006; Michl et al., 2013), mehr Erschöpfung (Donahue et al., 2012; Weigelt et al., 2019) und gesteigerter depressiver Stimmung (Segerstrom et al., 2006) in Verbindung gebracht. Im Gegensatz dazu hat sich gezeigt, dass positives Grübeln über die Arbeit positive psychologische Implikationen für die Beschäftigen hat, wie etwa ein höheres Maß an Vitalität (Weigelt et al., 2019), mehr Gelassenheit (Meier et al., 2016) und mehr Entspannung (Fritz & Sonnentag, 2006).

Berufliche Erlebnisse beeinflussen nicht nur das Erleben und Verhalten der Beschäftigten in ihrer Freizeit, sondern wirken sich auch auf das Erleben und Verhalten ihrer Partner/innen aus. Dieses „Crossover" geschieht durch die Interaktion der Partner/innen eines romantischen Paares in ihrer gemeinsamen Freizeit (Bakker & Demerouti, 2013). Die Crossover-Forschung konzentriert sich bisher hauptsächlich auf einen negativ-affektiven Mechanismus und zeigt Zusammenhänge zwischen negativem Grübeln über die Arbeit und höherer Anspannung (King & DeLongis, 2014) sowie einem gesteigerten Ausdruck negativer Emotionen zwischen Partner/in und Partner/in (Green et al., 2011; Meier & Cho, 2019). Umgekehrt wurde auch die Abwesenheit von Gedanken an die Arbeit in der Freizeit (i.e., gedankliche Distanzierung von der Arbeit) positiv mit der Beziehungszufriedenheit von Paaren assoziiert (Debrot et al., 2018; Rodríguez-Muñoz et al., 2018). Danner-Vlaardingerbroek et al. (2013) zeigten, dass negatives

Grübeln über die Arbeit deshalb auf den/die Partner/in wirkt, weil es die „psychologische Verfügbarkeit“ der Beschäftigten für ihre Partner/innen senkt, was als eine Mischung der Aufmerksamkeit für die Partner/innen und des Interesses an diesen konzeptualisiert wurde. Die Autorinnen und Autoren gaben jedoch weder theoretische noch empirische Informationen darüber, wie Grübeln über die Arbeit die „psychologische Verfügbarkeit“ der Beschäftigten für ihre Partner/innen senkt. Zudem wissen wir noch nicht viel über die Auswirkungen von positivem Grübeln über die Arbeit auf die Paarbeziehung sowie darüber, was Paare machen können, um sich vor negativen Crossover-Effekten zu schützen.

Diese Wissenslücken möchten wir mit Manuskript 3 (Schoellbauer, Tement, et al., eingereicht) schließen. Auf Grundlage der Belastungstheorie der selektiven Aufmerksamkeit (Theory of selective attention; Lavie et al., 2004) spezifizierten wir einen kognitiven Crossover-Mechanismus und stellen die Hypothese auf, dass sowohl negatives als auch positives Grübeln über die Arbeit in der Freizeit Aufmerksamkeitsressourcen beansprucht und somit die Aufmerksamkeit der Beschäftigten für ihre Partner/innen verringert. Aufmerksamkeit ist eine entscheidende Voraussetzung für die Interaktionen von Paaren miteinander, die wiederum die Beziehungszufriedenheit der Partner/innen bestimmen (Rogers & May, 2003). Demnach hypothetisieren wir weiters, dass die Aufmerksamkeit der Beschäftigten für ihre Partner/innen positiv mit der Beziehungszufriedenheit beider Partner/innen zusammenhängt.

Grübeln wird als „ruminativ“ beschrieben weil sich die Gedanken so lange wiederholen, bis die Diskrepanz aufgelöst wurde bzw. die Person endlich versteht, wie es zu diesem unerwarteten Misserfolg oder Erfolg kam (Martin & Tesser, 1996). Wir gehen davon aus, dass durch das Besprechen der Gedanken mit dem/der Partner/in die Auflösung der arbeitsbezogenen Gedanken gefördert wird, was die Aufmerksamkeit der Beschäftigten für

die Partner/innen und somit die Beziehungszufriedenheit beider Partner/innen wieder erhöhen müsste. Denn durch das Teilen von Informationen bewältigt ein Paar gemeinsam Probleme, auch wenn diese nur eine/n der beiden betreffen (dyadic coping; Bodenmann, 1997; Falconier & Kuhn, 2019). Um die in den vorhergehenden Absätzen dargelegten Hypothesen zu testen, führten wir eine Tagebuchstudie mit Paaren in Wissensberufen durch (siehe Kästchen 3).

Kästchen 3. Überblick über Manuskript 3 (Schoellbauer, Tement, & Korunka, eingereicht). Einzelheiten sind dem Nachdruck im Anhang zu entnehmen.

Ziel der Studie: Das Ziel des dritten Manuskripts meiner Dissertation ist es, den Zusammenhang von negativem und positivem Grübeln über die Arbeit mit der Beziehungsqualität von Paaren zu untersuchen. In Anlehnung an die Belastungstheorie der selektiven Aufmerksamkeit (Lavie et al., 2004) stellen wir die Hypothese auf, dass sowohl negatives als auch positives Grübeln über die Arbeit Aufmerksamkeitsressourcen beansprucht, was die Aufmerksamkeit der Beschäftigten für ihre Partner/innen und in weiterer Folge die Beziehungszufriedenheit beider Partner/innen verringert. Darüber hinaus testen wir, ob das Teilen der arbeitsbezogenen Gedanken mit dem/der Partner/in diesen negativen kognitiven Mechanismus abpuffern kann.

Methode: Zum Testen der Hypothesen führten wir eine Tagebuchstudie mit 42 Paaren durch von denen beide Partner/innen berufstätig sind. Diese beantworteten täglich nach der Arbeit Fragen zum Grübeln und zu ihrer Aufmerksamkeit gegenüber dem/der Partner/in und vor dem Zubettgehen zu ihrer Beziehungszufriedenheit. Die gesammelten 579 täglichen dyadischen Beobachtungen wurden in einem actor-partner

interdependence model (Kenny & Ledermann, 2010) aufbereitet und dienten als Datensatz zur Hypothesenprüfung mittels Pfadmodels in Mplus (Muthén & Muthén, 2017).

Ergebnisse: Die Ergebnisse stützen unsere Hypothesen auf dem Tageslevel (i.e., within-person level): Sowohl negatives als auch positives Grübeln über die Arbeit in der Freizeit steht in Zusammenhang mit verringerter Aufmerksamkeit für den/die Partner/in am selben Tag und dadurch auch indirekt mit einer verringerten Beziehungszufriedenheit beider Partner/innen. Das Sprechen der Partner/innen über die arbeitsbezogenen Dinge, über die die Beschäftigten grübeln, verringert den negativen indirekten Effekt des Grübelns auf die Beziehungszufriedenheit beider Partner/innen nicht nur sondern kehrt ihn sogar in einen positiven Effekt um..

Unsere Ergebnisse bestätigen den von uns angenommenen kognitiven Crossover-Mechanismus, der auf der Belastungstheorie der selektiven Aufmerksamkeit (Lavie et al., 2004) beruht. Genauer gesagt deuten unsere Ergebnisse darauf hin, dass sowohl negative als auch positive Gedanken an die Arbeit die kognitiven begrenzten Aufmerksamkeitsressourcen des Arbeitsgedächtnisses der Beschäftigten in ihrer Freizeit so beanspruchen, dass diese dem/der Partner/in nur weniger Aufmerksamkeit während der gemeinsamen Zeit nach der Arbeit schenken können als sie das für gewöhnlich tun. Und je niedriger die Aufmerksamkeit des/der Beschäftigten für den/die Partner/in ist, desto geringer ist auch die Beziehungszufriedenheit beider Partner/innen an diesem Tag, und umgekehrt. Unsere Ergebnisse erweitern die Paarforschung indem ein kognitiver Mechanismus spezifiziert wird, der eine indirekte negative Auswirkung jeglicher Art von Grübeln über die Arbeit auf die Liebesbeziehung von Beschäftigten vorhersagt. Und dieser kognitive Crossover-

Mechanismus sagt auch dann verringerte Beziehungszufriedenheit voraus, wenn die Arbeit keinen starken Affekt bei den Beschäftigten ausgelöst hat der das Verhalten gegenüber dem/der Partner/in feindselig macht. Somit hat der kognitive Crossover-Mechanismus einen inkrementellen Wert zu den negativ-affektiven Crossover-Mechanismen, die in früheren Studien gezeigt wurden (e.g., Debrot et al., 2018; King & DeLongis, 2014; Rodríguez-Muñoz et al., 2018). Die nachteiligen Crossover-Effekte nach positivem Grübeln über die Arbeit sind jedoch insofern erstaunlich, als bisherige Studien überwiegend positive Effekte von positivem Grübeln über die Arbeit auf das Wohlbefinden der Beschäftigten zeigen (e.g., Fritz & Sonnentag, 2006; Meier et al., 2016; Sonnentag & Grant, 2012; Weigelt et al., 2019).

Schließlich zeigt unsere Paar-Tagebuchstudie, dass das Teilen ihrer arbeitsbezogenen Gedanken die negative Beziehung des Grübelns zur Aufmerksamkeit für den/die Partner/in abschwächt. Wir argumentieren, dass durch das Gespräch über die Gedanken ein dyadischer Bewältigungsprozess (Bodenmann, 1997; Falconier & Kuhn, 2019) angestoßen wird, der den Beschäftigten hilft, die vergangenen Situationen (e.g., unerwarteter Erfolg oder Misserfolg) zu verstehen. Dieses Verstehen ermöglicht eine effiziente Auflösung der Gedanken (Martin & Tesser, 1996), wodurch wieder Aufmerksamkeitsressourcen des Arbeitsgedächtnisses frei werden (Lavie et al., 2004) die nun auf den/die Partner/in gerichtet werden können.

Projektifizierung und die Unvorhersehbarkeit der Arbeit (Studie 3)

„Die klassische industrielle Rationalität ist in gewisser Weise ein allgemeiner Versuch, den Besonderheiten der jeweiligen Situation zu entkommen“ (S.369), sie ist definiert durch typisierte Probleme und standardisierte Arbeitsprozesse zu deren Lösung (Midler, 1995). Als

Strategie des Wettbewerbsvorteils ist seit den 1990er Jahren ein Trend zur Projektifizierung von Arbeit zu beobachten, bei dem prozessorientierte Routinearbeit durch dynamische, situationsabhängige Projektarbeit ersetzt wird (Midler, 1995; Schoper et al., 2018). Der Einsatz von Projekten soll Organisationen flexibler und innovativer machen und zur Lösung komplexer Probleme befähigen (Hobday, 2000; Lundin & Söderholm, 1995).Im Gegensatz zu typisierten Probleme und standardisierten Arbeitsprozesse sind Projekte einmalige Ereignisse, deren Probleme maßgeschneiderter Methoden und Lösungen bedürfen, da sie nicht aus ihrem spezifischen Kontext herausgelöst werden können (Midler, 1995). Projektifizierung ist in Industrie- sowie Dienstleistungsorganisationen gleichermaßen zu beobachten, der Anteil an Projektarbeit wuchs in den letzten Jahren jedoch im Bereich der Wissensarbeit (vor allem im Bereich der öffentlichen Verwaltung sowie bei Dienstleistungen im Bereich Bildung und Gesundheit) am stärksten an (Schoper et al., 2018).

Projektifizierung konfrontiert die Beschäftigten mit einer zunehmenden Unvorhersehbarkeit ihrer Arbeit. Wir argumentieren, dass Beschäftigte, die Projektarbeit leisten, konkret vor zwei Herausforderungen stehen: Die erste Herausforderung besteht darin, dass sich die Arbeitsaufgaben aufgrund der flexiblen, von der Marktsituation abhängigen Priorisierung von Projekten innerhalb von Organisationen jederzeit dynamisch ändern können (Mohr & Wolfram, 2010). Personen sind besser in der Lage, das Auftreten von Arbeitserlebnissen zu antizipieren, wenn die Arbeitserlebnisse über einen längeren Zeitraum hinweg stabil sind, als wenn diese im Laufe der Zeit schwanken (Rosen et al., 2020). Ergo machen es dynamisch ändernde Arbeitsprojekte wahrscheinlich schwierig vorherzusehen, welche Arbeitsaufgaben konkret bevorstehen.

Die zweite Herausforderung ist die Abnahme von Routinearbeit zugunsten einer Zunahme komplexer Arbeitsaufgaben, da die Projektarbeit unregelmäßig wechselnde und einmalige

Tätigkeiten umfasst (Schoper et al., 2018). Selbst wenn klar ist, welche Arbeitsaufgaben anstehen, macht es diese Situation wahrscheinlich schwierig, die konkrete Durchführung der Arbeitsaufgaben zu antizipieren. In Anlehnung an eine Arbeit zur Vorhersehbarkeit von Arbeit zählen wir hierzu die Methoden der Durchführung, deren Zeitbedarf und mögliche Probleme, die im Prozess der Durchführung auftreten können (Schyns & Paul, 2004).

Die Rolle der Unvorhersehbarkeit von Arbeit für das Wohlbefinden von Beschäftigten blieb bisher weitgehend unbeachtet. Scholarios et al. (2017) zeigen, dass die Unvorhersehbarkeit von Arbeitszeit mit Gefahren für die Gesundheit von Polizistinnen und Polizisten einhergeht. Andere Studien betonen die Rolle der Vorhersehbarkeit von Arbeit als Arbeitsressource mit mildernder Wirkung auf den negativ-affektiven Einfluss anderer Arbeitsstressoren (Flovik et al., 2019; Mohr & Wolfram, 2010; Rosen et al., 2020).

In Manuskript 4 (Schoellbauer, Sonnentag, Prem, & Korunka, 2021) schließen wir diese Forschungslücke und stellen drei Argumente dafür vor, dass die Unvorhersehbarkeit der Arbeit einen zeitgenössischen Arbeitsstressor darstellt. Erstens wird die Unvorhersehbarkeit der Arbeit wahrscheinlich als ein Mangel an Kontrolle wahrgenommen, was dem Grundbedürfnis nach Autonomie entgegensteht (Deci et al., 2017). Zweitens hindert die Unvorhersehbarkeit der Arbeit die Beschäftigten daran, antizipatorische Maßnahmen zu ergreifen. Dies macht die erfolgreiche Bewältigung der Aufgaben unwahrscheinlicher (Meurs & Perrewé, 2011) und steht dem Grundbedürfnis nach Kompetenz entgegen (Deci et al., 2017). Drittens ist die Unvorhersehbarkeit der Arbeit mit mehr Regulierungs- und Planungsanforderungen verbunden, welche die mentale Arbeitsbelastung der Beschäftigten erhöhen (Mohr & Wolfram, 2010). Die Frustration der Grundbedürfnisse (Vansteenkiste & Ryan, 2013) und eine hohe Arbeitsbelastung (Ilies et al., 2010)—etwa zu viel zu tun in zu wenig Zeit—sind bekannt als stressende Arbeitserfahrungen.

Weiters zeigen wir in Manuskript 4 empirisch, dass Arbeitsunvorhersehbarkeit die Beschäftigten täglich beeinflusst. In Anlehnung an die kognitive Aktivierungstheorie von Stress (Cognitive activation theory of stress; Ursin & Eriksen, 2004) stellen wir die Hypothese auf, dass ein hohes Maß an Unvorhersehbarkeit der Arbeit Stressgefühle hervorruft, die über die Arbeitsstunden eines Tages hinaus andauert und wiederum mit einer geringeren Ruhe und Gelassenheit der Beschäftigten am Abend vor dem Schlafengehen zusammenhängt (im Folgenden nur noch als Gelassenheit bezeichnet). Um diese Hypothesen zu testen, führten wir eine Tagebuchstudie mit Beschäftigten in Wissensberufen durch (siehe Kästchen 4).

Kästchen 4. Überblick über Manuskript 4 (Schoellbauer, Sonnentag, Prem, & Korunka, 2021). Einzelheiten sind dem Nachdruck im Anhang zu entnehmen.

Ziel der Studie: Das erste Ziel des vierten Manuskripts meiner Dissertation ist es, theoretische Argumente dafür vorzubringen, dass die Unvorhersehbarkeit der Arbeit (von Arbeitsaufgaben und deren Durchführungsmodalitäten wie Methode, Dauer und mögliche Probleme) einen zeitgenössischen Arbeitsstressor darstellt (siehe die genauere Darlegung auf Seite 23f): Erstens kann Unvorhersehbarkeit der Arbeit als Mangel an Kontrolle bei der Arbeit wahrgenommen werden. Zweitens kann Unvorhersehbarkeit der Arbeit ein Hindernis sein, antizipatorische Maßnahmen zur Arbeitserledigung zu ergreifen, was berufliche Erfolgserlebnisse unwahrscheinlicher macht. Drittens ist die Unvorhersehbarkeit der Arbeit mit mehr Regulierungs- und Planungsanforderungen verbunden, was die mentale Arbeitsbelastung der Beschäftigten erhöhen kann.

Das zweite Ziel ist es, die Wirkung des Stressors auf das tägliche Wohlbefinden der Beschäftigten empirisch zu belegen. Wir stellen die Hypothese auf, dass an Tagen, an denen Beschäftigte mehr Arbeitsunvorhersehbarkeit als sonst erleben, diese auch nach der Arbeit von mehr Stressgefühlen berichten, welche wiederum mit weniger Gelassenheit am Abend verbunden sind.

Methode: Wir führten eine Tagebuchstudie mit 105 unselbständigen Beschäftigten in Wissensberufen durch und sammelten mittels dreier täglicher Fragebögen über zwei Wochen insgesamt 666 tägliche Beobachtungen. Dabei wurden Arbeitsunvorhersehbarkeit, Stressgefühle nach der Arbeit und Gelassenheit am Abend jeweils in einem eigenen täglichen Fragebogen erfasst. Die Hypothesen testeten wir mittels Pfadmodells in Mplus (Muthén & Muthén, 2017).

Ergebnisse: Die Ergebnisse unterstützen unsere Hypothesen und zeigen auf dem Tageslevel (i.e., within-person level), dass die Arbeitsunvorhersehbarkeit mit mehr Stressgefühlen der Beschäftigten nach der Arbeit einhergeht, was wiederum mit weniger Gelassenheit am Abend assoziiert ist. Diese Zusammenhänge wurden auch gefunden, nachdem um Zeitdruck (i.e., ein Arbeitsstressor mit gut dokumentierten negativen Auswirkungen auf den affektiven Zustand der Beschäftigten während und nach der Arbeit; e.g., Baethge & Rigotti, 2013) und um das Level an Gelassenheit nach der Arbeit kontrolliert wurde.

Unsere Studie leistet zwei relevante Beiträge zur Literatur. Zum einen konzeptualisiert sie die Unvorhersehbarkeit von Arbeitsinhalten als eigenständiges Arbeitsmerkmal und macht damit Forschung und Praxis auf einen zeitgenössischen Arbeitsstressor aufmerksam, welcher

in Zukunft mehr Beachtung bekommen sollte. Zum anderen trägt unsere Studie zur Stressforschung bei, indem sie die Dauer der affektiven Reaktion nach Erleben eines Stressors und dem Befinden später am Tag hervorhebt (Brosschot & Thayer, 1998). Dieser Zusammenhang wird meist theoretisch angenommen, in der empirischen Stressforschung jedoch häufig vernachlässigt (Meurs & Perrewé, 2011), und das trotz seiner offensichtlichen praktischen Relevanz: Die Unvorhersehbarkeit der Arbeit und abendliche Gelassenheit hängen nicht direkt zusammen, sondern wurden über Stressgefühle nach der Arbeit vermittelt. Zudem war der negative Zusammenhang zwischen den Stressgefühlen nach der Arbeit und der Gelassenheit am Abend auch nach statistischer Kontrolle um die Gelassenheit nach der Arbeit signifikant. Dies zeigt, dass Stressgefühle nach der Arbeit einen relevanten Einfluss auf die abendliche Gelassenheit haben.

Diskussion

Ziel dieser Dissertation ist es, die psychologischen Implikationen von zwei zuvor identifizierten Merkmalen zeitgenössischer Wissensarbeit zu untersuchen und zu diskutieren: Entgrenzung und Unvorhersehbarkeit. Zusammengefasst zeigen die Ergebnisse meiner drei Studien, die ich in vier wissenschaftlichen Manuskripten veröffentliche, dass sowohl Entgrenzung als auch Unvorhersehbarkeit der Arbeit deutliche Auswirkungen auf das Wohlbefinden der Beschäftigten (und teilweise ihrer Partner/innen) haben. Die psychologischen Implikationen beider Merkmale zeitgenössischer Wissensarbeit sind weitgehend negativ und müssen aus zwei Gründen auch eher kritisch betrachtet werden.

Erstens ermöglicht Entgrenzung, dass Arbeit das Verhalten (e.g., Arbeiten in der Freizeit) und die Gedanken der Beschäftigten (e.g., Grübeln über die Arbeit in der Freizeit) noch jenseits der Arbeitsstunden beeinflusst. Dieser Anspruch der Arbeit auf die Freizeit der

Beschäftigten steht in Konkurrenz zu anderen Lebensbereichen um knappe zeitliche und kognitive Ressourcen. Dies kann weiters zu sozialen Konflikten (etwa durch mangelnde Zeit für gemeinsame Aktivitäten oder durch mangelnde Aufmerksamkeit für Personen aus dem Privatleben; siehe Greenhaus & Beutell, 1985) sowie zu schlechterer Erholung (etwa durch mangelnde Zeit für entspannende Aktivitäten oder durch mangelnde mentale Distanzierung von der Arbeit; siehe Sonnentag & Fritz, 2007) führen. Manuskript 1 und 2 zeigen diese Folgen in Hinblick auf Arbeiten in der Freizeit und Manuskript 3 in Hinblick auf Grübeln über die Arbeit in der Freizeit.

Zweitens ermöglichen Entgrenzung und Unvorhersehbarkeit, dass Arbeit die Gefühle der Beschäftigten noch jenseits ihrer Arbeitsstunden beeinflusst. Manuskript 1 und 2 zeigen, dass Verfügbarkeitserwartungen sowie wiederkehrendes Arbeiten in der Freizeit (als zwei Ausprägungen des komplexen Phänomens Arbeiten in der Freizeit) negativ mit dem affektiven Wohlbefinden der Beschäftigten assoziiert sind. Manuskript 4 schildert und zeigt den Stresseffekt, der erlebter Arbeitsunvorhersehbarkeit folgt und Beschäftigte und ihren Affekt über die Arbeitsstunden hinaus negativ beeinflusst. Weiters war es bereits bekannt, dass das Grübeln über die Arbeit in der Freizeit mit negativen Gefühlen in Verbindung steht (Donahue et al., 2012; Segerstrom et al., 2006), welche die Erholung der Beschäftigten beeinträchtigen (Cropley et al., 2006, 2016). Es ist bekannt, dass sich die affektive Belastung von Beschäftigten im Laufe der Zeit zu chronischen körperlichen und psychischen Gesundheitsbeeinträchtigungen akkumuliert (Frese & Zapf, 1988; Geurts & Sonnentag, 2006; Ursin & Eriksen, 2004), was die Relevanz der berichteten Ergebnisse unterstreicht.

Meine Untersuchungen lassen jedoch auch Potenzial erkennen, dass zwei Ausprägungen der Entgrenzung das Leben der Beschäftigten auch bereichern können. Erstens wirkt sich das

Grübeln über die Arbeit in der Freizeit nur dann indirekt negativ auf die Beziehungszufriedenheit der Beschäftigten und ihrer Partner/innen aus, wenn die Partner/innen nicht darüber sprechen. Die Beschäftigten können Grübeln über die Arbeit in der Freizeit jedoch auch als Chance sehen, ihre Beziehungszufriedenheit und die ihrer Partner/innen sogar zu steigern, wenn diese ihre arbeitsbezogenen Gedanken mit diesen teilen (siehe Manuskript 3).

Zweitens haben empirische Studien das kontinuierliche Arbeiten in der Freizeit mit dem Gewinn kognitiver Ressourcen (e.g., Selbstwirksamkeitserwartung) in Verbindung gebracht (siehe Manuskript 2). Ich argumentiere, dass dies deshalb der Fall ist, weil kontinuierliches Arbeiten in der Freizeit nicht nur das Privatleben weniger unterbricht, sondern den Beschäftigten die Möglichkeit gibt, sich fern der Ablenkungen und der Hektik eines beruflichen Alltags eingehend mit einer Arbeitsaufgabe zu beschäftigen. Eine tiefgreifende Verarbeitung von Informationen steigert die Leistung (Resick et al., 2014) und Erfolgserlebnisse steigern die Selbstwirksamkeit (Bandura, 1982). Zudem kann argumentiert werden, dass kontinuierliche Arbeitsepisoden mit einer gewissen Dauer eher vorab eingeplant werden und demnach vorhersehbarer sind als wiederkehrende, kürzere Arbeitsepisoden in der Freizeit. Die Vorhersehbarkeit von Arbeitsanforderungen wurde als Ressource beschrieben, welche die negativen psychologischen Konsequenzen von Arbeitsbelastungen mildert (Mohr & Wolfram, 2010; Rosen et al., 2020).

Stärken meiner Studien

Neben den neuen Erkenntnissen hat meine Arbeit weitere Stärken, jedoch auch Schwächen. Zu den Stärken zählen die angewandten Methoden. Zur Ermittlung der psychologischen Implikationen von Arbeiten in der Freizeit habe ich mich für eine Methode der Evidenzsynthese entschieden, da in den letzten Jahren viele empirische Studien zu diesem

Trendthema publiziert wurden. In einem systematischen Review wird mittels eines reproduzierbaren und transparenten Prozesses relevante Primärforschung gesucht, gewählt und kritisch bewertet (Centre for Reviews and Dissemination, University of York, 2009). Nur durch Zusammenführung der Ergebnisse mehrerer Primärstudien war es möglich, ansonsten verborgen gebliebene Muster psychologischer Zusammenhängen aufzudecken (siehe auch Daniels, 2019): die unterschiedlichen Implikationen von Verfügbarkeitserwartungen und Verhalten (Manuskript 1) sowie die des wiederkehrenden und kontinuierlichen Arbeitens in der Freizeit (Manuskript 2). Bei Manuskript 3 und 4 habe ich mich für die Durchführung einer Tagebuchstudie entschieden, da diese für die Testung kurzfristiger intrapersonaler Effekte in natürlichen Arbeitssettings geeignet ist (Ohly et al., 2010). Zudem können im Tagebuch-design die psychologischen Zustände am selben Tag jedoch in getrennten Fragebögen erfragt werden, was Probleme im Zusammenhang mit der Varianz bei gemeinsamen Methoden (Common-method variance; Podsakoff et al., 2003) für die statistischen Analysen deutlich reduziert (Ohly et al., 2010).

Schwächen meiner Studien und Ausblick

Eine Schwäche meiner Arbeit besteht darin, dass ich psychologische Mechanismen zur Wirkung von Arbeiten in der Freizeit auf Wohlbefindensindikatoren sowie von Unvorhersehbarkeit auf Stressgefühle zwar theoretisch postuliere, jedoch nicht empirisch zeigen konnte. Erstens wirken sich Verfügbarkeitserwartungen wahrscheinlich deshalb negativ auf das Wohlbefinden aus, weil diese zu extrinsischer Arbeitsmotivation führen. Extrinsisch motiviertes Verhalten wird aus externen Gründen gezeigt, etwa um Lob und Anerkennung zu erhalten oder um die Enttäuschung anderer zu vermeiden (Gagné & Deci, 2005) und wirkt sich negativ auf das Wohlbefinden der Beschäftigten aus (Deci et al., 2017).

Zweitens wirkt sich wiederkehrendes Arbeiten in der Freizeit theoretisch negativ auf das Wohlbefinden aus, weil dieses zu wiederholten Unterbrechungen des Privatlebens führt (Kossek et al., 2012) und so Stress verursacht (Blank et al., 2020; Van Den Berg et al., 1996). Drittens führt kontinuierliches Arbeiten in der Freizeit wahrscheinlich deshalb zu kognitiven Gewinnen, da dieses spezielle Arbeitssetting eine tiefe Auseinandersetzung mit der Arbeitsaufgabe zulässt, was die Leistung (Resick et al., 2014) und folglich auch die kognitiven Ressourcen steigert (e.g., Selbstwirksamkeitserwartungen; Bandura, 1982). Viertens habe ich theoretisch argumentiert, dass Arbeitsunvorhersehbarkeit das Gefühl der Kontrolle und die Chancen auf Erfolg verringert sowie die mentale Arbeitsbelastung der Beschäftigten erhöht. Künftige Forschung hat die Aufgabe empirische Belege für die diese theoretischen Argumente zu finden um diese zu untermauern.

Um weitere valide Aussagen zu den psychologischen Implikationen der Entgrenzung zwischen Arbeit und Freizeit treffen zu können ist es notwendig, in zukünftigen Forschungsarbeiten auch die anderen temporalen Eigenschaften des Arbeitens in der Freizeit zu beachten (siehe Navarro et al., 2015; Roe, 2008). Diese umfassen neben den zeitlichen Verhaltensmustern Kontinuität und Wiederholung auch den Zeitpunkt des erstmaligen Auftretens, die Dauer des Auftretens über die Zeit, die Stabilität bzw. Instabilität des Auftretens über die Zeit, das Wachstum bzw. die Abnahme der Intensität über die Zeit sowie das zeitliche Verhältnis der kausalen Beziehungen zu anderen psychologischen Phänomenen und Zuständen (Roe, 2008).

Um mehr über den zeitgenössischen Arbeitsstressor der Arbeitsunvorhersehbarkeit und seine psychologischen Implikationen zu erfahren ist es wichtig, auch andere mögliche Ausprägungen von Arbeitsunvorhersehbarkeit (e.g., zeitliche Unsicherheit, Unsicherheit hinsichtlich möglicher Kollaborationen) sowie die Beziehung von Arbeitsunvorhersehbarkeit

zu Motivation zu untersuchen. Da Beschäftigte Arbeitsunvorhersehbarkeit mit einem Mangel an Kontrolle oder geringen Erfolgserwartungen in Verbindung bringen könnten wird weder das Bedürfnis nach Autonomie noch das Bedürfnis nach Kompetenz befriedigt. Die Erfüllung dieser Bedürfnisse ist jedoch entscheidende Voraussetzung für die Entwicklung intrinsischer Arbeitsmotivation (Deci et al., 2017).

Schließlich ist in Zukunft auch noch die Frage zu klären, wie sich die zwei getrennt voneinander untersuchten Merkmale zeitgenössischer Wissensarbeit—Entgrenzung und Unvorhersehbarkeit—zueinander verhalten. Wie oben argumentiert könnte Arbeitsunvorhersehbarkeit zur psychischen Arbeitslast der Beschäftigten beitragen. Und je mehr Arbeitslast die Beschäftigten wahrnehmen, desto eher arbeiten sie in der Freizeit (Bowen et al., 2018; Glavin & Schieman, 2012; Kelliher & Anderson, 2010) oder grübeln in ihrer Freizeit über die Arbeit (Smit & Barber, 2016).

Literaturverzeichnis

Allvin, M., Aronsson, G., Hagström, T., Johansson, G., & Lundberg, U. (2011). *Work without boundaries: Psychological perspectives on the new working life*. John Wiley & Sons.

Allvin, M., Mellner, C., Movitz, F., & Aronsson, G. (2013). The diffusion of flexibility: Estimating the incidence of low-regulated working conditions. *Nordic Journal of Working Life Studies*, *3*, 99–116.

Altreiter, C., Astleithner, F., & Flecker, J. (2016). Arbeitszeit(en) im Wandel. In J. Fritz & N. Tomaschek (Hrsg.), *Gesellschaft im Wandel: Gesellschaftliche, wirtschaftliche und ökologische Perspektiven* (S. 15–28). Waxmann.

Arlinghaus, A., & Nachreiner, F. (2013). When work calls—Associations between being contacted outside of regular working hours for work-related matters and health. *Chronobiology International*, *30*, 1197–1202. https://doi.org/10.3109/07420528.2013.800089

Arlinghaus, A., & Nachreiner, F. (2014). Health effects of supplemental work from home in the European Union. *Chronobiology International*, *31*, 1100–1107. https://doi.org/10.3109/07420528.2014.957297

Ashforth, B. E., Kreiner, G. E., & Fugate, M. (2000). All in a day's work: Boundaries and micro role transitions. *Academy of Management Review*, *25*, 472–491. https://doi.org/10.5465/amr.2000.3363315

Baethge, A., & Rigotti, T. (2013). Interruptions to workflow: Their relationship with irritation and satisfaction with performance, and the mediating roles of time pressure and mental demands. *Work and Stress*, *27*, 43–63. https://doi.org/10.1080/02678373.2013.761783

Bakker, A. B., & Demerouti, E. (2013). The spillover-crossover model. In J. G. Grzywacz & E. Demerouti (Hrsg.), *New frontiers in work and family research* (S. 54–71). Psychology Press.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37*, 122–147. https://doi.org/10.1037/0003-066X.37.2.122

Beerheide, E., & Katenkamp, O. (2011). Wissensarbeit im Innovationsprozess. In J. Howaldt, R. Kopp, & E. Beerheide (Hrsg.), *Innovationsmanagement 2.0* (S. 67–99). Gabler. https://doi.org/10.1007/978-3-8349-6743-5_4

Blank, C., Zaman, S., Wesley, A., Tsiamyrtzis, P., Da Cunha Silva, G., Gutierrez-Osuna, R., Mark, G., & Pavlidis, I. (2020). Emotional footprints of email interruptions. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 1–12. https://doi.org/10.1145/3290605.3300898

Bodenmann, G. (1997). Dyadic coping: A systemic-transactional view of stress and coping among couples: Theory and empirical findings. *Revue Européenne de Psychologie Appliquée, 47*, 137–140.

Bowen, P., Govender, R., Edwards, P., & Cattell, K. (2018). Work-related contact, work–family conflict, psychological distress and sleep problems experienced by construction professionals: An integrated explanatory model. *Construction Management and Economics, 36*, 153–174. https://doi.org/10.1080/01446193.2017.1341638

Brosschot, J. F., & Thayer, J. F. (1998). Anger inhibition, cardiovascular recovery, and vagal function: A model of the link between hostility and cardiovascular disease. *Annals of Behavioral Medicine, 20*, 326–332. https://doi.org/10.1007/BF02886382

Cascio, W. F., & Montealegre, R. (2016). How technology is changing work and organizations. *Annual Review of Organizational Psychology and Organizational Behavior*, *3*, 349–375. https://doi.org/10.1146/annurev-orgpsych-041015-062352

Centre for Reviews and Dissemination, University of York. (2009). *Systematic reviews: CRD's guidance for undertaking reviews in healthcare*. Centre for Reviews and Dissemination, University of York.

cnet.com. (2017). *iPhone 2007, meet 2017: Using the original, 10 years later*. https://www.cnet.com/news/using-the-2007-iphone-in-2017/

Cotton, P., & Hart, P. M. (2003). Occupational wellbeing and performance: A review of organisational health research. *Australian Psychologist*, *38*, 118–127. https://doi.org/10.1080/00050060310001707117

Cropley, M., Dijk, D.-J., & Stanley, N. (2006). Job strain, work rumination, and sleep in school teachers. *European Journal of Work and Organizational Psychology*, *15*, 181–196. https://doi.org/10.1080/13594320500513913

Cropley, M., Zijlstra, F. R. H., Querstret, D., & Beck, S. (2016). Is work-related rumination associated with deficits in executive functioning? *Frontiers in Psychology*, *7*, Article 1524. https://doi.org/10.3389/fpsyg.2016.01524

Daniels, K. (2019). Guidance on conducting and reviewing systematic reviews (and meta-analyses) in work and organizational psychology. *European Journal of Work and Organizational Psychology, 28*(1), 1–10. https://doi.org/10.1080/1359432X.2018.1547708

Danner-Vlaardingerbroek, G., Kluwer, E. S., Van Steenbergen, E. F., & Van Der Lippe, T. (2013). Knock, knock, anybody home? Psychological availability as link between

work and relationship. *Personal Relationships*, *20*, 52–68. https://doi.org/10.1111/j.1475-6811.2012.01396.x

Day, A., Paquet, S., Scott, N., & Hambley, L. (2012). Perceived information and communication technology (ICT) demands on employee outcomes: The moderating effect of organizational ICT support. *Journal of Occupational Health Psychology*, *17*, 473–491. https://doi.org/10.1037/a0029837

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*, *19*, 2283–2301. https://doi.org/10.1007/s10902-017-9922-6

Deci, E. L., Olafsen, A. H., & Ryan, R. M. (2017). Self-determination theory in work organizations: The state of a science. *Annual Review of Organizational Psychology and Organizational Behavior*, *4*, 19–43. https://doi.org/10.1146/annurev-orgpsych-032516-113108

Dettmers, J., Bamberg, E., & Seffzek, K. (2016). Characteristics of extended availability for work: The role of demands and resources. *International Journal of Stress Management*, *23*, 276–297. https://doi.org/10.1037/str0000014

Donahue, E. G., Forest, J., Vallerand, R. J., Lemyre, P.-N., Crevier-Braud, L., & Bergeron, É. (2012). Passion for work and emotional exhaustion: The mediating role of rumination and recovery. *Applied Psychology: Health and Well-Being*, *4*, 341–368. https://doi.org/10.1111/j.1758-0854.2012.01078.x

Ďuranová, L., & Ohly, S. (2016). *Persistent work-related technology use, recovery and well-being processes*. Springer International Publishing. http://link.springer.com/10.1007/978-3-319-24759-5

Duxbury, L., Higgins, C., Smart, R., & Stevenson, M. (2014). Mobile technology and boundary permeability. *British Journal of Management*, *25*, 570–588. https://doi.org/10.1111/1467-8551.12027

Duxbury, L., & Smart, R. (2011). The "myth of separate worlds": An exploration of how mobile technology has redefined work-life balance. In S. Kaiser, M. J. Ringlstetter, D. R. Eikhof, & M. Pina e Cunha (Hrsg.), *Creating Balance?* (S. 269–284). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-16199-5_15

Emerson, R. M. (1976). Social exchange theory. *Annual Review of Sociology*, *2*, 335–362.

Eurofound. (2021). *Right to disconnect: Exploring company practices*. Publications Office of the European Union. https://data.europa.eu/doi/10.2806/748556

European Foundation for the Improvement of Living and Working Conditions. (2017). *Sixth European Working Conditions survey – Overview report (2017 update)*. Publications Office of the European Union. https://data.europa.eu/doi/10.2806/422172

Falconier, M. K., & Kuhn, R. (2019). Dyadic coping in couples: A conceptual integration and a review of the empirical literature. *Frontiers in Psychology*, *10*, article 571. https://doi.org/10.3389/fpsyg.2019.00571

Fender, C. M. (2010). *Electronic tethering: Perpetual wireless connectivity to the organization*. Drexel University.

Feuchtl, S., Hartner-Tiefenthaler, M., & Koeszegi, S. (2016). Erreichbarkeit außerhalb der Arbeitszeit: Ergebnisse einer quantitativen Fragebogenstudie in Niederösterreich. *WISO*, *39*, 69–82.

Flecker, J., & Schönauer, A. (2016). The production of "placelessness"—Digital service activities in global value chains. In J. Flecker (Hrsg.), *Space, place and global digital work* (S. 11–30). Palgrave Macmillan.

Flovik, L., Knardahl, S., & Christensen, J. O. (2019). How leadership behaviors influence the effects of job predictability and perceived employability on employee mental health – A multilevel, prospective study. *Scandinavian Journal of Work, Environment & Health*, *45*, 134–145. https://doi.org/10.5271/sjweh.3880

Frese, M., & Zapf, D. (1988). Methodological issues in the study of work stress: Objective vs. subjective measurement and the question of longitudinal studies. In C. L. Cooper & R. Payne (Hrsg.), *Causes, coping and consequences of stress at work* (S. 375–411). Wiley. http://doi.wiley.com/10.1002/smi.2460050217

Fritz, C., & Sonnentag, S. (2006). Recovery, well-being, and performance-related outcomes: The role of workload and vacation experiences. *Journal of Applied Psychology*, *91*, 936–945. https://doi.org/10.1037/0021-9010.91.4.936

Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, *26*, 331–362. https://doi.org/10.1002/job.322

Geurts, S. A. E., & Sonnentag, S. (2006). Recovery as an explanatory mechanism in the relation between acute stress reactions and chronic health impairment. *Scandinavian Journal of Work, Environment & Health*, *32*, 482–492. https://doi.org/10.5271/sjweh.1053

Glavin, P., & Schieman, S. (2012). Work–family role blurring and work–family conflict: The moderating influence of job resources and job demands. *Work and Occupations*, *39*, 71–98. https://doi.org/10.1177/0730888411406295

Gombert, L., Konze, A.-K., Rivkin, W., & Schmidt, K.-H. (2018). Protect your sleep when work is calling: How work-related smartphone use during non-work time and sleep quality impact next-day self-control processes at work. *International Journal of*

Environmental Research and Public Health, *15*, 1757. https://doi.org/10.3390/ijerph15081757

Green, S. G., Bull Schaefer, R. A., MacDermid, S. M., & Weiss, H. M. (2011). Partner reactions to work-to-family conflict: Cognitive appraisal and indirect crossover in couples. *Journal of Management*, *37*, 744–769. https://doi.org/10.1177/0149206309349307

Greenhaus, J. H., & Beutell, N. J. (1985). Sources of conflict between work and family roles. *The Academy of Management Review*, *10*, 76. https://doi.org/10.2307/258214

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.

Hobday, M. (2000). The project-based organisation: An ideal form for managing complex products and systems? *Research Policy*, *29*, 871–893. https://doi.org/10.1016/S0048-7333(00)00110-4

Holtgrewe, U. (2014). New new technologies: The future and the present of work in information and communication technology: The future and present of work in ICT. *New Technology, Work and Employment*, *29*, 9–24. https://doi.org/10.1111/ntwe.12025

Ilies, R., Dimotakis, N., & De Pater, I. E. (2010). Psychological and physiological reactions to high workloads: Implications for well-being. *Personnel Psychology*, *63*, 407–436. https://doi.org/10.1111/j.1744-6570.2010.01175.x

Institut zur Zukunft der Arbeit (IZA), & XING. (2018). *Neue Arbeitswelt: Arbeitszeitgesetz verliert an Bedeutung*. https://newsroom.iza.org/wp-content/uploads/2018/05/IZA-PM_20180306.pdf

Kalleberg, A. L. (2001). Organizing flexibility: The flexible firm in a new century. *British Journal of Industrial Relations, 39*, 479–504. https://doi.org/10.1111/1467-8543.00211

Kelliher, C., & Anderson, D. (2010). Doing more with less? Flexible working practices and the intensification of work. *Human Relations, 63*, 83–106. https://doi.org/10.1177/0018726709349199

Kenny, D. A., & Ledermann, T. (2010). Detecting, measuring, and testing dyadic patterns in the actor–partner interdependence model. *Journal of Family Psychology, 24*, 359–366. https://doi.org/10.1037/a0019651

Kim, S., & Hollensbe, E. (2017). When work comes home: Technology-related pressure and home support. *Human Resource Development International*, 1–16. https://doi.org/10.1080/13678868.2017.1366177

King, D. B., & DeLongis, A. (2014). When couples disconnect: Rumination and withdrawal as maladaptive responses to everyday stress. *Journal of Family Psychology, 28*, 460–469. https://doi.org/10.1037/a0037160

Kinnunen, U., Rantanen, J., de Bloom, J., Mauno, S., Feldt, T., & Korpela, K. (2016). The role of work–nonwork boundary management in work stress recovery. *International Journal of Stress Management, 23*, 99–123. https://doi.org/10.1037/a0039730

Kirkegaard Thomsen, D. (2006). The association between rumination and negative affect: A review. *Cognition & Emotion, 20*, 1216–1235. https://doi.org/10.1080/02699930500473533

Korunka, C., & Hoonakker, P. (Hrsg.). (2014). *The impact of ICT on quality of working life*. Springer Press.

Korunka, C., & Kubicek, B. (2017). *Job demands in a changing world of work*. Springer International Publishing. https://doi.org/10.1007/978-3-319-54678-0_1

Kossek, E. E., Ruderman, M. N., Braddy, P. W., & Hannum, K. M. (2012). Work–nonwork boundary management profiles: A person-centered approach. *Journal of Vocational Behavior, 81*, 112–128. https://doi.org/10.1016/j.jvb.2012.04.003

Krause, A., Baeriswyl, S., Berset, M., Deci, N., Dettmers, J., Dorsemagen, C., Meier, W., Schraner, S., Stetter, B., & Straub, L. (2015). Selbstgefährdung als Indikator für Mängel bei der Gestaltung mobil-flexibler Arbeit: Zur Entwicklung eines Erhebungsinstruments. *Wirtschaftspsychologie*, *17*, 49–59.

Krenn, M., Flecker, J., & Stary, C. (2003). IKT und neue Formen der Arbeitsorganisation. *Wirtschaft Und Gesellschaft, 29. Jahrgang, Heft 3*.

Kubicek, B., Paškvan, M., & Korunka, C. (2015). Development and validation of an instrument for assessing job demands arising from accelerated change: The intensification of job demands scale (IDS). *European Journal of Work and Organizational Psychology, 24*, 898–913. https://doi.org/10.1080/1359432X.2014.979160

Lanaj, K., Johnson, R. E., & Barnes, C. M. (2014). Beginning the workday yet already depleted? Consequences of late-night smartphone use and sleep. *Organizational Behavior and Human Decision Processes, 124*, 11–23. https://doi.org/10.1016/j.obhdp.2014.01.001

Lanaj, K., Johnson, R. E., & Lee, S. M. (2016). Benefits of transformational behaviors for leaders: A daily investigation of leader behaviors and need fulfillment. *Journal of Applied Psychology, 101*, 237–251. https://doi.org/10.1037/apl0000052

Lavie, N., Hirst, A., de Fockert, J. W., & Viding, E. (2004). Load theory of selective attention and cognitive control. *Journal of Experimental Psychology: General*, *133*, 339–354. https://doi.org/10.1037/0096-3445.133.3.339

Lundin, R. A., & Söderholm, A. (1995). A theory of the temporary organization. *Scandinavian Journal of Management*, *11*, 437–455. https://doi.org/10.1016/0956-5221(95)00036-U

March, J. G. (1991). Exploration and Exploitation in Organizational Learning. *Organization Science*, *2*, 71–87. https://doi.org/10.4337/9781849807630.00024

Martin, L. L., & Tesser, A. (1996). Some ruminative thoughts. In R. S. Wyer (Hrsg.), *Ruminative thoughts* (S. 1–46). Lawrence Erlbaum.

Mazmanian, M., Orlikowski, W. J., & Yates, J. (2013). The autonomy paradox: The implications of mobile eEmail devices for knowledge professionals. *Organization Science*, *24*, 1337–1357. https://doi.org/10.1287/orsc.1120.0806

Meier, L. L., & Cho, E. (2019). Work stressors and partner social undermining: Comparing negative affect and psychological detachment as mechanisms. *Journal of Occupational Health Psychology*, *24*, 359–372. https://doi.org/10.1037/ocp0000120

Meier, L. L., Cho, E., & Dumani, S. (2016). The effect of positive work reflection during leisure time on affective well-being: Results from three diary studies. *Journal of Organizational Behavior*, *37*, 255–278. https://doi.org/10.1002/job.2039

Meijman, T. F., & Mulder, G. (1998). Psychological aspects of workload. In P. J. D. Drenth & H. Thierry (Hrsg.), *Handbook of work and organizational psychology, vol. 2: Work psychology* (S. 5–33). Psychology Press.

Messenger, J. C., & Gschwind, L. (2016). Three generations of telework: New ICTs and the (r)evolution from home office to virtual office. *New Technology, Work and Employment*, *31*, 195–208. https://doi.org/10.1111/ntwe.12073

Meurs, J. A., & Perrewé, P. L. (2011). Cognitive activation theory of stress: An integrative theoretical approach to work stress. *Journal of Management*, *37*, 1043–1068. https://doi.org/10.1177/0149206310387303

Meyer, E., Schöllbauer, J., & Korunka, C. (2021). Research perspectives from job control to flexibility: Historical outline, depiction of risks, and implications for future research. In C. Korunka (Hrsg.), *Flexible working practices and approaches* (S. 1–17). Springer International Publishing. https://doi.org/10.1007/978-3-030-74128-0_1

Michl, L. C., McLaughlin, K. A., Shepherd, K., & Nolen-Hoeksema, S. (2013). Rumination as a mechanism linking stressful life events to symptoms of depression and anxiety: Longitudinal evidence in early adolescents and adults. *Journal of Abnormal Psychology*, *122*, 339–352. https://doi.org/10.1037/a0031994

Midler, C. (1995). "Projectification" of the firm: The renault case. *Scandinavian Journal of Management*, *11*, 363–375. https://doi.org/10.1016/0956-5221(95)00035-T

Mohr, G., & Wolfram, H.-J. (2010). Stress among managers: The importance of dynamic tasks, predictability, and social support in unpredictable times. *Journal of Occupational Health Psychology*, *15*, 167–179. https://doi.org/10.1037/a0018892

Muthén, L. K., & Muthén, B. O. (2017). *Mplus user's guide (8th edition)*. Muthén & Muthén.

Navarro, J., Roe, R. A., & Artiles, M. I. (2015). Taking time seriously: Changing practices and perspectives in work/organizational psychology. *Revista de Psicología Del Trabajo y de Las Organizaciones*, *31*, 135–145. https://doi.org/10.1016/j.rpto.2015.07.002

Nieto-Rodriguez, A., & Buliga, D. (2004). *Nieto-Rodriguez et al. 2004_Boosting Business Performance through Programme and Project Management.pdf*. PriceWaterhouseCoopers.

Nippert-Eng, C. (1996). Calendars and keys: The classification of "home" and "work." *Sociological Forum*, *11*, 563–582. https://doi.org/10.1007/BF02408393

Ohly, S., Sonnentag, S., Niessen, C., & Zapf, D. (2010). Diary studies in organizational research: An introduction and some practical recommendations. *Journal of Personnel Psychology*, *9*, 79–93. https://doi.org/10.1027/1866-5888/a000009

Pangert, B., & Schüpbach, H. (2014). Auswirkungen arbeitsbezogener erweiterter Erreichbarkeit auf Gesundheit und Life-Domain-Balance von Beschäftigten. *Wirtschaftspsychologie*, *4*, 73–82.

Park, J.-C., Kim, S., & Lee, H. (2020). Effect of work-related smartphone use after work on job burnout: Moderating effect of social support and organizational politics. *Computers in Human Behavior*, Advance online publication. https://doi.org/10.1016/j.chb.2019.106194

Piszczek, M. M. (2017). Boundary control and controlled boundaries: Organizational expectations for technology use at the work-family interface: Boundary Control or Controlled Boundaries? *Journal of Organizational Behavior*, *38*, 592–611. https://doi.org/10.1002/job.2153

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

Poethke, U., Klasmeier, K. N., Diebig, M., Hartmann, N., & Rowold, J. (2019). Entwicklung eines Fragebogens zur Erfassung zentraler Merkmale der Arbeit 4.0. *Zeitschrift für Arbeits- und Organisationspsychologie A&O*, *63*(3), 129–151. https://doi.org/10.1026/0932-4089/a000298

Praeg, C.-P., & Bauer, W. (2017). Vom Zukunftstrend zum Arbeitsalltag 4.0: Die Zukunft der Arbeit im Spannungsfeld von Work-Life-Separation und Work-Life-Integration. In W. Jochmann, I. Böckenholt, & S. Diestel (Hrsg.), *HR-Exzellenz* (S. 165–185). Springer. https://doi.org/10.1007/978-3-658-14725-9_10

Pravettoni, G., Cropley, M., Leotta, S. N., & Bagnara, S. (2007). The differential role of mental rumination among industrial and knowledge workers. *Ergonomics*, *50*, 1931–1940. https://doi.org/10.1080/00140130701676088

Prem, R. (2017). The effects of a changing world of work on daily working life. In C. Korunka & B. Kubicek (Hrsg.), *Job demands in a changing world of work* (S. 111–129). Springer International Publishing. https://doi.org/10.1007/978-3-319-54678-0_7

Prem, R., Kubicek, B., Uhlig, L., Baumgartner, V., & Korunka, C. (2021). Development and initial validation of a scale to measure cognitive demands of flexible work. *Frontiers in Psychology*, *12*, 679471. https://doi.org/10.3389/fpsyg.2021.679471

Pyöriä, P. (2005). The concept of knowledge work revisited. *Journal of Knowledge Management*, *9*, 116–127. https://doi.org/10.1108/13673270510602818

Querstret, D., & Cropley, M. (2013). Assessing treatments used to reduce rumination and/or worry: A systematic review. *Clinical Psychology Review*, *33*, 996–1009. https://doi.org/10.1016/j.cpr.2013.08.004

Rau, R., & Göllner, M. (2019). Erreichbarkeit gestalten, oder doch besser die Arbeit?. *Zeitschrift für Arbeits- und Organisationspsychologie, 63*, 1–14. https://doi.org/10.1026/0932-4089/a000284

Reich, R. B. (1996). *Die neue Weltwirtschaft: Das Ende der nationalen Ökonomie*. Büchergilde Gutenberg.

Resick, C. J., Murase, T., Randall, K. R., & DeChurch, L. A. (2014). Information elaboration and team performance: Examining the psychological origins and environmental contingencies. *Organizational Behavior and Human Decision Processes, 124*, 165–176. https://doi.org/10.1016/j.obhdp.2014.03.005

Rodríguez-Muñoz, A., Sanz-Vergel, A. I., Antino, M., Demerouti, E., & Bakker, A. B. (2018). Positive experiences at work and daily recovery: Effects on couple's well-being. *Journal of Happiness Studies, 19*, 1395–1413. https://doi.org/10.1007/s10902-017-9880-z

Roe, R. A. (2008). Time in applied psychology: The study of "what happens" rather than "what is." *European Psychologist, 13*, 37–52. https://doi.org/10.1027/1016-9040.13.1.37

Rogers, S. J., & May, D. C. (2003). Spillover between marital quality and job satisfaction: Long-term patterns and gender differences. *Journal of Marriage and Family, 65*, 482–495. https://doi.org/10.1111/j.1741-3737.2003.00482.x

Rosen, C. C., Dimotakis, N., Cole, M. S., Taylor, S. G., Simon, L. S., Smith, T. A., & Reina, C. S. (2020). When challenges hinder: An investigation of when and how challenge stressors impact employee outcomes. *Journal of Applied Psychology, 105*, 1181–1206. https://doi.org/10.1037/apl0000483

Schier, M., Jurczyk, K., & Szymenderski, P. (2011). Entgrenzung von Arbeit und Familie – mehr als Prekarisierung. *WSI-Mitteilungen, 64*, 402–408. https://doi.org/10.5771/0342-300X-2011-8-402

Schlachter, S. (2017). *Voluntary work-related ICT use during non-work time: Its antecedents and consequences for employee recovery and well-being* [University of Surrey]. http://epubs.surrey.ac.uk/845728/1/eThesis_final_Svenja%20Schlachter_Feb%202018.pdf

Schlachter, S., McDowall, A., Cropley, M., & Inceoglu, I. (2018). Voluntary work-related technology use during non-work time: A narrative synthesis of empirical research and research agenda. *International Journal of Management Reviews*, *20*, 825–846. https://doi.org/10.1111/ijmr.12165

Schoellbauer, J., Hartner-Tiefenthaler, M., & Kelliher, C. (eingereicht). Gain vs. Strain: A systematic literature review on two patterns of technology-based work extending behaviours and their implications for wellbeing. *Journal of Occupational and Organizational Psychology*. https://doi.org/10.1007/978-3-030-74128-0_8

Schoellbauer, J., Sonnentag, S., Prem, R., & Korunka, C. (2021). I'd rather know what to expect... Work unpredictability as contemporary work stressor with detrimental implications for employees' daily wellbeing. *Work & Stress, Advance online publication*. https://doi.org/10.1080/02678373.2021.1976881

Schoellbauer, J., Tement, S., & Korunka, C. (eingereicht). Honey, there's something on my mind... Adverse consequences of negative and positive work rumination on attention to the partner, and the advantage of talking about it. *Journal of Happiness Studies*.

Scholarios, D., Hesselgreaves, H., & Pratt, R. (2017). Unpredictable working time, well-being and health in the police service. *The International Journal of Human Resource Management, 28*, 2275–2298. https://doi.org/10.1080/09585192.2017.1314314

Schöllbauer, J., Hartner-Tiefenthaler, M., & Kelliher, C. (2021). ICT-enabled work extension and its consequences: A paradoxical situation between high performance and low wellbeing. In C. Korunka (Ed.), *Flexible working practices and approaches* (S. 149–165). Springer International Publishing. https://doi.org/10.1007/978-3-030-74128-0_8

Schoper, Y.-G., Wald, A., Ingason, H. T., & Fridgeirsson, T. V. (2018). Projectification in Western economies: A comparative study of Germany, Norway and Iceland. *International Journal of Project Management*, *36*, 71–82. https://doi.org/10.1016/j.ijproman.2017.07.008

Schyns, B., & Paul, T. (2004). Entwicklung einer Aufgabenanalyse für Fuehrungskräfte. In W. Bungard, B. Koop, & C. Liebig (Hrsg.), *Psychologie und Wirtschaft leben. Aktuelle Themen der Wirtschaftspsychologie in Forschung und Praxis* (S. 253–258). Huethig.

Segerstrom, S. C., Tsao, J. C. I., Alden, L. E., & Craske, M. G. (2006). Worry and rumination: Repetitive thought as a concomitant and predictor of negative mood. *Cognitive Therapy and Research*, *24*, 671–688. https://doi.org/10.1023/A:1005587311498

Senarathne Tennakoon, K. L. U. (2011). *Empowerment or enslavement: ICT use and work-life balance of managers and professionals*. University of Calgary.

Senarathne Tennakoon, K. L. U., da Silveira, G., & Taras, D. (2013). Drivers of context-specific ICT use across work and nonwork domains: A boundary theory perspective.

Information and Organization, *23*, 107–128. https://doi.org/10.1016/j.infoandorg.2013.03.002

Siegrist, J. (1996). Adverse health effects of high-effort/low-reward conditions. *Journal of Occupational Health Psychology*, *1*, 27–41. https://doi.org/10.1037/1076-8998.1.1.27

Smit, B. W., & Barber, L. K. (2016). Psychologically detaching despite high workloads: The role of attentional processes. *Journal of Occupational Health Psychology*, *21*, 432–442. https://doi.org/10.1037/ocp0000019

Sonnentag, S., & Bayer, U.-V. (2005). Switching off mentally: Predictors and consequences of psychological detachment from work during off-job time. *Journal of Occupational Health Psychology*, *10*, 393–414. https://doi.org/10.1037/1076-8998.10.4.393

Sonnentag, S., & Fritz, C. (2007). The recovery experience questionnaire: Development and validation of a measure for assessing recuperation and unwinding from work. *Journal of Occupational Health Psychology*, *12*, 204–221. https://doi.org/10.1037/1076-8998.12.3.204

Sonnentag, S., & Fritz, C. (2015). Recovery from job stress: The stressor-detachment model as an integrative framework. *Journal of Organizational Behavior*, *36*, 72–103. https://doi.org/10.1002/job.1924

Sonnentag, S., & Grant, A. M. (2012). Doing good at work feels good at home, but not right away: When and why perceived prosocial impact predicts positive affect. *Personnel Psychology*, *65*, 495–530. https://doi.org/10.1111/j.1744-6570.2012.01251.x

Thoemmes, J. (2013). *Organizations and working time standards: A comparison of negotiations in Europe*. Routledge. https://doi.org/10.4324/9780203067048

Ursin, H., & Eriksen, H. R. (2004). The cognitive activation theory of stress. *Psychoneuroendocrinology*, *29*, 567–592. https://doi.org/10.1016/S0306-4530(03)00091-X

Van Den Berg, P. T., Roe, R. A., Zijlstra, F. R. H., & Krediet, I. (1996). Temperamental factors in the execution of interrupted editing tasks. *European Journal of Personality*, *10*, 233–248.

Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration*, *23*, 263–280. https://doi.org/10.1037/a0032359

Wan, M., Shaffer, M. A., Lau, T., & Cheung, E. (2019). The knife cuts on both sides: Examining the relationship between cross-domain communication and work–family interface. *Journal of Occupational and Organizational Psychology*, *92*, 978–1019. https://doi.org/10.1111/joop.12284

Weigelt, O., Gierer, P., & Syrek, C. J. (2019). My mind is working overtime—Towards an integrative perspective of psychological detachment, work-related rumination, and work reflection. *International Journal of Environmental Research and Public Health*, *16*, 2987. https://doi.org/10.3390/ijerph16162987

Xie, J., Shi, Y., & Ma, H. (2017). Relationship between similarity in work-family centrality and marital satisfaction among dual-earner couples. *Personality and Individual Differences*, *113*, 103–108. https://doi.org/10.1016/j.paid.2017.03.021

Zimmer, M., & Ziehmer, H. (2019). Produktiver durch Digitalisierung? – Produktivitätsparadox und Entgrenzung von Arbeit. In B. Hermeier, T. Heupel, & S. Fichtner-Rosada (Hrsg.), *Arbeitswelten der Zukunft* (S. 87–105). Springer. https://doi.org/10.1007/978-3-658-23397-6_6

Anhang

Zusammenfassung

Flexibilisierung und Projektifizierung von Arbeit bringen nicht nur Wettbewerbsvorteile für Organisationen, sie verändern auch das Erleben und Verhalten der Beschäftigten. Erstens löst Arbeitsflexibilität die zeitlichen und örtlichen Grenzen zwischen Arbeit und Freizeit auf, und diese Entgrenzung brachte das Phänomen des technologiegestützten Arbeitens in der Freizeit hervor und verstärkte das Grübeln über die Arbeit in der Freizeit. Zweitens macht Projektifizierung die Arbeitsaufgaben und deren Durchführung zunehmend unvorhersehbar. In meiner Dissertation untersuche ich mittels eines systematischen Literaturreviews, welche Auswirkungen Arbeiten in der Freizeit auf das Wohlbefinden der Beschäftigten hat (Manuskript 1 und 2). Weiters untersuche ich mittels einer Paar-Tagebuchstudie, wie sich negatives und positives Grübeln über die Arbeit in der Freizeit auf die Aufmerksamkeit der Beschäftigten für Ihre Partner/innen und weiters auf die Beziehungszufriedenheit beider Partner/innen auswirkt (Manuskript 3). Schließlich stelle ich in Manuskript 4 Arbeitsunvorhersehbarkeit als zeitgenössischen Arbeitsstressor vor und zeige anhand der Ergebnisse einer Tagebuchstudie, dass Arbeitsunvorhersehbarkeit über eine verlängerte Stressreaktion die abendliche Ruhe und Gelassenheit der Beschäftigten verringert.

Zusammengefasst zeigen meine Ergebnisse, dass durch Entgrenzung und Arbeitsunvorhersehbarkeit die Beschäftigten noch jenseits ihrer Arbeitsstunden und -orte kognitiv, affektiv und verhaltensbezogen von ihrer Arbeit beeinflusst werden. Dieser Einfluss ist oft belastend, einige Aspekte der Entgrenzung können das Leben der Beschäftigten jedoch offenbar auch bereichern: Kontinuierliches Arbeiten in der Freizeit ist mit dem Gewinn kognitiver Ressourcen assoziiert und das Grübeln über die Arbeit in der Freizeit kann die Beziehungszufriedenheit sogar erhöhen, wenn die Partner/innen ihre arbeitsbezogenen

Gedanken miteinander austauschen und somit einen dyadischen Copingprozess starten, der den psychologischen Bund zwischen ihnen stärkt.

Englischer Abstract

Flexibilization and projectification of work do not only bring competitive advantages for organizations, they also change employees' experiences and behaviors. First, work flexibility dissolves the temporal and spatial boundaries between work and leisure, and this boundarylessness gave rise to the phenomenon of technology-enabled work outside working hours and increased rumination about work. Second, projectification makes work tasks and their execution increasingly unpredictable. In my dissertation I use a systematic literature review to examine what effects work outside working hours has on employees' wellbeing (Manuscript 1 and 2). Furthermore, I conducted a diary study among dual-earner couples to investigate how negative and positive rumination about work affect employees' attention to their partners and, in turn, the relationship satisfaction of both partners (Manuscript 3). Finally, in Manuscript 4, I present work unpredictability as a contemporary work stressor. By means of the results of a diary study I show that work unpredictability reduces employees' serenity in the evening after work via a prolonged stress response.

In summary, my results show that through boundarylessness and work unpredictability, employees are cognitively, affectively, and behaviorally influenced by their work even beyond their working hours and locations. This influence is often distressing, but some aspects of boundarylessness can apparently also enrich employees' lives: Continuous work outside working hours is associated with the gain of cognitive resources, and ruminating about work can actually increase relationship satisfaction if partners share their work-related thoughts with each other, thus starting a dyadic coping process that strengthens the psychological bond between them.

Nachdrucke der wissenschaftlichen Manuskripte

Nachdruck von Schöllbauer, Hartner-Tiefenthaler, und Kelliher (2021)

Schöllbauer, J., Hartner-Tiefenthaler, M., & Kelliher, C. (2021). ICT-enabled work extension and its consequences: A paradoxical situation between high performance and low wellbeing. In C. Korunka (Hrsg.), *Flexible Working Practices and Approaches [Flexible Arbeitspraktiken und -ansätze]* (S. 149–165). Springer International Publishing. https://doi.org/10.1007/978-3-030-74128-0_8

Chapter 8

ICT-enabled work extension and its consequences: A paradoxical situation between high performance and low wellbeing

Julia Schoellbauer, Martina Hartner-Tiefenthaler, and Clare Kelliher

Author Notes

Julia Schoellbauer, Department of Work-, Economic-, and Social Psychology, Faculty of Psychology, University of Vienna, Vienna, Austria.

Martina Hartner-Tiefenthaler, Institute of Management Science, TU Wien, Vienna, Austria.

Clare Kelliher, Cranfield School of Management, Cranfield University, Bedfordshire, UK.

Correspondence concerning this article should be addressed to Julia Schoellbauer, Department of Occupational, Economic, and Social Psychology, Faculty of Psychology, University of Vienna, Vienna, Austria. E-mail: julia.schoellbauer@univie.ac.at

Abstract

The work-related use of mobile technological devices allows workers to reach out to digital work content or to engage in job-related communications outside their working hours. ICT-enabled work extension represents a new challenge for workers and management, yet we do not know much about its consequences. We thus systematically review and synthesize empirical results on the consequences of work extending behaviors and availability expectations presented by 68 peer-reviewed pieces of literature published between 2007 and 2019. Our findings reveal a paradoxical situation: The more workers engage in work extending behaviors, the lower is their wellbeing, yet the higher is their work performance and commitment. Availability expectations are only associated with lower levels of wellbeing. We call upon future research to further investigate the mechanism leading to preferable outcomes and to consider moderating factors such as workers' motivation for ICT-enabled work extension in order to resolve this high-performance-low-wellbeing paradox.

Keywords: technology-assisted supplemental work, extended availability, work connectivity behavior after-hours, boundary between work and private life, systematic review

Introduction

Enabled via the use of information and communication technology (ICT), knowledge professionals increasingly extend work into their private time (Jarvenpaa & Lang, 2005) by staying in touch with their work outside working hours, mostly in form of e-mails (Feuchtl et al., 2016). Especially laptops and mobile devices such as smartphones allow workers to be connected with work almost anywhere and anytime (Messenger & Gschwind, 2016). Flexible working arrangements such as telework foster the extension of work into private life (Leung & Zhang, 2017; Senarathne Tennakoon et al., 2013). Consequently, the numbers of workers who extend work into their private lives have increased during the COVID-19 pandemic: In the US, 44 percent now work from home five days or more per week (in contrast to 17 percent in 2019; (Statista, 2020), and also in the EU, half of the employees work at least partly at home, and employees working from home more often report working in their free time (Eurofound, 2020).

Recent developments in the global world of work as well as the widespread use of mobile ICT devices blur the boundaries between work and private life (Wajcman et al., 2008) which, in turn, trigger a fundamental shift in how the two main life domains – work and private life – interact with each other (Golden & Geisler, 2007). Consequently, ICT-enabled work extension needs to be critically discussed and scholars as well as workers and organizations need to be aware of all potential consequences connected to this contemporary phenomenon.

A permeable boundary between work and private life has been traditionally seen critically in the literature as it easily evokes a conflict between work and private life over scarce resources such as time and energy (Kubicek & Tement, 2016; Olson-Buchanan & Boswell, 2006). Also in the public debate, a permeable boundary between the two life domains is described as detrimental for workers' wellbeing due to increased stress (i.e., prolonged

occupational strain and “smartphone-stress”). Moreover, work extension is seen as detrimental for workers’ performance due to decreased time for recovery from work (Caldwell, 2018). There seems to be a common understanding that a complete separation of work and private life is associated with workers’ optimal health and wellbeing and any deviation from it results in a deterioration of health and wellbeing, a situation we further call segmentation axiom. Correspondingly, organizations have implemented rules and restrictions to prevent their workers from dealing with work outside of working hours (Gibson, 2014).

The purpose of this systematic review is to provide more clarity around the phenomenon of ICT-enabled work extension and its consequences on the quality of workers’ lives. We extend previous attempts and answer the call for an exhaustive, theory-led and systematically protocolled review (Schlachter et al., 2018) and evaluate the existing empirical evidence of ICT-enabled work extension and its consequences from two angles: workers’ actual work extending behaviors and perceived expectations of them to remain available for work during their private time. In addition to taking stock of the current literature, we critically discuss the prevailing segmentation axiom and give implications for future research and practice.

Unraveling the broad concept of ICT-enabled work extension

ICT-enabled work extension has prompted different research approaches but still lacks a clear and widely accepted definition. In general, we define ICT-enabled work extension (in the following also referred to as work extension) as mostly unpredictable work contacts during workers’ private time which are not pre-defined. Despite the generally broad and fuzzy conceptualizations, extant research follows two broad strands: (1) workers’ ICT-enabled work extending behaviors and (2) workers’ perceived expectations of others regarding their ICT-enabled availability for work outside of working hours (i.e., during private time).

Work extending behaviors

Work extending behaviors (e.g., working on a report while commuting) refer to workers' engagement in work tasks or contacts (e.g. with co-workers, supervisors, clients) enabled by the use of ICT devices outside working hours (i.e., during private time on workdays before and after working hours or during long breaks, on nonwork days, during sick leave or during vacation) and in their private environment (see e.g., Arlinghaus & Nachreiner, 2013; Boswell & Olson-Buchanan, 2007; Fender, 2010; Fenner & Renn, 2010). Work extending behaviors are usually unpaid or at least not specifically remunerated, for example if the worker has an all in-contract or is self-employed. For the purposes of this review, our understanding of work extending behaviors does not include long working hours or overtime or other work behaviors during workers' regular working hours such as teleworking or sickness presenteeism.

Availability expectations

Availability expectations refer to the extent to which workers perceive that they need to be responsive to work-related communication outside their regular working hours or places (see e.g., Derks et al., 2015; Dettmers, 2017; Fender, 2010; Pangert & Schuepbach, 2014). Availability expectations do not necessarily refer to workers' actual behavior, but are perceived as demands and thus put pressure on workers, often leading to work extending behavior. Related concepts such as on-call work are not included here, since on-call work normally involves pre-defined times of availability and is also usually remunerated.

Systematic literature review

Our aim is to synthesize and analyze the literature about the consequences of work extension (i.e., work extending behaviors and availability expectations). To pursue this aim, and due to the heterogeneity of methodologies used in current literature, we opted for a systematic literature review. Studies looking into work extension and its outcomes have emerged in a variety of academic disciplines requiring a cross-disciplinary approach. The

systematic review involves a scientific, replicable and transparent process that selects and critically appraises relevant primary research (Centre for Reviews and Dissemination, 2009). We followed a rigorous process of analysis that considerably extends the scope of narrative reviews and minimizes biases (e.g., de Menezes & Kelliher, 2011). In order to maintain confidence in relation to the quality of evidence, we restricted our systematic review to peer-reviewed studies that reported empirical results.

Based on our definition of ICT-enabled work extension as two interacting concepts (i.e., work extending behaviors and availability expectations), we identified relevant keywords (see Table 8.1). Using these keywords, we received 214,576 records searching the multidisciplinary online databases Scopus, Web of Science and PsycINFO for literature dated from January 2007 (i.e., the launch of the iPhone; cnet.com, 2017) to April 2019. Choosing this period, we reflect on the effects of the emergence and vast distribution of smartphones in the population of first world countries. After excluding unrelated disciplines (e.g., arts, mathematics, chemistry) and keywords unlikely to be relevant (e.g., Clinic*, Disease*, School*, Teacher*) we screened 22,386 records for duplicates. In the next step, we manually screened 13,442 titles for eligibility.

[Insert Table 8.1 about here]

By reviewing 242 abstracts, we excluded articles unrelated to the use of ICT devices, such as "work-family multitasking" (Schieman & Young, 2014) or focusing on antecedents of work extension such as an organizational "always on" culture (e.g., Richardson & Benbunan-Fich, 2011) or workload (e.g., Senarathne Tennakoon et al., 2013). In order to keep the results comparable, we only integrated questionnaire studies in our review that investigated ICT-enabled work extension and its associations with indicators for wellbeing and work-related experiences on a between-person level. These studies made up the vast majority, we just

excluded seven diary studies with a day-specific within-person focus (e.g., Butts et al., 2015; Lanaj et al. 2014).

We finally identified 68 records of literature for our review, including 62 journal articles and six dissertations. Literature included in the review is marked with an asterisk in the reference list. In the foregoing text, we will refer to all records of literature as articles for reasons of simplicity. The 68 articles reported findings based on a total of 70 questionnaire studies with one (i.e., 62 studies) or more (i.e., 8 studies) measurements, which have mostly originated from the USA (32), Germany (13), Canada (9), and China (6) from various academic disciplines, mostly psychology (37), business and management sciences (29), and sociology (8). All studies reviewed collected data by means of self-report questionnaires in which participants were presented items with standardized response options.

Theoretical background of the studies

Many articles studying ICT-enabled work extension referred to popular theoretical frameworks focusing on the impact of work demands or stressors on workers' lives, such as the job demands-resources model (Bakker & Demerouti, 2007), the conservation of resources theory (e.g., Westman et al., 2005) or the work-family conflict model (e.g., Greenhaus & Beutell, 1985). Thus, ICT-enabled work extension was categorized as a work demand or stressor with a detrimental impact on workers' experiences outside of working hours and thus on their general health and wellbeing.

The majority of articles referred to the general framing models "boundary theory" (Ashforth et al., 2000) and "work/family border theory" (Clark, 2000). Both describe that individuals have multiple roles within various life domains (e.g., as a worker and as a partner) and that they try to manage the boundaries between them. However, these models do not

provide much information about the consequences workers and organizations face after letting the boundaries between working and private lives become blurred by a certain extent of work extending behaviors or availability expectations.

It can be argued that especially researchers who base their research on general frameworks such as boundary theory (Ashforth et al., 2000) implicitly accepted a segmentation axiom (which we earlier also attributed to the public debate) when formulating hypotheses that assume detrimental consequences of work extension for workers' wellbeing. In contrast, only a very limited number of studies treated work extension as a neutral phenomenon or even considered potential beneficial consequences following work extending behaviors (e.g., Fender, 2010; Kim & Hollersbe, 2017; Senarathne Tennakoon, 2011). These studies mainly draw on the work-family enrichment model (e.g., Edwards & Rothbard, 2000) which states that experiences made in one life role (i.e., work) can enrich the quality of other life roles.

ICT-enabled work extension and its consequences

We screened the articles reviewed for main effects of ICT-enabled work extending behaviors as well as availability expectations on indicators for the subjective quality of workers' lives in terms of their affect and psychological experiences. Table 8.2 and Table 8.3 provide an overview of the associated variables and their direct statistical relationships with ICT-enabled work extension. Thereby, we distinguish between positive (in the tables indicated as "pos."), negative ("neg.") or not significant ("no") main effects derived from the reviewed questionnaire studies.

Our findings draw a clear picture: On the one side, work extending behaviors as well as availability expectations have been predominantly associated negatively with wellbeing-related consequences such as a lack of recovery, psychological and physiological health problems as well as with an unbalanced interface between work and private life. These

observations reflect the public attitude on this contemporary phenomenon. On the other side, however, ICT-enabled work extending behaviors seem to be positively associated with work-related experiences such as indicators for work performance as well as commitment.

Generally negative associations with wellbeing-related consequences

There is a large body of evidence that ICT-enabled work extension comes along with a lack of recovery and sleep. More precisely, the more workers engage in work extending behaviors, the more problems they have to psychologically detach themselves from work (i.e., not thinking about work at all; e.g., Richardson & Thompson, 2012; Schieman & Young, 2010), to sleep (e.g., Barber & Jenkins, 2013; Bowen et al., 2018) and to relax outside working hours (Kinnunen et al., 2016). Moreover, they also feel less in control over their lives compared to workers who experience work extension less often (e.g., Dettmers et al., 2016; Wilson, 2013). There has been less research linking availability expectations to recovery indicators. Yet, findings yield a negative relationship between availability expectations and psychological detachment (e.g., Dettmers et al., 2016; Mellner, 2016) and workers' feeling of control over their life (Dettmers et al., 2016).

An important indicator for workers' psychological wellbeing is their negative emotional state, which can be differentiated into high activated (e.g., feelings of anger and strain) and low activated (e.g., feelings of exhaustion and fatigue; Warr et al. 2014). Empirical evidence linked extended work behaviors (e.g., Kossek et al., 2012; Bowen et al., 2018) as well as availability expectations (Barber & Santuzzi, 2015; Fender, 2010) to higher levels of workers' feelings of strain and anger. Although there was no unequivocal link to work extending behaviors, availability expectations were associated with higher levels of exhaustion (Pangert & Schuepbach, 2014; Piszczek, 2016). Feeling exhausted is also the most important indicator for occupational burnout syndrome (Maslach et al., 2001), yet the evidence regarding work

extending behaviors was less clear as nine studies showed a positive (e.g., Wepfer et al., 2018; Xie et al., 2018) and ten studies could not find any direct relationship (Glavin et al., 2011; Ohly & Latour, 2014). Another burnout indicator – cynicism or depersonalization – could not be linked to neither ICT-enabled work behaviors nor availability expectations (Day et al. 2012). Finally, physical health was negatively associated with actual work extension (e.g., Arlinghaus & Nachreiner, 2013; 2014) but not with availability expectations (e.g., Fender, 2010).

Workers' conflict between their work role and their private life roles is by far the most frequently studied consequence of ICT-enabled work extension. Thereby, most studies captured a mixture of time-based (i.e., whether work consumes too much private time) and strain-based conflict (i.e., occupational strain spills over into workers' private lives) which provokes tension regarding private relationships or responsibilities (see Greenhaus & Beutell, 1985). There is a considerable amount of empirical results that point out that work extending behaviors (e.g., Adkins & Premeaux, 2014; Albertsen et al., 2010; Leung, 2011; Palm et al., 2016) as well as availability expectations (e.g., Fender, 2010; Pangert & Schuepbach, 2014) relate to higher levels of workers' perceived work-to-nonwork conflict. Moreover, the more workers experience an actual extension of their work, the less they are satisfied with their private life (e.g., with their private relationship; e.g., Hecht & Allen, 2009; Russo et al., 2018). Yet, there was no conclusive evidence that workers' ICT-enabled work extending behaviors also relate to their partners' relationship satisfaction (Russo et al., 2018; Wilson, 2013).

[Insert Table 8.2 about here]

Generally positive associations with work-related consequences

Empirical findings unequivocally state a positive relationship between workers' extended work behaviors and their perceived creativity (Poethke et al., 2019) and professional self-efficacy (e.g., Manapragada, 2017; Shi et al., 2018) – which refers to a feeling of accomplishment, competence and productivity at work (Maslach et al., 2001). However, work extending behaviors do not seem to be considerably linked to workers' subjective task performance as most studies could not find any statistically significant relationship (Chen & Karahanna, 2018; Wilson, 2013). However, availability expectations have been linked to higher levels of task performance (Fender, 2010). Yet, they do not seem to affect workers' self-efficacy beliefs (Day et al., 2012).

All investigated indicators for workers' commitment to work have been linked positively to ICT-enabled work extending behaviors except of turnover intentions (e.g., Wright et al., 2014; 2015). In other words, the more actual work extension workers experience, the higher their job satisfaction (e.g., Moore, 2017; Rau & Göllner, 2019), job involvement (e.g., Boswell & Olson-Buchanan, 2007; Senarathne Tennakoon, 2011), affective commitment to their work (e.g., Fender, 2010; Ferguson et al., 2016), and subjective enrichment of private life due to work (e.g., "Skills developed at work helped me in my home life"; e.g., Kim & Hollersbe, 2017; Kinnunen et al., 2016). With regard to work engagement, six studies linked it positively to work extending behaviors (e.g., Barber & Santuzzi, 2015; Ragsdale & Hoover, 2016), whereas other six studies could not find any association whatsoever (e.g., Wright et al., 2014). Workers who are engaged at work have positive and fulfilling work-related experiences (Schaufeli et al., 2008) characterized by feelings of vigor, dedication, and absorption (e.g., Schaufeli et al., 2006). Work engagement further predicts positive work-related attitudes but also higher levels of wellbeing (Christian & Slaughter, 2007) or lower

levels of burnout-associated illbeing, respectively (see Schaufeli et al., 2009). Moreover, availability expectations were not or ambiguously related to indicators for work commitment.

[Insert Table 8.3 about here]

Integrative summary of findings

As can be seen in Tables 4.2 and 4.3, the vast majority of empirical studies we reviewed investigated the relationship between ICT-enabled work extending behaviors and wellbeing-indicators. A total of 128 empirical results (i.e., a share of 73% of the total of 175 results in this category) revealed a detrimental relationship between work extension and wellbeing, whereas 45 indicated no relationships (i.e., 26%) and only two a beneficial relationship (i.e., 1%). The most studied wellbeing-related associations were psychological detachment as a recovery indicator, feelings of exhaustion and fatigue as a health indicator and the subjective conflict between work and private life as an indicator for the compatibility between the two life domains.

In contrast, the studies researching the relationship between ICT-enabled work extension and work-related experiences reported mostly beneficial relationships: A total of 34 results suggested a beneficial relationship between work extension and performance or commitment indicators (i.e., a share of 58% of the total of 58 results in this category), whereas 23 indicated no (i.e., 40%) and only one showed a detrimental relationship (i.e., 2%). Workers' professional self-efficacy was the most studied performance-related association. With regard to work-related commitment, the construct of work engagement received most research attention so far.

Discussion

When we looked at our results, we found the situation we expected based on the prevailing segmentation axiom: A vast majority of studies hypothesizing, testing and finding

detrimental consequences of ICT-enabled work extension on wellbeing indicators. More precisely, most studies observed a negative relationship between work extending behaviors as well as availability expectations and workers' recovery, psychological health and the balance between their work and private lives. We found considerably less research looking into potentially neutral or positive wellbeing-related outcomes or into negative work-related consequences of work extending behaviors or availability expectations.

Surprisingly though, with regard to workers' work performance and commitment, empirical findings indicate positive consequences following work extending behaviors, such as higher levels of professional self-efficacy, work engagement, job involvement and satisfaction. Availability expectations were predominantly associated with lower levels of workers' wellbeing but not so much with higher levels of work-related variables (with the exception of one result linking it to higher subjective task performance; Fender, 2010).

These findings on work extension's detrimental consequences on wellbeing and beneficial consequences on work-related experiences such as performance and commitment are rather paradoxical, as there is a generally positive relationship between performance and wellbeing (see Cotton & Hart, 2003). For example, impaired wellbeing relates to lower job performance (Meijman & Mulder, 1998), whereas a sense of accomplishment and competence due to "good job performance" is positively associated with workers' wellbeing (e.g., Deci et al., 2017). However, we believe that this high-performance-low-wellbeing paradox can be resolved by future research by overcoming theoretical shortages and by considering potentially moderating factors such as motivation.

Implication for future research

Firstly, we advise that future research projects should be built on a sound theoretical basis in order to identify and comprehend the psychological mechanisms linking ICT-enabled work extension to wellbeing and work-related variables. Reviewing the empirical evidence, we found that the majority of previous studies on ICT-enabled work extension most likely followed an implicit principle to which we refer to as segmentation axiom. Of course, the line between single unpaid working hours and (self-)exploitation is thin, making one prone to thoughts that work extension has to foster negative consequences for workers' health and wellbeing. Nevertheless, we critically claim that many studies seem to have just assumed this detrimental link by implicitly following the segmentation axiom which was enabled due to the application of insufficient theoretical foundations of the investigated psychological processes or due to a lack of predictive power of applied theoretical frameworks, such as boundary theory (Ashforth et al., 2000). Such general frameworks describe the interplay between work and private life roles, but do not predict outcomes of permeable boundaries between them.

Secondly, we suggest that future studies should pay more attention to factors potentially moderating the relationship between ICT-enabled work extension and workers' wellbeing and work-related experiences. For example, workers' different motivations to engage in work extending behaviors could play a major role in determining whether work extension leads to good or bad outcomes (see Cooper & Lu, 2019). Thus, future research on ICT-enabled work extension and its consequences would profit from considering workers' intrinsic vs. extrinsic motivation to stay in touch with their work beyond working hours (see Cooper & Lu, 2019; Ohly & Latour, 2014). Drawing on self-determination theory (e.g., Deci & Ryan, 2000), different mental and emotional states follow different forms of motivation.

Individuals are intrinsically motivated if the reason to act already lies within themselves – or workers can at least identify themselves with a proposed reason to act, which is generally

associated with high levels of wellbeing. Accordingly, Ohly and Latour (2014) who found a positive relationship between work extending behaviors and psychological detachment for workers who were autonomously motivated and no relationship for workers who were extrinsically motivated (e.g., through availability expectations). Extrinsically regulated motivation refers to external reasons to act (e.g., instruction from the supervisor), and a lack of control is known to have detrimental effects for individuals' wellbeing (e.g., Deci & Ryan, 2000). It can be argued that perceived availability expectations promote extrinsically motivated work extending behaviors, but not intrinsically motivated work extension. However, this hypothesis has to be tested by means of future studies.

Practical implications

Based on our review, we conclude that ICT-enabled work extending behaviors should not be assessed as inherently good, but it should not be demonized either as they are associated with higher levels of performance and commitment indicators. However, availability expectations need to be treated more critically, as they seem to be detrimental to workers' wellbeing without promoting their work-related experiences. It is thus important that organizations critically reflect on their explicit or implicit availability expectations within their working teams, as well as workers' actual work extending behaviors outside working hours, in order to prevent negative consequences for workers' wellbeing. Most organizations do not have formal guidelines regulating ICT-enabled work extension into workers' private time (Hassler & Rau, 2016). Availability expectations are often not discussed within an organization, and this lack of information creates a situation of ambiguity and role uncertainty (see Katz & Kahn, 1978).

When formal organizational guidelines are missing, workers will learn about the rules and norms in an informal way by observing the actions and habits of relevant people around them

(Bandura, 1979). Therefore, to ensure a positive evaluation by their managers, workers will try to behave in a way that is in accordance with their managers' (presumed) expectations and preferences. Establishing clear and transparent availability expectations is necessary and will increase workers' satisfaction (Heissler, 2019). Thereby, organizations could clarify that they do not expect their employees to be available outside working hours at all. If, however, ICT-enabled work extension is an explicit or implicit norm within an organization, managers should reward their workers for the extra time they invest in work in order to restore an effort-reward imbalance. An effort-reward imbalance could be a potential mechanism linking ICT-enabled work extension to lower levels of wellbeing (see Siegrist, 2002). Extrinsic rewards such as money or time can further help to transfer an ambiguous "always-on" norm into a clear situation within the boundaries of a work contract.

Finally, in a life in which professional and private commitments co-exist and are both handled with the use of ICT, workers need to be the agents of their own lives and to actively regulate their connective flow between ICT-enabled work and nonwork interactions (Dery et al., 2014). In other words, workers themselves should monitor their behaviors outside working hours and actively make sure that they spend enough time away from work, behaviorally and mentally. Psychological detachment, which is significantly lower for workers that engage in ICT-enabled work extending behaviors, is an important recovery experience (Sonnentag & Fritz, 2007). Recovery experiences help workers regain the resources expended at work so that they remain healthy and vital in the future, both during and outside of work.

Conclusion

Workers' ICT-enabled work extension is a contemporary phenomenon posing a new challenge for workers and organizations. In this systematic review, we contribute to the

literature by shedding light on two aspects of this ambiguous phenomenon (i.e., work extending behaviors and availability expectations). Analyzing previous observations on the relationships between both work extending behaviors and availability expectations with the quality of workers' lives, we uncovered that previous findings sketch a paradoxical situation of high performance and low wellbeing – especially with regard to workers' actual work extending behaviors. Moreover, by critically reflecting the theoretical frameworks of the studies reviewed, we emphasize that not only the public debate, but also academic research seems to be biased by a segmentation axiom that is implicitly assuming that only a complete separation of work and private life is associated with workers' optimal health and wellbeing, without providing a sound theoretical argumentation for this assumption (although it would be self-evident to attribute the negative consequences to the lack of gratification). Future studies should challenge the prevailing segmentation axiom by putting more effort in the theoretical derivation of psychological operating mechanisms and aim to resolve the high-performance-low-wellbeing paradox by taking into account moderating factors such as workers' motivation to extend work.

References

Literature included in the review is marked with an asterisk.

*Adkins, C. L., & Premeaux, S. A. (2014). The use of communication technology to manage work-home boundaries. *Journal of Behavioral and Applied Management, 15,* 82–100.

*Albertsen, K., Persson, R., Garde, A. H., & Rugulies, R. (2010). Psychosocial determinants of work-to-family conflict among knowledge workers with boundaryless work. *Applied Psychology: Health and Well-Being, 2,* 160–181.

*Arlinghaus, A., & Nachreiner, F. (2013). When work calls – Associations between being contacted outside of regular working hours for work-related matters and health. *Chronobiology International, 30,* 1197–1202.

*Arlinghaus, A., & Nachreiner, F. (2014). Health effects of supplemental work from home in the European Union. *Chronobiology International, 31*, 1100–1107.

Ashforth, B. E., Kreiner, G. E., & Fugate, M. (2000). All in a day's work: Boundaries and micro role transitions. *Academy of Management Review, 25*, 472–491.

Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology, 22*, 309–328.

Bandura, A. (1979). Self-referent mechanisms in social learning theory. *American Psychologist, 34*, 439–441.

*Barber, L. K., & Jenkins, J. S. (2013). Creating technological boundaries to protect bedtime: Examining work-home boundary management, psychological detachment and sleep. *Stress and Health, 30*, 259–264.

*Barber, L. K., & Santuzzi, A. M. (2015). Please respond ASAP: Workplace telepressure and employee recovery. *Journal of Occupational Health Psychology, 20*, 172–189.

*Berkowsky, R. W. (2013). When you just cannot get away: Exploring the use of information and communication technologies in facilitating negative work/home spillover. *Information, Communication and Society, 16*, 519–541.

*Boswell, W. R., & Olson-Buchanan, J. B. (2007). The use of communication technologies after hours: The role of work attitudes and work-life conflict. *Journal of Management, 33*, 592–610.

*Bowen, P., Govender, R., Edwards, P., & Cattell, K. (2018). Work-related contact, work–family conflict, psychological distress and sleep problems experienced by construction

professionals: an integrated explanatory model. *Construction Management and Economics, 36*, 153–174.

Butts, M. M., Becker, W. J., & Boswell, W. R. (2015). Hot buttons and time sinks: The effects of electronic communication during nonwork time on emotions and work-nonwork conflict. *Academy of Management Journal, 58*, 763–788.

Caldwell, S. (2018, May 15). Revealed: How Britain's always-on culture is really affecting employees. *Business Advice.* https://businessadvice.co.uk/hr/employment-law/always-on-culture-affecting-employees/

Centre for Reviews and Dissemination. (2009). *Systematic reviews: CRD's guidance for undertaking reviews in healthcare*. York, UK: Centre for Reviews and Dissemination, University of York.

*Chen, A., & Karahanna, E. (2014). Boundaryless technology: Understanding the effects of technology-mediated interruptions across the boundaries between work and personal life. *AIS Transactions on Human-Computer Interaction, 6*, 16–36.

*Chen, A., & Karahanna, E. (2018). Life interrupted: The effects of technology-mediated work interruptions on work and nonwork outcomes. *MIS Quarterly, 42*, 1023-1042.

*Chen, Z., Powell, G. N., & Greenhaus, J. H. (2009). Work-to-family conflict, positive spillover, and boundary management: A person-environment fit approach. *Journal of Vocational Behavior, 74*, 82–93.

Christian, M. S., & Slaughter, J. E. (2007). Work engagement: A meta-analytical review and directions for research in an emerging area. *Academy of Management Proceedings, 2007*, 1–6.

Clark, S. C. (2000). Work/family border theory: A new theory of work/family balance. *Human relations, 53*, 747–770.

cnet.com. (2017, June 26). iPhone 2007, meet 2017: Using the original, 10 years later. *cnet.com.* https://www.cnet.com/news/using-the-2007-iphone-in-2017/

Cooper, C. L., & Lu, L. (2019). Excessive availability for work: Good or bad? Charting underlying motivations and searching for game-changers. *Human Resource Management Review, 29,* Article 100682.

Cotton, P., & Hart, P. M. (2003). Occupational wellbeing and performance: A review of organisational health research. *Australian Psychologist, 38,* 118–127.

*Day, A., Paquet, S., Scott, N., & Hambley, L. (2012). Perceived information and communication technology (ICT) demands on employee outcomes: The moderating effect of organizational ICT support. *Journal of Occupational Health Psychology*, *17*, 473–491.

De Menezes, L. M., & Kelliher, C. (2011). Flexible working and performance: A systematic review of the evidence for a business case. *International Journal of Management Reviews*, *13*, 452–474.

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.

Deci, E. L., Olafsen, A. H., & Ryan, M. R. (2017). Self-determination theory in work organizations: The state of a science. *Annual Review of Organizational Psychology and Organizational Behavior, 4*, 19–43.

*Derks, D., van Duin, D., Tims, M., & Bakker, A. B. (2015). Smartphone use and work–home interference: The moderating role of social norms and employee work engagement. *Journal of Occupational and Organizational Psychology, 88*, 155–177.

Dery, K., Kolb, D., & MacCormick, J. (2014). Working with connective flow: How smartphone use is evolving in practice. *European Journal of Information Systems, 23,* 558–570.

*Dettmers, J. (2017). How extended work availability affects well-being: The mediating roles of psychological detachment and work-family-conflict. *Work & Stress*, *31*, 24–41.

*Dettmers, J., Bamberg, E., & Seffzek, K. (2016). Characteristics of extended availability for work: The role of demands and resources. *International Journal of Stress Management, 23*, 276–297.

*Diaz, I., Chiaburu, D. S., Zimmerman, R. D., & Boswell, W. R. (2012). Communication technology: Pros and cons of constant connection to work. *Journal of Vocational Behavior*, *80*, 500–508.

Edwards, J. R., & Rothbard, N. P. (2000). Mechanisms linking work and family: Clarifying the relationship between work and family constructs. *Academy of Management Review, 25*, 178–199.

*Fender, C. M. (2010). *Electronic tethering: perpetual wireless connectivity to the organization* [Doctoral dissertation, Drexel University].

*Fenner, G. H., & Renn, R. W. (2010). Technology-assisted supplemental work and work-to-family conflict: The role of instrumentality beliefs, organizational expectations and time management. *Human Relations, 63,* 63–82.

*Ferguson, M., Carlson, D., Boswell, W., Whitten, D., Butts, M. M., & Kacmar, K. M. (2016). Tethered to work: A family systems approach linking mobile device use to turnover intentions. *Journal of Applied Psychology, 101,* 520–534.

Feuchtl, S., Hartner-Tiefenthaler, M., & Koeszegi, S. (2016). Erreichbarkeit außerhalb der Arbeitszeit: Ergebnisse einer quantitativen Fragebogenstudie in Niederösterreich [Accessibility outside working hours: Results of a quantitative questionnaire study in Lower Austria]. *WISO, 39,* 69–82.

*Gadeyne, N., Verbruggen, M., Delanoeije, J., & De Cooman, R. (2018). All wired, all tired? Work-related ICT-use outside work hours and work-to-home conflict: The role of integration preference, integration norms and work demands. *Journal of Vocational Behavior, 107*, 86–99.

Gibson, M. (2014, August 15). Here's a radical way to end vacation email overload. *Time.* https://time.com/3116424/daimler-vacation-email-out-of-office/

*Glavin, P., & Schieman, S. (2010). Interpersonal context at work and the frequency, appraisal, and consequences of boundary-spanning demands. *Sociological Quarterly, 51*, 205–225.

*Glavin, P., Schieman, S., & Reid, S. (2011). Boundary-spanning work demands and their consequences for guilt and psychological distress. *Journal of Health and Social Behavior, 52*, 43–57.

*Glavin, P., & Schieman, S. (2012). Work–family role blurring and work–family conflict: The moderating influence of job resources and job demands. *Work and Occupations, 39*, 71–98.

Golden, A. G., & Geisler, C. (2017). Work-life boundary management and the personal digital assistant. *Human Relations, 60*, 519-551.

*Gombert, L., Konze, A.-K., Rivkin, W., & Schmidt, K.-H. (2018). Protect your sleep when work is calling: How work-related smartphone use during non-work time and sleep quality impact next-day self-control processes at work. *International Journal of Environmental Research and Public Health, 15*, Article 1757.

Greenhaus, J. H., & Beutell, N. J. (1985). Sources of conflict between work and family roles. *Academy of Management Review, 10*, 76–88.

Hassler, M., & Rau, R. (2016). Ständige Erreichbarkeit: Flexibilisierungsanforderung oder Flexibilisierungsmöglichkeit. [Constant availability: Flexibility requirement or flexibility possibility]. *Wirtschaftspsychologie [Economic psychology]*, *2*, 25–34.

*Hecht, T. D., & Allen, N. J. (2009). A longitudinal examination of the work–nonwork boundary strength construct. *Journal of Organizational Behavior, 30*, 839–862.

Heissler, C. C. (2019). *Working after hours, sharing availability expectations, and interrupting yourself: Extending perspectives on ICT-related concepts in research.* [Doctoral dissertation, Universität Kassel].

*Hu, X., Santuzzi, A. M., & Barber, L. K. (2019). Disconnecting to detach: The role of impaired recovery in negative consequences of workplace telepressure. *Journal of Work and Organizational Psychology*, *35*, 9–15.

Jarvenpaa, S. L., & Lang, K. R. (2005). Managing the paradoxes of mobile technology. *Information Systems Management, 22*, 7–23.

*Jostell, D., & Hemlin, S. (2018). After hours teleworking and boundary management: Effects on work-family conflict. *Work, 60*, 475–483.

Katz, D., & Kahn, R. L. (1978). *The social psychology of organizations*. New York: Wiley.

*Kim, S., & Hollensbe, E. (2017). When work comes home: Technology-related pressure and home support. *Human Resource Development International*, *21*, 91–106.

*Kinnunen, U., Feldt, T., de Bloom, J., Sianoja, M., Korpela, K., & Geurts, S. A. E. (2017). Linking boundary crossing from work to nonwork to work-related rumination across time: A variable-and person-oriented approach. *Journal of Occupational Health Psychology*, *22*, 467–480.

*Kinnunen, U., Rantanen, J., de Bloom, J., Mauno, S., Feldt, T., & Korpela, K. (2016). The role of work–nonwork boundary management in work stress recovery. *International Journal of Stress Management, 23*, 99–123.

*Kossek, E. E., Ruderman, M. N., Braddy, P. W., & Hannum, K. M. (2012). Work–nonwork boundary management profiles: A person-centered approach. *Journal of Vocational Behavior, 81*, 112–128.

*Kotecha, K., Ukpere, W., & Geldenhuys, M. (2014). Technology and work-life conflict of academics in a South African higher education institution. *Mediterranean Journal of Social Sciences, 5*, 629–641.

Kubicek, B., & Tement, S. (2016). Work intensification and the work-home interface: The moderating effect of individual work-home segmentation strategies and organizational segmentation supplies. *Journal of Personnel Psychology, 15*, 76–89.

Lanaj, K., Johnson, R. E., & Barnes, C. M. (2014). Beginning the workday yet already depleted? Consequences of late-night smartphone use and sleep. *Organizational Behavior and Human Decision Processes, 124*, 11–23.

*Leung, L. (2011). Effects of ICT connectedness, permeability, flexibility, and negative spillovers on burnout and job and family satisfaction. *Human Technology: An Interdisciplinary Journal on Humans in ICT Environments, 7*, 250–267.

*Leung, L., & Zhang, R. (2017). Mapping ICT use at home and telecommuting practices: A perspective from work/family border theory. *Telematics and Informatics, 34*, 385–396.

*Manapragada, A. (2017). *The always on employee: The antecedents and consequences of work-related email use after hours* [Doctoral dissertation, Florida International University].

Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. *Annual Review of Psychology, 52*, 397–422.

*Matthews, R. A., Barnes-Farrell, J. L., & Bulger, C. A. (2010). Advancing measurement of work and family domain boundary characteristics. *Journal of Vocational Behavior, 77*, 447–460.

*McCloskey, D. W. (2016). Finding work-life balance in a digital age: An exploratory study of boundary flexibility and permeability. *Information Resources Management Journal, 29*, 53–70.

Meijman, T. F., & Mulder, G. (1998). Psychological aspects of workload. In P. J. D. Drenth & H. Thierry (Eds.), *A Handbook of Work and Organizational Psychology* (Vol. 2: Work psychology, pp. 5–33). Abington: Psychology Press.

*Mellner, C. (2016). After-hours availability expectations, work-related smartphone use during leisure, and psychological detachment: The moderating role of boundary control. *International Journal of Workplace Health Management, 9*, 146–164.

Messenger, J. C., & Gschwind, L. (2016). Three generations of telework: New ICTs and the (r)evolution from home office to virtual office. *New Technology, Work and Employment, 31*, 195–208.

*Moore, A. T. (2017). *Computers, cell phones, and social media: How after-hours communication impacts work–life balance and job satisfaction*. [Doctoral dissertation, Regent University].

*Ohly, S., & Latour, A. (2014). Work-related smartphone use and well-being in the evening: The role of autonomous and controlled motivation. *Journal of Personnel Psychology, 13,* 174–183.

Olson-Buchanan, J. B., & Boswell, W. R. (2006). Blurring boundaries: Correlates of integration and segmentation between work and nonwork. *Journal of Vocational Behavior, 68*, 432–445.

*Palm, E., Glaser, J., Heiden, B., Herbig, B., Kolb, S., Nowak, D., & Herr, C. (2016). Zusammenspiel von organisationalen Normen, individuellen Praeferenzen und arbeitsbezogenem Entgrenzungsverhalten [Interrelations of organizational norms, individual preferences and work-related boundary behavior]. *Wirtschaftspsychologie [Economic Psychology], 18*, 44–54.

*Pangert, B., & Schuepbach, H. (2014). Auswirkungen arbeitsbezogener erweiterter Erreichbarkeit auf Gesundheit und Life-Domain-Balance von Beschäftigten. [Consequences of work-related extended availability on health and employees‘ life-domain-balance]. *Wirtschaftspsychologie [Economic Psychology], 4*, 73–82.

*Park, Y., Fritz, C., & Jex, S. M. (2011). Relationships between work-home segmentation and psychological detachment from work: The role of communication technology use at home. *Journal of Occupational Health Psychology, 16*, 457–467.

*Park, Y., & Jex, S. M. (2011). Work-home boundary management using communication and information technology. International Journal of Stress Management, 18, 133–152.

*Piszczek, M. M. (2016). Boundary control and controlled boundaries: Organizational expectations for technology use at the work-family interface: Boundary Control or Controlled Boundaries? *Journal of Organizational Behavior, 38*, 592–611.

*Poethke, U., Klasmeier, K. N., Diebig, M., Hartmann, N., & Rowold, J. (2019). Entwicklung eines Fragebogens zur Erfassung zentraler Merkmale der Arbeit 4.0 [Development of a questionnaire to capture key characteristics of work 4.0]. *Zeitschrift für Arbeits- und Organisationspsychologie [Journal for Work and Organizational Psychology], 63*, 129–151.

*Ragsdale, J. M., & Hoover, C. S. (2016). Cell phones during nonwork time: A source of job demands and resources. *Computers in Human Behavior, 57*, 54–60.

*Rau, R., & Göllner, M. (2019). Erreichbarkeit gestalten, oder doch besser die Arbeit? [Designing accessibility, or even better the work]. *Zeitschrift für Arbeits- und Organisationspsychologie [Journal for Work and Organizational Psychology], 63*, 1–14.

Richardson, K., & Benbunan-Fich, R. (2011). Examining the antecedents of work connectivity behavior during non-work time. *Information and Organization*, *21*, 142–160.

*Richardson, K. M., & Thompson, C. A. (2012). High tech tethers and work-family conflict: A conservation of resources approach. *Engineering Management Research, 1*, 29–43.

*Rosenbloom, T., & Eldror, E. (2017). Perfectionism as a moderator of the association of work connectivity behavior after-hours (WCBA) and burnout. *North American Journal of Psychology, 19*, 461–476.

*Russo, M., Ollier-Malaterre, A., Kossek, E. E., & Ohana, M. (2018). Boundary management permeability and relationship satisfaction in dual-earner couples: The asymmetrical gender effect. *Frontiers in Psychology, 9*, article 1723.

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.

Schaufeli, W. B., Leiter, M. P., & Maslach, C. (2009). Burnout: 35 years of research and practice. *Career Development International, 14*, 202–220.

Schaufeli, W. B., Taris, T. W., & van Rhenen, W. (2008). Workaholism, burnout, and work engagement: Three of a kind or three different kinds of employee well-being? *Applied Psychology, 57*, 173–203.

*Schieman, S., & Glavin, P. (2008). Trouble at the border? Gender, flexibility at work, and the work-home interface. *Social Problems, 55*, 590–611.

*Schieman, S., & Young, M. (2010). The demands of creative work: Implications for stress in the work-family interface. *Social Science Research, 39,* 246–259.

*Schieman, S., & Young, M. (2013). Are communications about work outside regular working hours associated with work-to-family conflict, psychological distress and sleep problems? *Work & Stress, 27,* 244–261.

Schieman, S., & Young, M. (2014). Who engages in work–family multitasking? A study of Canadian and American workers. *Social Indicators Research, 120,* 741–767.

*Schlachter, S. (2017). *Voluntary work-related ICT use during non-work time: Its antecedents and consequences for employee recovery and well-being* [Doctoral dissertation, University of Surrey].

Schlachter, S., McDowall, A., Cropley, M., & Inceoglu, I. (2018). Voluntary work-related technology use during non-work time: A narrative synthesis of empirical research and research agenda. *International Journal of Management Reviews, 20,* 825–846.

*Senarathne Tennakoon, K. L. U. (2011). *Empowerment or enslavement: ICT use and work-life balance of managers and professionals* [Doctoral dissertation, Wilmington University].

Senarathne Tennakoon, K. L. U., da Silveira, G., & Taras, D. (2013). Drivers of context-specific ICT use across work and nonwork domains: A boundary theory perspective. *Information and Organization, 23,* 107–128.

*Shi, Y., Zhang, H., Xie, J., & Ma, H. (2018). Work-related use of information and communication technologies after hours and focus on opportunities: The moderating role of work-family centrality. *Current Psychology, 37,* 1–8.

Siegrist, J. (2002). Effort-reward imbalance at work and health. In P. L. Perrewe & D. C. Ganster (Eds.), *Historical and Current Perspectives on Stress and Health* (pp. 261–291). Amsterdam: JAI Elsevier.

Sonnentag, S., & Fritz, C. (2007). The recovery experience questionnaire: Development and validation of a measure for assessing recuperation and unwinding from work. *Journal of Occupational Health Psychology, 12*, 204–221.

Wajcman, J., Bittman, M., & Brown, J. E. (2008). Families without borders: Mobile phones, connectedness and work-home divisions. *Sociology, 42*, 635–652.

*Wajcman, J., Rose, E., Brown, J. E., & Bittman, M. (2010). Enacting virtual connections between work and home. *Journal of Sociology, 46*, 257–275.

*Wan, M., Shaffer, M. A., Lau, T., & Cheung, E. (2019). The knife cuts on both sides: Examining the relationship between cross-domain communication and work–family interface. *Journal of Occupational and Organizational Psychology, 92*, 978–1019.

*Wang, Z., Chen, X., & Duan, Y. (2017). Communication technology use for work at home during off-job time and work–family conflict: The roles of family support and psychological detachment. *Anales de Psicología, 33*, 93–101.

*Ward, S., & Steptoe-Warren, G. (2013). A conservation of resources approach to BlackBerry use, work-family conflict and well-being: Job control and psychological detachment from work as potential mediators. *Engineering Management Research, 3,* 8–23.

Warr, P., Bindl, U. K., Parker, S. K., & Inceoglu, I. (2014). Four-quadrant investigation of job-related affects and behaviours. *European Journal of Work and Organizational Psychology, 23*, 342–363.

*Wepfer, A. G., Allen, T. D., Brauchli, R., Jenny, G. J., & Bauer, G. F. (2018). Work-life boundaries and well-being: Does work-to-life integration impair well-being through lack of recovery? *Journal of Business and Psychology, 33*, 727–740.

Westman, M., Hobfoll, S. E., Chen, S., Davidson, O. B., & Laski, S. (2005). Organizational stress through the lens of conservation of resources (COR) theory. In P. L. Perrewé & D. C. Ganster (Eds.), *Research in Occupational Stress and Well-being* (Vol. 4, pp. 167–220). Bingley: Emerald Group Publishing Limited.

*Wilson, M. S. (2013). *Drivers and outcomes of responsiveness to technological interruptions from work during nonwork time* [Doctoral dissertation, University of Illinois].

*Wright, K. B., Abendschein, B., Wombacher, K., O'Connor, M., Hoffman, M., Dempsey, M., Krull, C., Dewes, A. & Shelton, A. (2014). Work-related communication technology use outside of regular work hours and work life conflict: The influence of communication technologies on perceived work life conflict, burnout, job satisfaction, and turnover intentions. *Management Communication Quarterly, 28*, 507–530.

*Wright, N. A., Kutschenko, K., Bush, B. A., Hannum, K. M., & Braddy, P. W. (2015). Measurement and predictive invariance of a work–life boundary measure across gender. *International Journal of Selection and Assessment, 23*, 131–148.

*Xie, J., Ma, H., Zhou, Z. E., & Tang, H. (2018). Work-related use of information and communication technologies after hours (W_ICTs) and emotional exhaustion: A mediated moderation model. *Computers in Human Behavior, 79*, 94–104.

*Yang, J., Zhang, Y., Shen, C., Liu, S., & Zhang, S. (2019). Work-family segmentation preferences and work-family conflict: Mediating effect of work-related ICT use at home and the multilevel moderating effect of group segmentation norms. *Frontiers in Psychology, 10*, article 834.

Table 8.1. Keywords used for systematic literature search

Area of interest	Keywords
1. Relation to working individuals	Employee* OR Entrepreneur* OR Laborer* OR Manager* OR Professionals OR Worker* OR "Working-individual" OR Arbeiter OR Arbeiterin* OR Arbeitnehmer* OR Angestellte* OR Berufstaetige* OR Beschaeftigte* OR Erwerbstaetige* OR Managerin* OR Unternehmer*
2. ICT-enabled connection with work	Accessib* OR "Additional-work" OR Availab* OR Border* OR Boundar* OR Call* OR Cellphone* OR "Cell-phone" OR Communic* OR Computer* OR Connect* OR Contact* OR Email* OR "E-Mail" OR Interface OR Messag* OR Messenger* OR Mobilephon* OR "Mobile-phone" OR Notebook* OR "On-call" OR Permeab* OR Phone* OR Reachab* OR Respon* OR Spillover OR "Spill-over" OR "Supplemental-work" OR Telephone* OR Smartphon* OR Socialmedia OR "Social-media" OR Technolog* OR Anruf* OR Erreichbar* OR Handy* OR Kommuni* OR Kontakt* OR Mobiltele* OR Nachrichten OR Rufbereitschaft* OR "Soziale-Medien" OR Verfuegbar*
3. Time extension of work into private life	"After-hour" OR "After-normal" OR "After-regular" OR "After-work" OR "Beyond-hours" OR "Beyond-normal" OR "Beyond-regular" OR "Beyond-work" OR Boundaryless* OR Blurr* OR Constant* OR Continu* OR "Day-off" OR "Days-off" OR Evening* OR Expand* OR Extend* OR Extension OR Family* OR "Free-time" OR Holidays OR home* OR Integrating OR Leisure* OR "Life-domain" OR Night* OR Non-work* OR "Off-work" OR Ongoing* OR "Outside-of" OR

	Permanent* OR Perpetual* OR "Private-domain" OR "Private-hours" OR "Private-life" OR "Private-time" OR Segmentation OR Segmenting OR "Sick-leave" OR Spanning OR "Time-off" OR Vacation* OR Weekend* OR Abend* OR "Ausserhalb-der-Arbeit" OR Bereitschaft* OR Durchgehend* OR Durchlaessig* OR Erweiter* OR Familie OR Feierabend* OR Freizeit* OR Grenzenlos* OR Grenzlos* OR Konstant* OR Krankenstand* OR "Nach-der-Arbeit" OR Nacht* OR Privatleben OR Privatzeit* OR Staendig* OR Urlaub* OR Wochenende*
4. Empirical studies	Analys* OR Data OR Diary OR Diaries OR Empiri* OR Examin* OR Experiment* OR Finding* OR Hypothes* OR Intervention* OR Investig* OR Interview* OR Observation* OR Questionnaire* OR Result* OR Study OR Studies OR Survey* OR Frageb* OR Studie*

The search string in each area of interest consists of English and German keywords, consecutively. All four areas of interest were linked with the command “and” in the search engines. An asterisk indicates that keywords with different endings are included in the search, a quotation mark marks a bound search string which is not to be altered by the search engine.

Table 8.2. Association between ICT-enabled work extension and wellbeing-related variables

Wellbeing-related variables	**of ICT-enabled work extending behaviors**	**of availability expectations**	**Total**
Recovery			
psychological detachment	**19 neg.**	**3 neg.**	22
sleep problems	5 no, **8 pos.**		13
feeling of control over life	**3 neg.**, 1 no	**1 neg.**	5
relaxation	**2 neg.**, 1 no		3
Psychological and physiological health			
strain and anger	8 no, **15 pos.**	1 no, **2 pos.**	26
physical health	2 no, **4 neg.**	2 no	8
exhaustion and fatigue	1 neg., 12 no, **13 pos.**	1 no, **5 pos.**	32
cynicism, interest in others	1 no	1 no	2
Balance between work and private life			
conflict between work & private life	1 neg., 3 no, **43 pos.**	2 no, **4 pos.**	53
(private) life satisfaction	**5 neg.**, 4 no		9
partner's relationship satisfaction	1 neg., 1 no		2

pos./neg. = article marked variable as significantly positive/negative consequence, no = article marked variable as not significantly associated with ICT-enabled work extension

Table 8.3. Associations between ICT-enabled work extension and work-related variables

Work-related variables	**of work extending behaviors**	**of availability expectations**	**Total**
Performance			
professional self-efficacy	**4 pos.**	1 no	5
perceived creativity	**1 pos.**		1
perceived task performance	2 no, 1 pos.	**1 pos.**	4
Commitment			
job satisfaction	2 no, **7 pos.**	1 no, 1 pos.	11
job involvement	1 no, **6 pos.**		7
commitment to work	1 no, **3 pos.**	1 no	5
enrichment of life due to work	1 no, **3 pos.**	1 no	5
work engagement	6 no, 6 pos.	1 neg., 1 no, 1 pos.	15
turnover intentions	5 no		5

pos./neg. = article marked variable as significantly positive/negative consequence, no = article marked variable as not significantly associated with ICT-enabled work extension

Nachdruck von Schoellbauer, Hartner-Tiefenthaler, und Kelliher (eingereicht)

Schoellbauer, J., Hartner-Tiefenthaler, M., & Kelliher, C. (eingereicht). Gain vs. strain: A systematic literature review on continuous vs. recurring technology-based work extending behaviours and their implications for wellbeing. *Journal of Occupational and Organizational Psychology*.

Gain vs. strain: A systematic literature review on continuous vs. recurring technology-based work extending behaviours and their implications for wellbeing

Julia Schoellbauer, Martina Hartner-Tiefenthaler, and Clare Kelliher

Author Notes

Julia Schoellbauer, Department of Work-, Economic-, and Social Psychology, Faculty of Psychology, University of Vienna, Vienna, Austria.

Martina Hartner-Tiefenthaler, Institute of Management Science, TU Wien, Vienna, Austria.

Clare Kelliher, Cranfield School of Management, Cranfield University, Bedfordshire, UK.

Correspondence concerning this article should be addressed to
Martina Hartner-Tiefenthaler, Institute of Management Science, TU Wien, Theresianumgasse 27, 1040 Vienna, Austria.
E-mail: martina.hartner-tiefenthaler@tuwien.ac.at

Abstract

Workers engage in work-related communication and access digital work content outside of working hours. Scientific research on technology-based work extending behaviours has flourished in recent decades but has produced rather vague information about its relationship with workers' wellbeing. To answer this crucial question on wellbeing more clearly, we believe it necessary to recognize the complexity of this contemporary behavioural phenomenon and to differentiate its various time patterns. We systematically searched and analysed 81 questionnaire studies. Based on their measures, we were able to analyse the relationship between continuous (i.e., consecutive activities with a certain duration) and recurring work extending behaviours (i.e., activities with a certain frequency with a noticeable break in between) and various wellbeing indicators. Findings point towards three effects: a time-loss effect that is linked to both time patterns and relates to reduced time resources for private life and recovery, a straining effect of recurring work extending associated with negative affect and poor quality of life, and a gain effect of continuous work extending associated with higher levels of cognitive resources. We encourage future research to continue on this path and to systematically explore technology-based work extending in relation to all its temporal aspects.

Keywords: constant availability for work, technology-assisted supplemental work, work interrupting private life, occupational health and wellbeing, work-life conflict

Introduction

Technology-based work extending behaviours are a contemporary phenomenon with steadily increasing importance in the world of work. The technology-driven process of work flexibilization enables workers to work anywhere and anytime (Messenger & Gschwind, 2016), especially those in knowledge-based jobs in the service sector (Allvin et al., 2011). Higher levels of flexibility result in workers increasing their work effort, and if they do not have enough time during working hours, they work beyond their working hours in order to return the benefit to their employer (Kelliher & Anderson, 2010). According to the 6th European Working Conditions Survey, in 2015, 23% of European workers met work demands in their work-free time several times per month or more often (European Foundation for the Improvement of Living and Working Conditions., 2017). Three years later, in 2018, an allegedly representative German survey revealed that 63% of all employed workers aged 25 to 54 performed at least some regular work tasks outside their working hours (Institut zur Zukunft der Arbeit (IZA) & XING, 2018). As the COVID-19 pandemic has accelerated the adoption of flexible work practices (e.g., home office) in the service sector (Eurofound, 2021), we expect that the number of workers that extend work beyond their working hours has further grown in the last two years.

Substantial transformations of working conditions considerably alter the experience and behaviour of workers in their everyday life (Prem, 2017), raising the question on the psychological implications of technology-based work extending. For many workers, the workday no longer ends with leaving the office at a prescribed time (Praeg & Bauer, 2017) or—in the case of home office—the worker technically never leaves the office at all. This increasing boundarylessness between work and personal life (e.g., Holtgrewe, 2014; Schier et al., 2011) enables workers to flexibly switch between work and personal activities anytime

and anywhere which can make it easier for them to accommodate both work and private responsibilities (Duxbury & Smart, 2011). However, this boundarylessness may also foster interferences between the demands of work and private life (Kossek et al., 2012). Ergo, work extending behaviours seem to have the potential to increase wellbeing because of making life easier by providing more choice and, at the same time, to reduce wellbeing as they potentially cause a conflict between work and private life.

Scientific research on technology-based work extending behaviours has flourished in the last decade (see Figure 1) but, unfortunately, could not clarify its impact on workers' wellbeing. For example, some studies linked work extending behaviours to workers' higher negative affect (Park et al., 2020; Xie et al., 2017) while others studies could not find such a connection (Day et al., 2012; Piszczek, 2017). Likewise, empirical observations of an association between work extending and positive affect (Kinnunen et al., 2016; Schlachter, 2017) or sleep quality (Bowen et al., 2018; Lanaj et al., 2016) yielded inconsistent results. Consequently, the authors of a literature review came to the conclusion that work extending is "not inherently 'good' or 'bad', but a complex matter" (Schlachter et al., 2018, p. 840). However, the question remains as to how this increasingly important contemporary phenomenon affects workers' wellbeing, and how to unravel its complexity.

To move the field forward, we believe it is necessary to recognize the complexity of technology-based work extending. More precisely, as it is a behavioural phenomenon and thus a question of "what happens", its temporal characteristics such as the distinction between continuity and recurrence have be taken into account (Navarro et al., 2015; Roe, 2008). A time-sensitive approach not only avoids a distorted view on the phenomenon and its psychological implications but also "leads to theoretical innovations and to a substantial expansion of possibilities for intervention" (Roe, 2008, p. 37). Moreover, taking the time patterns of work

extending behaviours into account might enable us to clarify some of the foggy empirical evidence so far and thus, to provide information on when it is good and when it is bad for workers' wellbeing.

Going beyond previous literature reviews on technology-based work extending (Cooper & Lu, 2019; Ďuranová & Ohly, 2016; Schlachter et al., 2018), we analysed the theoretically different relationships of two work extending time patterns with various wellbeing indicators. Based on the measurements applied by the studies reviewed, we distinguished between continuous and recurring work extending behaviours. Consequently, with this systematic literature review, we aim to address the question of whether continuous vs. recurring work extending have different implications for different aspects of workers' wellbeing. Drawing on the theory that work extending behaviours are work-related interruptions during personal activities (Kossek et al., 2012) and that interruptions are stressors (Blank et al., 2020; Van Den Berg et al., 1996), we hypothesise that recurring work extending behaviours are potentially more detrimental for workers' wellbeing because of their association with interruptions in a higher frequency as compared to continuous work extending behaviours that are characterized by their duration.

Technology-based work extending and its time patterns

The literature seems widely in consensus that technology-based work extending means that workers somehow stay in contact with work outside of regular working hours (Adkins & Premeaux, 2014; Dettmers et al., 2016; Park et al., 2020; Richardson & Thompson, 2012; Schieman & Young, 2010; Wilson, 2013). This mostly refers to the time after working hours on workdays and nonwork days such as weekends or vacations. Consequently, work extending behaviours are usually not remunerated. The contact with work outside of working hours is enabled by the use of technological devices and manifests itself in the performance of

work tasks or the communication with other individuals or groups associated with the workers' job (e.g., co-workers, supervisors, clients) for work-related reasons. Our definition of technology-based work extending does not include regular telework, long working hours, and on-call work as they are usually paid work extensions defined in the employment contract.

With this review, we are the first to specifically differentiate whether workers engage in work extending behaviours continuously for a certain duration or recurringly in a certain frequency. Drawing on recommendations for theory-building research, we regard technology-based work extending not as a rigid job characteristic, but as contemporary phenomenon that happens in different time patterns (Roe, 2008). Roe (2008) describes multiple temporal features that define a behavioural phenomenon: its moment of onset (the starting point of the behaviour in time), its stability vs. instability (the behaviour stays the same or changes over time), its growth vs. decline (the behaviour gains intensity or loses intensity over time), and its continuity vs. recurrence. We specifically focused on continuous vs. recurring work extending behaviours and their relationship with workers' wellbeing. This is due to pragmatic reasons because the studies reviewed hardly captured any other time-specific information on the phenomenon as the dominant study designs were cross-sectional studies.

In the distinction of continuous vs. recurring work extending behaviours, it is not the work activity performed outside working hours itself that makes the difference (e.g., making a phone call, writing a report, conducting an analysis, checking e-mails), but the temporal coherence (see Roe, 2008). On the one hand, workers will likely perceive their work extending behaviours as continuous if they engage in several work activities consecutively for a certain duration (e.g., first checking work e-mails, followed by writing a report, and then messaging the supervisor), or perform just one activity without a pause. In other words, the

continuity of behaviours becomes salient if they are performed for a certain duration (see Roe, 2008). On the other hand, recurring work extending behaviours refer to the performance of work extending activities in a certain frequency and with a certain time interval between the activities (e.g., checking work-related messages in the morning, then writing a report at noon and answering work e-mails in the evening).

Different time patterns, different impact on wellbeing

Working outside of working hours has been described as work-related interruptions during personal activities (Kossek et al., 2012). An interruption is defined as a temporary disruption to the current flow of behaviours, typically involving stopping a primary activity task in favour of performing another, secondary task and resuming the primary activity after a certain period of time (Van Den Berg et al., 1996). In the context of work extending, non-work-related activities are the primary task (e.g., going to the zoo, family lunch, meeting with friends, taking a relaxing bath) that has to be stopped due to the secondary, work-related task (e.g., checking work e-mails, writing a report, taking a work-related call).

Work-related interruptions outside of working hours can also be stressful experiences with considerable impact on workers' negative affect (Kossek et al., 2012). More precisely, interruptions have been associated with higher levels of negative affect, indicated by increased irritation (Baethge, 2013), strain, frustration (Mark et al., 2008a), sadness (Blank et al., 2020), and exhaustion (Pachler et al., 2018). Technology-mediated interruptions in particular have been shown to be exhausting because they trigger an energy-consuming compensation process: After an interruption, individuals tend to perform the interrupted task faster to compensate for the time they lost when interrupted (Mark et al., 2008a). Moreover, in contrast to single interruptions, frequent interruptions have been described to be more detrimental for workers' wellbeing due to an accumulation effect: An interruption may be

perceived as a stressor (Blank et al., 2020; Van Den Berg et al., 1996) and is thus followed by a stress reaction (Lazarus & Folkman, 1987; Ursin & Eriksen, 2004). If a person is interrupted over and over again, however, the stress reactions to every single interruption accumulate and lead to an accelerative increase of strain (Baethge et al., 2015).

Consequently, as recurring work extending behaviours interrupt workers' personal lives in a higher frequency than continuous work extending, we might expect recurring work extending to have a higher impact on workers' wellbeing. First, for example, compared to continuous work extending behaviours, recurring work extending may bring more feelings of strain. As previously outlined, recurring work-related interruptions outside of working hours may not only cause multiple stress reactions in a row but also an accumulation of these reactions that considerably adds to workers' negative affect (see the theoretical framework presented by Baethge et al., 2015). Second, recurring work extending may also increase workers' level of exhaustion more than continuous work extending. As previously outlined, interruptions during an activity tend to initiate an energy-consuming compensation process (see the theoretical framework presented by Mark et al., 2008). In the context of work extending behaviours this might for example mean that a worker must put additional effort to make up for the last family dinner which was repeatedly interrupted by work. And this additional effort further adds to the worker's level of exhaustion, who is already pretty exhausted after work during working hours and beyond.

Systematic literature review methodology

In this literature review, we followed a scientific, replicable and transparent selection process (Centre for Reviews and Dissemination, 2009) and summarised as well as synthesised research evidence on the given topic area (Daniels, 2019). We systematically collected peer-reviewed empirical evidence from quantitative studies investigating technology-based work

extending and its relationship with workers' wellbeing between 2007 and 2020. We chose this period to cover the effect of the emergence and widespread distribution of smartphones in first world countries, starting with the launch of the iPhone in 2007 (cnet.com, 2017) up until the end of 2020.

We decided to conduct a systematic literature review and refrained from conducting a meta-analysis for two reasons: First, the measurements applied for technology-based work extending are characterized by heterogeneity (see also Schlachter et al., 2018). "Heterogeneity is a critical issue in meta-analysis because it implies the appropriateness of combining the collected studies and impacts the reliability of the synthesized results" (Lin, 2020, p. 376). Second, with regard to our focus on work extending's temporal features and their relationship with certain wellbeing indicators, we had to calculate with small sub-samples (partly only from one study) which contradicts the idea of a meta-analysis. Nevertheless, we systematically collected, analysed, and present quantitative findings to identify research gaps and potential research avenues.

Literature selection

First, we identified relevant keywords in English and German describing our research focus clustered into four main areas of interest: (1) working individuals (2) technology-based (3) extended contact to work (4) investigated by means of empirical studies. A list of these keywords is provided in the appendix (Table A1). Keyword searches covered title, abstract and keywords using the multidisciplinary online databases Scopus, Web of Science, PsycINFO and PSYNDEXplus. We found a total of 8,589 records between January 2007 and December 2020 covering the disciplines psychology, business, management and accounting, and social sciences.

Second, we sifted the papers based on reading the title, the abstract and the full paper. We focused on literature that reported empirical findings from questionnaire-based studies of the relationship between technology-based work extending and workers' wellbeing and excluded 8,247 records based on the title, 207 based on the abstract (including 18 duplicates), and 64 based on the full text because they measured work extending as thoughts/attitudes and not as behaviour, did not show any reference to technology or integrated affective and cognitive indicators of wellbeing into one common variable. Finally, we included four pieces (i.e., Chen & Karahanna, 2014; Richardson & Thompson, 2012; Schlachter, 2017; Ward & Steptoe-Warren, 2014) that were not indexed in the search engines used but were cited in other articles we reviewed.

Following this systematic process, we selected a total of 75 pieces of literature for our review, including 69 journal articles (4 in German, 65 in English) and six dissertations (i.e., Fender, 2010; Manapragada, 2017; Moore, 2017; Schlachter, 2017; Senarathne Tennakoon, 2011; Wilson, 2013). For simplicity reasons, we will hereinafter refer to all pieces of literature reviewed as 'articles'. The 75 articles (see all references in the appendix) reported findings based on a total of 81 questionnaire-based studies, involving 90,290 employed individuals (in the following also referred to as workers). Among these studies, technology-based work extending was represented 84 times as a variable measured through 43 distinct measurements. A total of 20 studies captured continuous technology-based work extending and 64 captured it as recurring activity (see Figure 1). The studies empirically examined a total of 175 relationships between technology-based work extending and wellbeing indicators. In the appendix, a list of these 175 empirical observations (Table A2 to A6) and a list of all articles reviewed is displayed.

[Insert Figure 1 about here]

Data preparation

Grouping studies examining continuous vs. recurring work extending

Based on their method of capturing work extending (questionnaire items and answering scales), we grouped the studies as either continuous work extending or recurring work extending. Three studies applied both aspects and were assigned to both categories (Jostell & Hemlin, 2018; Richardson & Thompson, 2012; Ward & Steptoe-Warren, 2014).

Continuous work extending means that workers engage in work activities outside working hours that do not have a noticeable break between them and are thus perceived as continuous (Roe, 2008). Consequently, continuous work extending can be captured by the total time—or duration—workers invest in technology-based work activities within a certain time off-work. Of all studies reviewed, 25% captured the total time of technology-based work extending. Thirteen studies asked participants to estimate the total amount of minutes or hours they engage in work extending on a typical workday or in a typical workweek and provided either open response formats (e.g., Braukmann et al., 2018; Lanaj et al., 2014; Senarathne Tennakoon, 2011), or answering scales ranging from "none" or "0 minutes" to "eight hours or more" (e.g., Adkins & Premeaux, 2014; Thörel et al., 2020; Ward & Steptoe-Warren, 2014). Further seven studies asked participants about their general attitudes toward technology-based work extending (e.g., Park & Jex, 2011; Poethke et al., 2019; Wang et al., 2017), or experienced regularity thereof (Ohly & Latour, 2014; Ragsdale & Hoover, 2016). As behavioural phenomena related to attitudes and regularity seem to be perceived as continuous (Roe, 2008), we grouped these seven studies to the continuous work extending category.

Recurring work extending means that workers engage in work activities outside working hours that have a noticeable break between them and are thus perceived as distinct events with a certain frequency (Roe, 2008). Consequently, recurring work extending can be captured by

the frequency workers engage in technology-based work activities within a certain time off-work. The majority of studies asked participants to estimate the frequency of their technology-based contacts with work outside working hours. Most of them asked the study participants directly about how often they engage in work extending behaviours. A typical questionnaire item was phrased as a question beginning with "How often did you…" and was accompanied by answering scales ranging from "never" to "several times a day" (e.g., Glavin & Schieman, 2010; Schieman & Young, 2010; Wilson, 2013) or from "never" to a more ambiguous "very often" or "always" (e.g., Bowen et al., 2018; Day et al., 2012; Xie et al., 2018). Further eight studies directly asked participants about the experienced interruptions from work during off-work time, mostly by using the instrument developed by Kossek et al. (2012). An example item reads "I allow work to interrupt me when I spend time with my family or friends" and participants were asked to respond on a scale ranging from "strongly disagree" to "strongly agree" (e.g., Kinnunen et al., 2017; Russo et al., 2018; Wright et al., 2015).

Grouping studies based on their wellbeing indicators

Based on semantic similarities of the items used to measure wellbeing, we clustered the 169 variables that were empirically associated with technology-based work extending into 14 wellbeing indicators. For example, we grouped wellbeing measures that captured "emotional exhaustion" (e.g., Day et al., 2012; Dettmers et al., 2016), "fatigue" (e.g., Arlinghaus & Nachreiner, 2014; Fender, 2010), "ego depletion" (e.g., Gombert et al., 2018; Lanaj et al., 2014), and "low activated unpleasant affect" (Schlachter, 2017) together under the wellbeing indicator exhaustion as they all measured workers' feelings of exhaustion and fatigue. The extracted 14 wellbeing indicators were further grouped into five wellbeing categories, namely

negative and positive affect, subjective quality of life, cognitive resources, and time resources for private life and recovery.

Data analysis

We evaluated between-person correlation or regression coefficients (if the correlation information was not provided) derived from cross-sectional and longitudinal studies, as well as within-person correlation or regression coefficients (if the correlation information was not provided) derived from diary studies with repeated measurements. Between-person relationships refer to workers' experiences compared to the experiences of other workers. Within-person relationships indicate the experience of a specific worker on a particular day in relation to the same worker's experiences averaged from all measurement occasions.

Findings

To get an overview of the observed relationships between continuous vs. recurring technology-based work extending and indicators of workers' wellbeing, we summarized the findings in Table 1. Table 1 displays the sum of studies yielding significantly negative and positive as well as nonsignificant relationships between the measurement of technology-based work extending and a wellbeing indicator. In the following paragraphs, we will present our findings by means of evidence statements (Daniels, 2019).

[Insert Table 1 about here]

After systematically examining the relationship of both work extending patterns with wellbeing, we propose three effects based on different relationships of work extending behaviours with most wellbeing indicators: a *time-loss effect* linked to both patterns and potentially causing a reduction in time workers have for their private life and their recovery, a *straining effect* of recurring work extending potentially increasing negative affect and

decreasing quality of life, and a *gain effect* of continuous work extending potentially fostering the gain of cognitive resources.

It is important to note that since the vast majority of studies did not use a time-sensitive study design, we remain cautious about causality. Nevertheless, we chose the word effect to outline possible impact scenarios that seemed more likely to us than the other way around. For example, it seems unlikely that workers who are exhausted or have poor sleeping quality engage in more frequent work extending than workers who are less exhausted or have better sleep. Other wellbeing indicators studied such as psychological detachment from work or sleep quantity are further logical outcomes of activities dedicated to work outside of working hours and thus depriving workers of off-work time. Of course, there are also wellbeing indicators whose relationship with work extending has no certain direction. For example, on the one hand, it makes sense that workers feel tense or strained after experiencing frequent work calls throughout the evening. On the other hand, however, workers may want to stay in contact with their colleagues at work to ensure the work progress because they experience strain due to a tight deadline the team has to meet.

The time-loss effect of work extending

We found a time-loss effect, indicating that work extending relates to a higher interference between work and private life and allows less time for sleep as well as psychological detachment from work, regardless of its pattern. The interference between work and family life is usually referred to as work-life-conflict or work-family-conflict and describes the competing of multiple roles (as a worker, as a family member, as a friend etc.) over a person's time resources (Greenhaus & Beutell, 1985). Thereby, workers miss out on activities related to private life (e.g., going to the zoo or family dinner) because they are too busy working at the time t or because they feel too exhausted to join the family activity after work extending.

However, workers can also miss out on activities to recover from work, for example by sleeping, by taking a relaxing bath or by just not thinking about work. Just like sleep (Geurts & Sonnentag, 2006), not thinking about work (i.e., psychological detachment from work) is an important recovery experience and crucial to recover from the physical and psychological arousal caused by previous work stress (Sonnentag & Fritz, 2015).

We reviewed evidence that supports a negative association between recurring as well as continuous work extending and workers' time resources for private life and recovery. Findings from our review indicate that workers who engage in more recurring work extending behaviours than others also perceive a greater conflict between work and private life (e.g., Diaz et al., 2012; Palm et al., 2016), lower sleep quantity (Barber & Jenkins, 2013; Hu et al., 2019), and less psychological detachment from work (Barber & Jenkins, 2013; Dettmers et al., 2016). Continuous work extending paints a similar picture: Workers who experience more continuous work extending also perceive greater conflict (e.g., Richardson & Thompson, 2012; Thörel et al., 2020), and lower levels of psychological detachment (Poethke et al., 2019; Ward & Steptoe-Warren, 2014), compared to workers who experience less continuous work extending.

The straining effect of recurring work extending

We found a straining effect of recurring work extending based on the findings about the detrimental relationship with negative affect and quality of life. The relationship was evident in the case of recurring work extending, but not in the case of continuous work extending behaviours. More specifically, consistent with our expectations, workers, who experience more recurring work extending, tend to report higher levels of negative affect in terms of strain (Bowen et al., 2018b; Wilson, 2013) and exhaustion (Leung, 2011; Wan et al., 2019) as compared to workers, who experience less recurring work extending. However, we found

only one study examining continuous work extending and workers' strain which yielded no significant relationship between the two (K. B. Wright et al., 2014). Moreover, of seven studies, only one found a significant positive association between continuous work extending and exhaustion (Ragsdale & Hoover, 2016) whereas six reported nonsignificant correlation coefficients (e.g., Lanaj et al., 2014; Piszczek, 2017).

With regard to workers' positive affect, empirical studies lack evidence about the relationship with work extending. More precisely, the majority of studies could not link recurring work extending to feelings of enthusiasm, neither negatively nor positively (e.g., Eichberger et al., 2020; Schlachter, 2017). With regard to relaxation, results are not clear either and resulted in as many negative (Kinnunen et al., 2016b; Schlachter, 2017) and nonsignificant results (Schlachter, 2017). There is also not enough information to make qualified judgements about the relationship between workers' continuous work extending and positive affect. Only one study examined this relationship, but could not link it to relaxation (Ohly & Latour, 2014).

With regard to workers' subjective quality of life, empirical evidence supports a negative association with recurring technology-based work extending, but there is a lack of empirical observations regarding its relationship with continuous work extending. Workers, who experience more recurring work extending, experience less control over their lives (e.g., Dettmers et al., 2016; Leung & Zhang, 2017), more physical health complaints (Arlinghaus & Nachreiner, 2013), and lower sleep quality (sleep impairments such as problems falling asleep; e.g., Hu et al., 2019; Schieman & Young, 2013). However, most studies could not link recurring work extending to workers' satisfaction with their private life (Russo et al., 2018) or life in general (McCloskey, 2016; Wilson, 2013). We found no studies that examined the relationship between continuous work extending and workers' control over their lives,

physical health complaints, as well as (private) life satisfaction. However, the evidence shows that continuous work extending is not associated with workers' sleep quality as all three diary studies could not find a significant relationship between the variables (Braukmann et al., 2018; Lanaj et al., 2014).

The gain effect of continuous work extending

Finally, more surprisingly, findings point towards a beneficial effect of continuous work extending behaviours which we titled "the gain effect of continuous work extending". In contrast to recurring work extending and its potential straining impact, a small number of studies points towards a positive association between continuous work extending and workers' cognitive resources such as professional self-efficacy beliefs and skill acquisition through work. Self-efficacy is described as "people's beliefs about their capabilities to exercise control over their own level of functioning and over events that affect their lives" (Bandura, 1991, p. 257). The variable skill acquisition more generally describes a "positive spill-over" (Kim & Hollensbe, 2017, p. 98) between work and private life and that the skills developed in the context of work help the workers in their private life (e.g., Kim & Hollensbe, 2017; Senarathne Tennakoon, 2011).

Two studies indicate that workers, who experience more continuous work extending, also report more professional self-efficacy beliefs (Manapragada, 2017; Poethke et al., 2019) compared to workers experiencing less continuous work extending. Another study showed a positive relationship between continuous work extending and workers' skill acquisition (Senarathne Tennakoon, 2011). This gain effect seems to be specific for continuous work extending as workers' professional self-efficacy could not be linked to recurring work extending (Chen & Karahanna, 2018; Day et al., 2012). Finally, two studies examining recurring work extending and skill acquisition yielded ambiguous results as one showed a

positive relationship (Kim & Hollensbe, 2017), but the other indicated that there is no relationship (Wan et al., 2019).

Discussion

Employing a systematic review of empirical studies, we explored whether the pattern of work extending behaviours makes a difference in the relationship between technology-based work extending and workers' wellbeing. Going beyond prior reviews on this contemporary phenomenon (Ďuranová & Ohly, 2016; Schlachter et al., 2018), and based on Roe's (2008) characterization of behavioural phenomena, we distinguished between continuous and recurring work extending behaviours. Based on their measurement of work extending, we grouped the 81 studies reviewed into these two groups to derive information on the specific relationship between continuous and recurring work extending and various wellbeing indicators.

The findings revealed that both patterns of work extending reduce time resources for private life and recovery. However, they also point towards different implications of continuous and recurring work extending for other wellbeing indicators, especially in terms of workers' affect and cognitive resources. Based on these results, we propose three effects of technology-based work extending. First, a time-loss effect that is linked to both patterns and relates to a higher conflict between work and private life and to lower levels of recovery from work. Second, a straining effect of recurring work extending, associated with higher negative affect and poorer quality of life. And finally, a gain effect of continuous work extending associated with the gain of cognitive resources.

In more detail, work extending generally results in a loss of time as the engagement in work outside of working hours means that the worker has less time for personal activities outside of working hours. In other words, regardless of its pattern, workers engaging in work

extending behaviours have less time for personal activities (with their family, partner, friends etc.), as indicated by findings on workers' higher conflict between work and private life. Moreover, workers are also deprived of time for the physical and psychological recovery from work, as indicated by work extending's negative relationships with sleep quantity and psychological detachment. Psychological detachment and sleep quantity are crucial for recovery from work because they stop the influence of work demands on the organism and replenish exhausted resources (Sonnentag & Fritz, 2015).

We also propose a straining effect of recurring work extending because findings show that only recurring work extending (but not continuous work extending) relates to higher levels of strain and exhaustion as well as to lower quality of life indicators. This straining effect may be explained by recurring work extending's interruptive character: If individuals are repeatedly interrupted by work in their flow of personal or recovery-related activities, they are likely to perceive these disturbances as a stressor (Blank et al., 2020; Van Den Berg et al., 1996). A high frequency of interruptions is especially straining (Baethge et al., 2015), exhausting (Mark et al., 2008b) and can potentially contribute to a reduced quality of life (Geurts & Sonnentag, 2006). Especially in the long-term, strain reactions have been described as pathogenic pathways leading to chronic physical and psychological impairments (Brosschot et al., 2005; Sonnentag & Frese, 2012). Continuous work extending, on the other hand, does not increase feelings of strain or exhaustion, probably because workers are not repeatedly interrupted by work during personal activities. Although there is a lack of empirical observations on its relationship with quality of life, one might assume that continuous work extending does not have a strong impact on quality of life indicators because it does not significantly impact workers' feelings in the first place.

The third effect draws on the potential positive side of work extending. As it relates to workers' higher self-efficacy beliefs and the acquisition cognitive skills, we propose a gain effect of continuous work extending. A psychological gaining following continuous work extending can be explained with the work-life-enrichment model (Greenhaus & Powell, 2006). This model emphasizes that work-related experiences can enrich workers' lives by enabling the acquisition of beneficial attitudes and skills (e.g., self-efficacy beliefs) which enrich not only their work but also their personal lives. People with high self-efficacy beliefs tend to rely on their own resourcefulness and thus perceive all life situations in the knowledge that they can manage to solve even the most difficult problems if only they try hard enough (Schwarzer et al., 1997).

Workers' cognitive resources may be strengthened by work extending because outside of working hours and places they are able to work without any hassles and distractions of their daily work routine. Thereby, only the engagement in a continuous work activity of a certain duration allows a deep focus on the task which increases workers' chances of successfully achieving their work duties. Experiencing competence at work fosters intrinsic work motivation (Deci et al., 2017) which may, in turn, cultivate workers' professional self-efficacy beliefs. Correspondingly to these arguments, our findings further indicate that recurring work extending—and its interruptive character—does not facilitate the gain of cognitive resources in the way continuous work extending does.

Research agenda

To fully understand the contemporary phenomenon of technology-based work extending and its implications for workers' wellbeing, more research is required. First, we advocate that future research should especially focus on collecting more empirical data on behavioural patterns of work extending. Most research investigated workers' experience of technology-

based work extending as a recurring activity. Thus, there is a lack of research on their experience of it as a continuous activity as we did not find any studies examining the relationship between continuous work extending and workers' positive affect and most quality of life indicators (i.e., control over life, private life satisfaction, general life satisfaction, and physical health complaints). Such studies are needed to provide further evidence that the proposed straining effect only applies in the case of recurring work extending. Moreover, we would also benefit from more empirical data supporting the proposed gain effect of continuous work extending. In particular, future studies should test this effect on specific cognitive skills such as time management skills, cognitive flexibility, proactivity or adaptability.

Second, we not only need to consider its patterns but need to examine other temporal characteristics of technology-based work extending. Next to its continuity vs. recurrence, Roe (2008) describes behavioural phenomena as stable vs. unstable and growing vs. declining over time. When taking a look into stress theories, these features may have crucial effects on workers' wellbeing: The first encounter of a stressor has a much stronger initial effect on workers than later encounters, because individuals need time to develop coping strategies, but also a longer exposure to a stressor can increase the impacts of the stressor on workers' health (Frese & Zapf, 1988).

Third and finally, we are in need of studies that examine the time the potential effects of work extending on wellbeing indicators needs to unfold (Navarro et al., 2015). Although there have been some attempts in recent years to apply more time-sensitive study designs, especially diary studies, we still do not know much about the time between workers' engagement in work extending behaviours and the change in their wellbeing. More specifically, we know that recurring work extending seems to increase workers' levels of

strain (Butts et al., 2015) and exhaustion (Schlachter, 2017) within one day, but we do not know anything about how long work extending's detrimental relationship with workers' subjective quality of life and the beneficial relationship with cognitive resources need to unfold itself. As work-related interventions take months (Ouweneel et al., 2013) or years (Füllemann et al., 2015) to affect workers' self-efficacy beliefs, we would anticipate that both relationships unfold over a longer period of time. Conversely, it has also been stated that work extending behaviours increase professional success and self-efficacy beliefs in the short term while harming health in the long term by deprivation of recovery (Krause et al., 2015). Empirical insights are needed to test these contradictory hypotheses.

Practical implications

Being aware of the different effects of continuous and recurring work extending, organisations can strive to provide supportive conditions to ensure workers' wellbeing. First, as recurring work extending potentially strains workers and thus harms not only their wellbeing but also their work engagement (Ferreira et al., 2019) and performance (Gillet et al., 2013), steps should be taken to minimise the frequency of work extending. This could be done, for example, by increasing the clarity of organisational expectations. Organisations can ensure that workers do neither feel implicit nor explicit pressure to extend work into their private lives by reflecting on organisational practices and by clarifying that workers are not expected to check their e-mails, talk to their colleagues on the phone, or perform work tasks outside their working hours. Establishing clarity of organisational expectations on work extending not only changes workers' behaviours but also their general work satisfaction (Heißler, 2017). If organisations, however, do expect that their workers extend their work for particular purposes, these occasions should be kept to a minimum and compensated with monetary or time rewards. In this case, extrinsic rewards are not only the morally correct

approach (Eurofound and the International Labour Office, 2017), but also a counterweight to keep the balance between their efforts and rewards which has been described as crucial for wellbeing (Siegrist, 2002).

Second, our results reveal that continuous work extending potentially helps workers to gain cognitive resources, probably because this behaviour enables the intensive cognitive engagement with a work task, undisturbed by the daily business. However, organisations should interpret this finding with great caution. We emphasize that continuous work activities can also be experienced within the realms of paid working time. In order to prevent a moral conflict and a legal grey area, it would be helpful for organisations to find a way to provide workers time within their working hours in which they can deal with a task in-depth for a certain period of time. This way, workers might profit from their intensive cognitive engagement with a work task and gain cognitive resources such as self-efficacy beliefs, without having to sacrifice the time they need to live their private life or to recover from their work efforts.

Conclusion

Through systematically reviewing existing empirical evidence, we were able to demonstrate that the contemporary phenomenon of technology-based work extending has varying relationships with workers' wellbeing, depending on its pattern and the wellbeing indicator. We found evidence indicating that continuous and recurring technology-based work extending behaviours have different implications for workers' wellbeing. Based on our findings, we propose three effects. First, the time-loss effect illustrates that workers who spend time on work activities outside working hours inherently have less time for personal activities needed to maintain a happy private life and to recover from the efforts they put into work during their regular working hours. Second, the straining effect of recurring work

extending behaviours links recurring work extending to high feelings of strain and exhaustion as well as to a low subjective quality of life as indicated by physical health complaints, a loss of control and reduced sleep quality. As work extending may affect workers as interruptions during personal activities (Kossek et al., 2012), we argue that recurring work extending behaviours may make them feel strained and uneasy. Third, the gain effect links continuous work extending to high self-efficacy beliefs and a gain of cognitive skills which we explain by drawing on the work-life-enrichment model (Greenhaus & Powell, 2006).

We raise awareness for both positive as well as negative effects of work extending and advise organisations to minimize situations in which workers are frequently interrupted during their personal activities outside working hours as this might put a strain on them and consequently harm their health and wellbeing. However, workers can potentially gain new skills and self-efficacy beliefs from engaging in continuous, uninterrupted work activities. Nonetheless, these activities should not be done at the expense of time needed for private life or recovery, but within the realms of paid working hours. Finally, we encourage researchers to provide more empirical evidence to strengthen our propositions, to pay specific attention to the time the proposed effects need to unfold, to clarify the impact of different work activities outside of working hours on workers' reports of work extending's frequency and length, and to examine the phenomenon's other temporal characteristics.

References

Adkins, C. L., & Premeaux, S. A. (2014). The use of communication technology to manage work-home boundaries. *Journal of Behavioral and Applied Management*, *15*, 82–100.

Allvin, M., Aronsson, G., Hagström, T., Johansson, G., & Lundberg, U. (2011). *Work without boundaries: Psychological perspectives on the new working life*. John Wiley & Sons.

Arlinghaus, A., & Nachreiner, F. (2013). When work calls—Associations between being contacted outside of regular working hours for work-related matters and health. *Chronobiology International*, *30*, 1197–1202. https://doi.org/10.3109/07420528.2013.800089

Arlinghaus, A., & Nachreiner, F. (2014). Health effects of supplemental work from home in the European Union. *Chronobiology International*, *31*, 1100–1107. https://doi.org/10.3109/07420528.2014.957297

Baethge, A. (2013). *A daily perspective on work interruptions*. Johannes Gutenberg-Universität.

Baethge, A., Rigotti, T., & Roe, R. A. (2015). Just more of the same, or different? An integrative theoretical framework for the study of cumulative interruptions at work. *European Journal of Work and Organizational Psychology*, *24*, 308–323. https://doi.org/10.1080/1359432X.2014.897943

Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational Behavior and Human Decision Processes*, *50*, 248–287. https://doi.org/10.1016/0749-5978(91)90022-L

Barber, L. K., & Jenkins, J. S. (2013). Creating technological boundaries to protect bedtime: Examining work-home boundary management, psychological detachment and sleep. *Stress and Health*, *30*, 259–264. https://doi.org/10.1002/smi.2536

Blank, C., Zaman, S., Wesley, A., Tsiamyrtzis, P., Da Cunha Silva, G., Gutierrez-Osuna, R., Mark, G., & Pavlidis, I. (2020). Emotional footprints of email interruptions. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 1–12. https://doi.org/10.1145/3290605.3300898

Bowen, P., Govender, R., Edwards, P., & Cattell, K. (2018a). Work-related contact, work–family conflict, psychological distress and sleep problems experienced by construction professionals: An integrated explanatory model. *Construction Management and Economics*, *36*, 153–174. https://doi.org/10.1080/01446193.2017.1341638

Bowen, P., Govender, R., Edwards, P., & Cattell, K. (2018b). Work-related contact, work–family conflict, psychological distress and sleep problems experienced by construction professionals: An integrated explanatory model. *Construction Management and Economics*, *36*, 153–174. https://doi.org/10.1080/01446193.2017.1341638

Braukmann, J., Schmitt, A., Ďuranová, L., & Ohly, S. (2018). Identifying ICT-related affective events across life domains and examining their unique relationships with employee recovery. *Journal of Business and Psychology*, *33*, 529–544. https://doi.org/10.1007/s10869-017-9508-7

Brosschot, J. F., Pieper, S., & Thayer, J. F. (2005). Expanding stress theory: Prolonged activation and perseverative cognition. *Psychoneuroendocrinology*, *30*, 1043–1049. https://doi.org/10.1016/j.psyneuen.2005.04.008

Butts, M. M., Becker, W. J., & Boswell, W. R. (2015). Hot buttons and time sinks: The effects of electronic communication during nonwork time on emotions and work-nonwork conflict. *Academy of Management Journal*, *58*, 763–788. https://doi.org/10.5465/amj.2014.0170

Centre for Reviews and Dissemination, University of York. (2009). *Systematic reviews: CRD's guidance for undertaking reviews in healthcare*. Centre for Reviews and Dissemination, University of York.

Chen, A., & Karahanna, E. (2014). Boundaryless technology: Understanding the effects of technology-mediated interruptions across the boundaries between work and personal life. *AIS Transactions on Human - Computer Interaction, 6*, 16–36.

Chen, A., & Karahanna, E. (2018). Life interrupted: The effects of technology-mediated work interruptions on work and nonwork outcomes. *MIS Quarterly, 42*, 1023–1042. https://doi.org/10.25300/MISQ/2018/13631

cnet.com. (2017). *iPhone 2007, meet 2017: Using the original, 10 years later*. https://www.cnet.com/news/using-the-2007-iphone-in-2017/

Cooper, C. L., & Lu, L. (2019). Excessive availability for work: Good or bad? Charting underlying motivations and searching for game-changers. *Human Resource Management Review,* S1053482218305424. https://doi.org/10.1016/j.hrmr.2019.01.003

Daniels, K. (2019). Guidance on conducting and reviewing systematic reviews (and meta-analyses) in work and organizational psychology. *European Journal of Work and Organizational Psychology, 28*, 1–10. https://doi.org/10.1080/1359432X.2018.1547708

Day, A., Paquet, S., Scott, N., & Hambley, L. (2012). Perceived information and communication technology (ICT) demands on employee outcomes: The moderating effect of organizational ICT support. *Journal of Occupational Health Psychology, 17*, 473–491. https://doi.org/10.1037/a0029837

Deci, E. L., Olafsen, A. H., & Ryan, R. M. (2017). Self-determination theory in work organizations: The state of a science. *Annual Review of Organizational Psychology and Organizational Behavior, 4*, 19–43. https://doi.org/10.1146/annurev-orgpsych-032516-113108

Dettmers, J., Bamberg, E., & Seffzek, K. (2016). Characteristics of extended availability for work: The role of demands and resources. *International Journal of Stress Management, 23*, 276–297. https://doi.org/10.1037/str0000014

Diaz, I., Chiaburu, D. S., Zimmerman, R. D., & Boswell, W. R. (2012). Communication technology: Pros and cons of constant connection to work. *Journal of Vocational Behavior, 80*, 500–508. https://doi.org/10.1016/j.jvb.2011.08.007

Ďuranová, L., & Ohly, S. (2016). *Persistent work-related technology use, recovery and well-being processes*. Springer International Publishing. http://link.springer.com/10.1007/978-3-319-24759-5

Duxbury, L., & Smart, R. (2011). The "myth of separate worlds": An exploration of how mobile technology has redefined work-life balance. In S. Kaiser, M. J. Ringlstetter, D. R. Eikhof, & M. Pina e Cunha (Eds.), *Creating Balance?* (pp. 269–284). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-16199-5_15

Eichberger, C., Derks, D., & Zacher, H. (2020). Technology-assisted supplemental work, psychological detachment, and employee well-being: A daily diary study. *German Journal of Human Resource Management*, advanced online publication.

Eurofound. (2021). *Right to disconnect: Exploring company practices*. Publications Office of the European Union. https://data.europa.eu/doi/10.2806/748556

Eurofound and the International Labour Office. (2017). *Working anytime, anywhere: The effects on the world of work*. Publications Office of the European Union and the International Labour Office. https://www.eurofound.europa.eu/sites/default/files/wpef18007.pdf

European Foundation for the Improvement of Living and Working Conditions. (2017). *Sixth European Working Conditions Survey – Overview report (2017 update)*. Publications Office of the European Union. https://data.europa.eu/doi/10.2806/422172

Fender, C. M. (2010). *Electronic tethering: Perpetual wireless connectivity to the organization*. Drexel University.

Ferreira, A. I., da Costa Ferreira, P., Cooper, C. L., & Oliveira, D. (2019). How daily negative affect and emotional exhaustion correlates with work engagement and presenteeism-constrained productivity. *International Journal of Stress Management, 26*, 261–271. https://doi.org/10.1037/str0000114

Frese, M., & Zapf, D. (1988). Methodological issues in the study of work stress: Objective vs. Subjective measurement and the question of longitudinal studies. In C. L. Cooper & R. Payne (Eds.), *Causes, coping and consequences of stress at work* (pp. 375–411). Wiley. http://doi.wiley.com/10.1002/smi.2460050217

Füllemann, D., Jenny, G. J., Brauchli, R., & Bauer, G. F. (2015). The key role of shared participation in changing occupational self-efficacy through stress management courses. *Journal of Occupational and Organizational Psychology, 88*, 490–510. https://doi.org/10.1111/joop.12124

Geurts, S. A. E., & Sonnentag, S. (2006). Recovery as an explanatory mechanism in the relation between acute stress reactions and chronic health impairment. *Scandinavian Journal of Work, Environment & Health, 32*, 482–492. https://doi.org/10.5271/sjweh.1053

Gillet, N., Vallerand, R. J., Lafrenière, M.-A. K., & Bureau, J. S. (2013). The mediating role of positive and negative affect in the situational motivation-performance relationship. *Motivation and Emotion, 37*, 465–479. https://doi.org/10.1007/s11031-012-9314-5

Glavin, P., & Schieman, S. (2010). Interpersonal context at work and the frequency, appraisal and consequences of boundary-spanning demands. *Sociological Quarterly*, *51*, 205–225. https://doi.org/10.1111/j.1533-8525.2010.01169.x

Gombert, L., Konze, A.-K., Rivkin, W., & Schmidt, K.-H. (2018). Protect your sleep when work is calling: How work-related smartphone use during non-work time and sleep quality impact next-day self-control processes at work. *International Journal of Environmental Research and Public Health*, *15*, 1757. https://doi.org/10.3390/ijerph15081757

Greenhaus, J. H., & Beutell, N. J. (1985). Sources of conflict between work and family roles. *The Academy of Management Review*, *10*, 76. https://doi.org/10.2307/258214

Greenhaus, J. H., & Powell, G. N. (2006). When work and family are allies: A theory of work-family enrichment. *Academy of Management Review*, *31*, 72–92. https://doi.org/10.5465/amr.2006.19379625

Heißler, C. C. (2017). *Working after hours, sharing availability expectations, and interrupting yourself: Extending perspectives on ICT-related concepts in research*. Universität Kassel.

Holtgrewe, U. (2014). New new technologies: The future and the present of work in information and communication technology. *New Technology, Work and Employment*, *29*, 9–24.

Hu, X., Santuzzi, A. M., & Barber, L. K. (2019). Disconnecting to detach: The role of impaired recovery in negative consequences of workplace telepressure. *Revista de Psicología Del Trabajo y de Las Organizaciones*, *35*, 9–15. https://doi.org/10.5093/jwop2019a2

Institut zur Zukunft der Arbeit (IZA), & XING. (2018). *Neue Arbeitswelt: Arbeitszeitgesetz verliert an Bedeutung*. https://newsroom.iza.org/wp-content/uploads/2018/05/IZA-PM_20180306.pdf

Jostell, D., & Hemlin, S. (2018). After hours teleworking and boundary management: Effects on work-family conflict. *Work, 60*, 475–483. https://doi.org/10.3233/WOR-182748

Kelliher, C., & Anderson, D. (2010). Doing more with less? Flexible working practices and the intensification of work. *Human Relations, 63*, 83–106. https://doi.org/10.1177/0018726709349199

Kim, S., & Hollensbe, E. (2017). When work comes home: Technology-related pressure and home support. *Human Resource Development International*, *21*, 91–106. https://doi.org/10.1080/13678868.2017.1366177

Kinnunen, U., Feldt, T., de Bloom, J., Sianoja, M., Korpela, K., & Geurts, S. A. E. (2017). Linking boundary crossing from work to nonwork to work-related rumination across time: A variable- and person-oriented approach. *Journal of Occupational Health Psychology*, *22*, 467–480. https://doi.org/10.1037/ocp0000037

Kinnunen, U., Rantanen, J., de Bloom, J., Mauno, S., Feldt, T., & Korpela, K. (2016a). The role of work–nonwork boundary management in work stress recovery. *International Journal of Stress Management*, *23*, 99–123. https://doi.org/10.1037/a0039730

Kinnunen, U., Rantanen, J., de Bloom, J., Mauno, S., Feldt, T., & Korpela, K. (2016b). The role of work–nonwork boundary management in work stress recovery. *International Journal of Stress Management*, *23*, 99–123. https://doi.org/10.1037/a0039730

Kossek, E. E., Ruderman, M. N., Braddy, P. W., & Hannum, K. M. (2012). Work–nonwork boundary management profiles: A person-centered approach. *Journal of Vocational Behavior*, *81*, 112–128. https://doi.org/10.1016/j.jvb.2012.04.003

Krause, A., Baeriswyl, S., Berset, M., Deci, N., Dettmers, J., Dorsemagen, C., Meier, W., Schraner, S., Stetter, B., & Straub, L. (2015). Selbstgefährdung als Indikator für Mängel bei der Gestaltung mobil-flexibler Arbeit: Zur Entwicklung eines Erhebungsinstruments. *Wirtschaftspsychologie*, *17*, 49–59.

Lanaj, K., Johnson, R. E., & Barnes, C. M. (2014). Beginning the workday yet already depleted? Consequences of late-night smartphone use and sleep. *Organizational Behavior and Human Decision Processes*, *124*, 11–23. https://doi.org/10.1016/j.obhdp.2014.01.001

Lanaj, K., Johnson, R. E., & Lee, S. M. (2016). Benefits of transformational behaviors for leaders: A daily investigation of leader behaviors and need fulfillment. *Journal of Applied Psychology*, *101*, 237–251. https://doi.org/10.1037/apl0000052

Lazarus, R. S., & Folkman, S. (1987). Transactional theory and research on emotions and coping. *European Journal of Personality*, *1*, 141–169. https://doi.org/10.1002/per.2410010304

Leung, L. (2011). Effects of ICT connectedness, permeability, flexibility, and negative spillovers on burnout and job and family satisfaction. *Human Technology*, *7*, 250–267. https://doi.org/10.17011/ht/urn.2011112211714

Leung, L., & Zhang, R. (2017). Mapping ICT use at home and telecommuting practices: A perspective from work/family border theory. *Telematics and Informatics*, *34*, 385–396. https://doi.org/10.1016/j.tele.2016.06.001

Lin, L. (2020). Comparison of four heterogeneity measures for meta-analysis. *Journal of Evaluation in Clinical Practice*, *26*, 376–384. https://doi.org/10.1111/jep.13159

Manapragada, A. (2017). *The always on employee: The antecedents and consequences of work-related email use after hours* [Florida International University]. https://doi.org/10.25148/etd.FIDC001945

Mark, G., Gudith, D., & Klocke, U. (2008a). *The cost of interrupted work: More speed and stress*. 107. https://doi.org/10.1145/1357054.1357072

Mark, G., Gudith, D., & Klocke, U. (2008b). The cost of interrupted work: More speed and stress. *CHI '08: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 107–110. https://doi.org/10.1145/1357054.1357072

McCloskey, D. W. (2016). Finding work-life balance in a digital age: An exploratory study of boundary flexibility and permeability. *Information Resources Management Journal*, *29*, 53–70. https://doi.org/10.4018/IRMJ.2016070104

Messenger, J. C., & Gschwind, L. (2016). Three generations of telework: New ICTs and the (r)evolution from home office to virtual office. *New Technology, Work and Employment*, *31*, 195–208. https://doi.org/10.1111/ntwe.12073

Moore, A. T. (2017). *Computers, cell phones, and social media: How after-hours communication impacts work–life balance and job satisfaction*. Regent University.

Navarro, J., Roe, R. A., & Artiles, M. I. (2015). Taking time seriously: Changing practices and perspectives in work/organizational psychology. *Revista de Psicología Del Trabajo y de Las Organizaciones*, *31*, 135–145. https://doi.org/10.1016/j.rpto.2015.07.002

Ohly, S., & Latour, A. (2014). Work-related smartphone use and well-being in the evening: The role of autonomous and controlled motivation. *Journal of Personnel Psychology*, *13*, 174–183. https://doi.org/10.1027/1866-5888/a000114

Ouweneel, E., Le Blanc, P. M., & Schaufeli, W. B. (2013). Do-it-yourself: An online positive psychology intervention to promote positive emotions, self-efficacy, and engagement at work. *Career Development International*, *18*, 173–195. https://doi.org/10.1108/CDI-10-2012-0102

Pachler, D., Kuonath, A., Specht, J., Kennecke, S., Agthe, M., & Frey, D. (2018). Workflow interruptions and employee work outcomes: The moderating role of polychronicity. *Journal of Occupational Health Psychology*, *23*, 417–427. https://doi.org/10.1037/ocp0000094

Palm, E., Glaser, J., Heiden, B., Herbig, B., Kolb, S., Nowak, D., & Herr, C. (2016). Zusammenspiel von organisationalen Normen, individuellen Praeferenzen und arbeitsbezogenem Entgrenzungsverhalten [Interplay of organizational norms, individual preferences and work-related boundary crossing behavior]. *Wirtschaftspsychologie*, *18*, 44–54.

Park, J.-C., Kim, S., & Lee, H. (2020). Effect of work-related smartphone use after work on job burnout: Moderating effect of social support and organizational politics. *Computers in Human Behavior*, Advance online publication. https://doi.org/10.1016/j.chb.2019.106194

Park, Y., & Jex, S. M. (2011). Work-home boundary management using communication and information technology. *International Journal of Stress Management*, *18*, 133–152. https://doi.org/10.1037/a0022759

Piszczek, M. M. (2017a). Boundary control and controlled boundaries: Organizational expectations for technology use at the work-family interface. *Journal of Organizational Behavior*, *38*, 592–611. https://doi.org/10.1002/job.2153

Piszczek, M. M. (2017b). Boundary control and controlled boundaries: Organizational expectations for technology use at the work-family interface: Boundary Control or Controlled Boundaries? *Journal of Organizational Behavior*, *38*, 592–611. https://doi.org/10.1002/job.2153

Poethke, U., Klasmeier, K. N., Diebig, M., Hartmann, N., & Rowold, J. (2019). Entwicklung eines Fragebogens zur Erfassung zentraler Merkmale der Arbeit 4.0 [Development of a questionnaire to capture key characteristics of work 4.0]. *Zeitschrift für Arbeits- und Organisationspsychologie*, *63*, 129–151.

Praeg, C.-P., & Bauer, W. (2017). Vom Zukunftstrend zum Arbeitsalltag 4.0: Die Zukunft der Arbeit im Spannungsfeld von Work-Life-Separation und Work-Life-Integration. In W. Jochmann, I. Böckenholt, & S. Diestel (Eds.), *HR-Exzellenz* (pp. 165–185). Springer. https://doi.org/10.1007/978-3-658-14725-9_10

Prem, R. (2017). The effects of a changing world of work on daily working life. In C. Korunka & B. Kubicek (Eds.), *Job demands in a changing world of work* (pp. 111–129). Springer International Publishing. https://doi.org/10.1007/978-3-319-54678-0_7

Ragsdale, J. M., & Hoover, C. S. (2016). Cell phones during nonwork time: A source of job demands and resources. *Computers in Human Behavior*, *57*, 54–60. https://doi.org/10.1016/j.chb.2015.12.017

Richardson, K. M., & Thompson, C. A. (2012). High tech tethers and work-family conflict: A conservation of resources approach. *Engineering Management Research*, *1*, 29–43. https://doi.org/10.5539/emr.v1n1p29

Roe, R. A. (2008). Time in applied psychology: The study of "what happens" rather than "what is." *European Psychologist*, *13*, 37–52. https://doi.org/10.1027/1016-9040.13.1.37

Russo, M., Ollier-Malaterre, A., Kossek, E. E., & Ohana, M. (2018). Boundary management permeability and relationship satisfaction in dual-earner couples: The asymmetrical gender effect. *Frontiers in Psychology*, *9*, Article 1723. https://doi.org/10.3389/fpsyg.2018.01723

Schieman, S., & Young, M. C. (2010). The demands of creative work: Implications for stress in the work-family interface. *Social Science Research*, *39*, 246–259. https://doi.org/10.1016/j.ssresearch.2009.05.008

Schieman, S., & Young, M. C. (2013). Are communications about work outside regular working hours associated with work-to-family conflict, psychological distress and sleep problems? *Work & Stress*, *27*, 244–261. https://doi.org/10.1080/02678373.2013.817090

Schier, M., Jurczyk, K., & Szymenderski, P. (2011). Entgrenzung von Arbeit und Familie – mehr als Prekarisierung. *WSI-Mitteilungen*, *64*, 402–408. https://doi.org/10.5771/0342-300X-2011-8-402

Schlachter, S. (2017). *Voluntary work-related ICT use during non-work time: Its antecedents and consequences for employee recovery and well-being* [University of Surrey]. http://epubs.surrey.ac.uk/845728/1/eThesis_final_Svenja%20Schlachter_Feb%202018.pdf

Schlachter, S., McDowall, A., Cropley, M., & Inceoglu, I. (2018). Voluntary work-related technology use during non-work time: A narrative synthesis of empirical research and research agenda. *International Journal of Management Reviews*, *20*, 825–846. https://doi.org/10.1111/ijmr.12165

Schwarzer, R., Bäßler, J., Kwiatek, P., Schröder, K., & Zhang, J. X. (1997). The assessment of optimistic self-beliefs: Comparison of the German, Spanish, and Chinese versions

of the general self-efficacy scale. *Applied Psychology, 46*, 69–88. https://doi.org/10.1111/j.1464-0597.1997.tb01096.x

Senarathne Tennakoon, K. L. U. (2011). *Empowerment or enslavement: ICT use and work-life balance of managers and professionals*. University of Calgary.

Siegrist, J. (2002). Effort-reward imbalance at work and health. In *Research in Occupational Stress and Well-being* (Vol. 2, pp. 261–291). Emerald (MCB UP). https://doi.org/10.1016/S1479-3555(02)02007-3

Sonnentag, S., & Frese, M. (2012). Stress in organizations. In W. C. Borman, D. R. Ilgen, & R. J. Klimoski (Eds.), *Comprehensive handbook of psychology: Vol. 12. Industrial and organizational psychology* (pp. 453–491). Wiley.

Sonnentag, S., & Fritz, C. (2015). Recovery from job stress: The stressor-detachment model as an integrative framework. *Journal of Organizational Behavior*, *36*, 72–103. https://doi.org/10.1002/job.1924

Thörel, E., Pauls, N., & Göritz, A. S. (2020). Antezedenzien und Wirkmechanismen arbeitsbezogener erweiterter Erreichbarkeit – Wenn die Arbeitszeit nicht ausreicht [Antecedents and mechanisms of work-related extended availability—When working time is not sufficient]. *Gruppe. Interaktion. Organisation. Zeitschrift für Angewandte Organisationspsychologie (GIO)*, *51*, 37–47. https://doi.org/10.1007/s11612-020-00496-z

Ursin, H., & Eriksen, H. R. (2004). The cognitive activation theory of stress. *Psychoneuroendocrinology*, *29*, 567–592. https://doi.org/10.1016/S0306-4530(03)00091-X

Van Den Berg, P. T., Roe, R. A., Zijlstra, F. R. H., & Krediet, I. (1996). Temperamental factors in the execution of interrupted editing tasks. *European Journal of Personality*, *10*, 233–248.

Wan, M., Shaffer, M. A., Lau, T., & Cheung, E. (2019). The knife cuts on both sides: Examining the relationship between cross-domain communication and work–family interface. *Journal of Occupational and Organizational Psychology*, *92*, 978–1019. https://doi.org/10.1111/joop.12284

Wang, Z., Chen, X., & Duan, Y. (2017). Communication technology use for work at home during off-job time and work–family conflict: The roles of family support and psychological detachment. *Anales de Psicología*, *33*, 93–101. https://doi.org/10.6018/analesps.33.1.238581

Ward, S., & Steptoe-Warren, G. (2014). A conservation of resources approach to Blackberry use, work-family conflict and well-being: Job control and psychological detachment from work as potential mediators. *Engineering Management Research*, *3*, 8–23. https://doi.org/10.5539/emr.v3n1p8

Wilson, M. S. (2013). *Drivers and outcomes of responsiveness to technological interruptions from work during nonwork time*. University of Illinois.

Wright, K. B., Abendschein, B., Wombacher, K., O'Connor, M., Hoffman, M., Dempsey, M., Krull, C., Dewes, A., & Shelton, A. (2014). Work-related communication technology use outside of regular work hours and work life conflict: The influence of communication technologies on perceived work life conflict, burnout, job satisfaction, and turnover intentions. *Management Communication Quarterly*, *28*, 507–530. https://doi.org/10.1177/0893318914533332

Wright, N. A., Kutschenko, K., Bush, B. A., Hannum, K. M., & Braddy, P. W. (2015). Measurement and predictive invariance of a work-life boundary measure across gender. *International Journal of Selection and Assessment*, *23*, 131–148. https://doi.org/10.1111/ijsa.12102

Xie, J., Ma, H., Zhou, Z. E., & Tang, H. (2018). Work-related use of information and communication technologies after hours (W_ICTs) and emotional exhaustion: A mediated moderation model. *Computers in Human Behavior*, *79*, 94–104. https://doi.org/10.1016/j.chb.2017.10.023

Xie, J., Shi, Y., & Ma, H. (2017). Relationship between similarity in work-family centrality and marital satisfaction among dual-earner couples. *Personality and Individual Differences*, *113*, 103–108. https://doi.org/10.1016/j.paid.2017.03.021

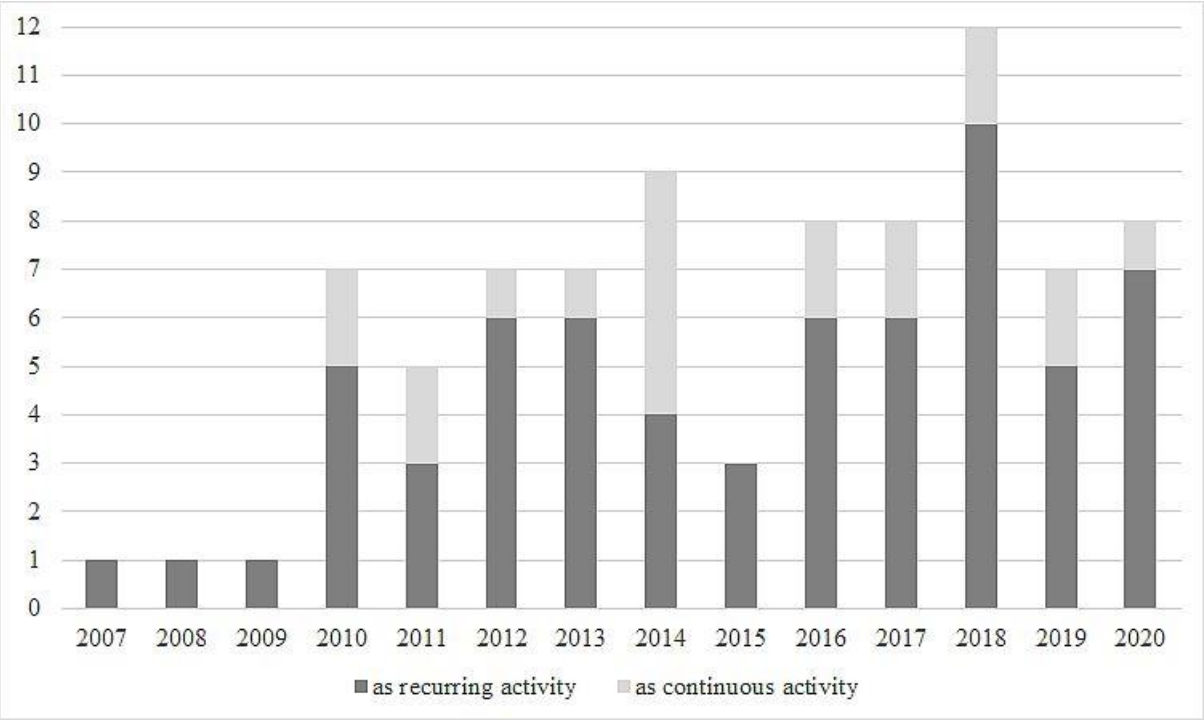

Figure 1. Research interest between 2007 and 2020 (sum of articles reviewed per publication year and categorized according to its operationalization of work extending either as recurring or as continuous activity)

Table 1. Relationship between technology-based work extending and wellbeing in relation to its recurrence and continuity

	recurring work extending			continuous work extending		
Wellbeing indicator per category	-	NO	+	-	NO	+
Time for private life and recovery						
conflict between work and private life	0	2	38	1	2	9
sleep quantity	2	0	0	2	0	0
psychological detachment from work	17	0	0	9	0	0
Negative affect						
strain	0	3	16	0	1	0
exhaustion	0	5	16	1	6	0
Positive affect						
enthusiasm	0	6	1	0	0	0
relaxation	2	2	0	0	1	0
Subjective quality of life						
control over life	4	0	0	0	0	0
physical health complaints	0	1	5	0	0	0
sleep quality	7	2	0	0	3	0
(private) life satisfaction	0	3	1	0	0	0
Psychological gain						
professional self-efficacy beliefs	0	2	0	0	0	2
skills acquisition	0	1	1	0	0	1

The numbers indicate the sum of studies yielding significantly negative (-), positive (+) and nonsignificant (no) linear relationships between recurring or continuous work extending and the respective wellbeing indicator.

Nachdruck von Schoellbauer, Tement, und Korunka (im Review)

Schoellbauer, J., Tement, S., & Korunka, C. (im Review). Honey, there's something on my mind... Adverse consequences of negative and positive work rumination on attention to the partner, and the advantage of talking about it. *Journal of Happiness Studies.*

Honey, there's something on my mind... Adverse consequences of negative and positive work rumination on attention to the partner, and the advantage of talking about it

Julia Schoellbauer, Sara Tement, and Christian Korunka

Author Notes

Julia Schoellbauer, Department of Occupational, Economic, and Social Psychology, Faculty of Psychology, University of Vienna, Vienna, Austria.

Sara Tement, Department of Psychology, Faculty of Arts, University of Maribor, Maribor, Slovenia.

Christian Korunka, Department of Occupational, Economic, and Social Psychology, Faculty of Psychology, University of Vienna, Vienna, Austria.

Correspondence concerning this article should be addressed to Julia Schoellbauer, Department of Occupational, Economic, and Social Psychology, Faculty of Psychology, University of Vienna, Vienna, Austria. E-mail: julia.schoellbauer@univie.ac.at

Abstract

Ruminating about work outside the work context lets work spill over into workers' private lives and affects the dynamics of their private relationships. Although negative work rumination was linked to couples' reduced relationship quality on the same day, little is known about the impact of positive work rumination on private relationships. Moreover, there is a lack of debate in the literature on what couples can do to actively counteract a potential harm to their relationship. Drawing on the load theory of selective attention, we hypothesize that both negative and positive rumination about work occupy attentional resources and thus reduce workers' attention to the partner and relationship satisfaction. However, we emphasize that couples are not helpless in this process: By sharing the work-related thoughts, a couple dyadically copes with the negative or positive work issue one of them ruminates about which fosters the resolving of the work-related thoughts and thus increases workers' attention to the partner. Findings based on 579 daily dyadic observations from 42 dual-earner couples support our hypotheses. We conclude that a daily talk about work seems to be a useful strategy for couples to maintain their relationship quality, especially in the contemporary 24/7 working society where the separation of work and private life is increasingly turning into an unrealizable ideal.

Keywords: diary study, dyadic research, relationship quality, psychological availability, spillover-crossover, actor-partner interdependence model

Today's working society is characterized by processes of acceleration (Rosa, 2011), flexibilization (Eurofound and the International Labour Office, 2017) and intensification (Korunka & Kubicek, 2017)—a situation that imposes increased demands on workers, making

them more vulnerable to think about their work outside of working hours (Sonnentag & Fritz, 2015). Thinking about work within another, private, life context is understood as rumination (Martin & Tesser, 1996). The increase of rumination about work is a critical development because, when individuals fail to focus on their present life situation, their quality of life is impaired (Lavie, 2010). Especially workers living in dual–earner living arrangements are challenged in balancing work–related demands—and thoughts—with private ones to maintain a functional and fulfilling relationship (e.g., Debrot et al., 2018).

Rumination can be referring to negative but also to positive thoughts (Martin & Tesser, 1996), yet research mostly draws on a negative-affective spillover-crossover mechanism based on the theory that (negative) rumination prolongs a person's negative affective activation due to an unpleasant experience (Brosschot et al., 2005) at work beyond the boundaries of a workday (Sonnentag & Fritz, 2015) which further determines the tone of their private interactions with the partner (Debrot et al., 2018). Accordingly, negative work rumination (King & DeLongis, 2014) was shown to relate to both partners' reduced relationship quality on the same day via their increased negative-affectionate and decreased positive-affectionate interactions. However, little is known about the impact of positive work rumination on couples' interactions.

Other studies point toward workers' withdrawal from their partners after having unpleasant work experiences (Repetti, 1989; Sears et al., 2016; Story & Repetti, 2006). Withdrawal generally reduces the quantity of couples' interactions yet has also been associated with lower levels of relationship satisfaction of workers (Tandler et al., 2020) and their partners (Johnson et al., 2018). Consequently, it seems that not only the affective tone of their interactions links experiences made at work to workers' relationship with their romantic partners. Hence, so far we are lacking a theoretical concept on an alternative, non-affective

spillover-crossover mechanism. Moreover, although mainly pointing toward detrimental consequences of work spilling over into workers' private lives and then crossing over to their partners, there is a lack of debate on what couples can do to actively counteract a potential harm to their relationship.

With this study we aim to close the three critical research gaps pointed out before. First, we propose and empirically test a cognitive spillover-crossover mechanism linking negative and positive work rumination of one partner to the relationship satisfaction of both partners via an attentional process. By drawing on the load theory of selective attention (Lavie et al., 2004), we argue that thoughts about work—no matter whether they are negative or positive—occupy scarce attentional resources and thus lower workers' attention to the partner during their private time together. Attention is a crucial precondition for couples' interactions with each other which further determine their relationship satisfaction (Rogers & May, 2003). As rumination, attention, and relationship satisfaction can be subject to intrapersonal variation within short time intervals, we conducted a diary study to test the hypothesized relationships in the lives of dual–earner couples on a daily level during their after-work hours. Moreover, to examine the crossover effects from workers to their partners, we analyzed our daily observations using an actor-partner interdependence model (e.g., Cook & Kenny, 2005).

Secondly, we postulate the cognitive spillover-crossover mechanism for each kind of rumination, no matter if the thoughts are negatively of positively valanced. In doing so, we highlight the incremental value of our cognitive model and emphasize that work experiences can influence workers' attentional processes outside of work hours, regardless of their individual evaluation of thoughts and associated negative or positive emotions. By empirically testing the proposed cognitive spillover-crossover mechanism triggered by negative versus positive rumination, we further close an empirical gap and provide first

empirical results on positive work rumination and its association with relationship satisfaction.

Thirdly, we include a potential buffering mechanism into our model, suggesting how couples can counteract cognitive spillover from work into private life with harmful consequences for their relationship dynamics. Even if not all of them create suffering, all ruminative thoughts should be resolved in order to get closure (Martin & Tesser, 1996) and thus to make attentional resources available for other—private—matters. We assume that the sharing of work-related thoughts with the partner supports the resolving of the work issue the workers ruminate about by means of dyadic coping and thus promotes the release of attentional resources which workers then can direct toward the partner.

Theoretical background and hypotheses

Rumination about work as a crucial factor in the spillover-crossover process

Ruminative thoughts about work outside working hours are "a class of conscious thoughts that revolve around a common instrumental theme and that recur in the absence of immediate environmental demands requiring the thoughts" (p. 7) and can be negatively and positively valanced (Martin & Tesser, 1996). Negative rumination about work evolves after demanding, unpleasant or stressful work situations (Frone, 2015; Volmer et al., 2012), happens outside of work (e.g., during private time with the partner), and functions as a problem–solving process (Martin & Tesser, 1996) through which individuals try to reappraise stressful experiences and prepare for future challenges (Lazarus & Folkman, 1987). Their substantive counterpart is represented by positive rumination. Positive work rumination refers to thinking about the positive aspects of one's job outside of work and encompasses thoughts about pleasant work experiences such as successful task accomplishment or friendly work relationships (Frone,

2015; Meier et al., 2016). Thereby positive rumination primarily serves the purpose of reminiscence or anticipation of a positive future (Martin & Tesser, 1996).

Rumination is a psychological process in which work spills over into workers' private lives by influencing their thoughts and consequently their psychological state and wellbeing outside working hours (Bakker & Demerouti, 2013). The majority of previous research draws on a negative-affective spillover mechanism based on the theory that rumination prolongs a person's negative affective activation caused by an unpleasant experience (Brosschot et al., 2005) at work beyond the boundaries of a workday (Sonnentag & Fritz, 2015). Accordingly, negative work rumination is associated with workers' increased feelings of anxiety (Kirkegaard Thomsen et al., 2011; Michl et al., 2013), exhaustion (Donahue et al., 2012; Weigelt et al., 2019), and depressive mood (Segerstrom et al., 2006), especially outside their working hours. Nevertheless, in contrast, positive rumination has been shown to relate to beneficial consequences for the workers such as higher levels of vitality (Weigelt et al., 2019), serenity (Meier et al., 2016), and relaxation (Fritz & Sonnentag, 2006), as well as lower levels of exhaustion (Clauss et al., 2018) and depressive mood (Meier et al., 2016).

Due to their interactions during their private time together, experiences made at work do not only influence workers' psychological state and wellbeing outside working hours, but also cross over and affect their partners' psychological state and wellbeing (Bakker & Demerouti, 2013). Crossover research also mainly focuses on a negative-affective mechanism and shows associations between workers' negative rumination about work and higher tension (King & DeLongis, 2014) and increased display of negative emotions between partners (Green et al., 2011; Meier & Cho, 2019). Following the same logic, not thinking about work (i.e., psychological detachment) has been shown to be beneficial for couples' relationship satisfaction (Debrot et al., 2018; Rodríguez-Muñoz et al., 2018) as it represents the absence of

negative thoughts about work and thus increases the chance of couples' positive-affectionate interactions (Debrot et al., 2018) which further relates to higher levels of both partners' positive mood (Rodríguez-Muñoz et al., 2018). However, we have not found any theoretical considerations nor empirical findings on the impact of positive work rumination on couples' relationship so far.

We argue that the crossover of workers' psychological state and wellbeing to their partners is not only determined by the affective tone of their interactions, but also by whether they interact at all or withdraw from each other. Studies by Rena Repetti and colleagues showed that—at least unpleasant—work experiences cause workers to withdraw from the partner at home (Repetti, 1989; Sears et al., 2016; Story & Repetti, 2006). As workers' withdrawal from the spouse was operationalized as the worker's desire to be alone and absorbed "in his/her own world" (Repetti, 1989, p. 654), a connection between increased withdrawal and reduced attention to the partner can be assumed. Withdrawal of a partner from the other of course reduces the total interaction time of a couple, and the absence of interactions is associated with lower levels of workers' (Tandler et al., 2020) and their partners' relationship satisfaction (Johnson et al., 2018). Building on these findings, we propose a daily cognitive spillover-crossover mechanism linking rumination about work to lower relationship satisfaction of both workers and their partners via the ruminating workers' reduced attention to the partner.

Rumination and attention to the partner

Rumination about work carries the risk that the work topic workers are ruminating about becomes their sole focus of attention and thus no attention can be paid to the partner. By drawing on the load theory of selective attention (Lavie et al., 2004), we argue that rumination about work makes the work issue the workers ruminate about their focus of attention. As

human working memory can only handle a certain load at any one time it must select what information will be processed and what will be ignored. Attention is the cognitive process that allocates an individual's limited cognitive processing resources toward selectively chosen information associated with the current focus of attention (Lavie et al., 2004). Vice versa, the current focus of attention is the stimulus (e.g., experiences made at work) of which the most information are processed at the moment as compared to other stimuli such as the presence of the partner (Lavie & Tsal, 1994; Macdonald & Lavie, 2011).

Focusing their attention on work issues lowers workers' ability to pay attention to the partner, no matter whether these work issues are perceived as negative or positive. Attention determines perception processes in the sense that information relevant to the stimulus in the focus of attention is processed before information irrelevant to the stimulus in focus (Lavie et al., 2004). Thus, if an individual's focus of attention lies on a negative or positive work-related experience, information related to work will be processed before private information. This happens no matter whether the information on the stimulus in focus are stemming from internal sources such as their own thoughts or from external ones such as another person (Lavie, 2010).

Ezzedeen and Swiercz (2007) pointed out that ruminating about work makes it more difficult for workers to participate in private activities due to a "cognitive preoccupation" (p. 979) with work. Correspondingly, Danner-Vlaardingerbroek et al. (2013) showed that thinking about work outside working hours is associated with a lower "ability and motivation to direct psychological resources at the partner," (p. 54). Correspondingly, Mellings and Alden (2000) showed that the more a person's attentional focus was on their own thoughts, the less they were able to process information about the partner.

Consequently, following the load theory of selective attention (Lavie et al., 2004), we hypothesize that negative and positive rumination about work have the same effect on workers' attention: If their working memory is occupied with information produced by their thoughts about work, workers will have few resources left to pay attention to the partner. Even if they are in the same room together, mentally preoccupied workers might not show any interest in interacting with the partner because they are not able to take notice of them at the moment. In other words, the higher the extent of workers' rumination about work, the lower their attention to the partner. Conversely, the lesser the extent of workers' rumination on a given day, the higher their (potential to pay) attention to the partner on that day.

Hypothesis 1: The higher the workers' (a) negative and (b) positive rumination about work on a given day, the lower their attention to their partner on that day.

Attention to the partner and relationship satisfaction

Relationship satisfaction is an important indicator of subjective wellbeing (Diener, 2000) and life satisfaction (Ruvolo, 1998). Contrary to affective wellbeing indicators with a hedonic tone (Organ & Near, 1985), relationship satisfaction reflects the cognitive evaluation of own feelings and attraction toward one's partner and romantic relationship (Rusbult & Buunk, 1993). It is one of the most researched variables in dyadic processes studies (Falconier et al., 2015) and has been shown to fluctuate on a daily basis (e.g., Debrot et al., 2018; Rodríguez-Muñoz et al., 2018).

Decreased attention to the partner during their time together will decrease workers' relationship satisfaction due to a lack of interactions. When work spills over and occupies workers' attention during their time with their partners, the partners will interact less with each other (see Cardenas et al., 2004). This is a critical development because interactions with the partner are necessary for the formation of one's satisfaction with the relationship (Rogers

& May, 2003). Consequently, in Hypothesis 2, we assume that workers' attention to the partner relates to higher levels of their relationship satisfaction and. As a logical step following Hypothesis 1 and Hypothesis 2, workers' attention should also mediate the relationship between their ruminative thoughts about work and their relationship satisfaction.

Hypothesis 2: The higher the workers' attention to the partner on a given day, the higher their relationship satisfaction on that day.

Hypothesis 3: *The higher the workers' (a) negative and (b) positive rumination about work on a given day, the lower their relationship satisfaction on that day, and this relationship is mediated via lower levels of the workers' attention to the partner.*

Workers' decreased attention to the partner during their time together will also decrease their partners' relationship satisfaction due to a lack of interactions and a lack of workers' responsiveness. Perceived partner responsiveness sustains intimacy in relationships; that is, partners who feel understood, validated, accepted, and cared for by the other perceive greater psychological closeness (Laurenceau et al., 2005). If workers withdraw from their partners following work activities, they demonstrate limited involvement in dyadic exchanges which detrimentally affects partners' feelings of intimacy (Cowlishaw et al., 2010) and thus also their relationship satisfaction (van Steenbergen et al., 2014). Vice versa, we argue that workers' attention to the partner positively relates to their partners' relationship satisfaction but also mediates the relationship between workers' ruminative thoughts about work and their partners' relationship satisfaction.

Hypothesis 4: The higher the workers' attention to the partner on a given day, the higher their partners' relationship satisfaction on that day.

Hypothesis 5: *The higher the workers' (a) negative and (b) positive rumination about work on a given day, the lower their partners' relationship satisfaction on that day, and this relationship is mediated via lower levels of the workers' attention to the partner.*

Sharing work-related thoughts with the partner as a buffering mechanism

To identify possible behaviors through which couples can buffer the detrimental effects of work rumination hypothesized in our cognitive spillover-crossover model, we further rely on the logic of the strain theory of selective attention (Lavie et al., 2004). Consequently, we argue that the partners have to find a way to reduce workers' focus on the work issue they keep thinking about in order to free resources which then can be directed to the partner.

Couples' communicative behavior may play a key role in alleviating the negative effect of work rumination on attention to the partner. Conversations between a couple are generally known to promote a positive cycle of reciprocation and foster a partner's perceptions that the other is responsive to their needs (Donato et al., 2015). More specifically, "talking about work during leisure time represents a behavioral pathway connecting work and home" (Tremmel et al., 2019, p. 248) which is known to help workers to shift their attention from work to their private life (Nippert-Eng, 1996).

Talking about work with the partner can help workers solve the work issue in their minds by means of dyadic coping. Even if not all of them create suffering, negative as well as positive ruminative thoughts should be resolved in order to get cognitive closure (Martin & Tesser, 1996). Work-related conversation between the partners potentially supports the resolving of workers' work-related thoughts through dyadic coping. Talking about experiences made during the workday is one way couples share joy or cope with strain together by sharing appraisals (Falconier & Kuhn, 2019). By sharing with and joining of the partner, the negative or positive work issue is no longer "his" or "her", but "their" issue (Lin

et al., 2016). Consequently, both partners participate in the coping process and thus join forces in order to handle a problem-focused or emotion-focused issue relevant to the dyad (Bodenmann, 1997) which should speed up the cognitive closure of the negative or positive work issue the worker is ruminating about.

Workers' closure of their work-related thoughts frees up attentional resources they can now direct toward the partner. If ruminative thoughts are resolved, the formerly occupied attentional resources are released and can be directed toward the partner. Dyadic coping should support workers in resolving the work issue they ruminate about, enabling them to shift their attention to the partner and to seize their time together. Taken together, we hypothesize that, if workers talk with their partners about their work, the detrimental relationship between negative and positive work rumination and workers' attention to the partner can be buffered. More precisely, workers' sharing of their work-related thoughts with the partner supports the resolving of the negative or positive work issue the workers ruminate about and thus frees up attentional resources which consequently enables workers to increase their attention to the partner.

Hypothesis 6: The negative relationship between workers' (a) negative and (b) positive rumination about work on their attention to the partner on a given day will be attenuated by higher levels of worker' sharing of work-related thoughts with the partner on that day.

Finally, we integrate our hypotheses into an overall conceptual model outlining our proposed cognitive spillover–crossover mechanism and buffering mechanism (see Figure 1) and formulate our last two hypotheses:

Hypothesis 7: Workers' (a) negative and (b) positive rumination about work on a given day will indirectly relate to lower levels of the workers' relationship satisfaction on that day

via workers' reduced attention to the partner; yet this mediation will be attenuated by higher levels of the workers' sharing of work-related thoughts with the partner.

Hypothesis 8: Workers' (a) negative and (b) positive rumination about work on a given day will indirectly relate to lower levels of the partners' relationship satisfaction on that day via workers' reduced attention to the partner; yet this mediation will be attenuated by higher levels of the workers' sharing of work-related thoughts with the partner.

[Insert Figure 1 about here]

Method

Rumination, attention, and relationship satisfaction as key constructs of our hypothesized cognitive spillover-crossover model are each reflecting cognitive processes or evaluations that are subject to intrapersonal variation within short time intervals. Moreover, couples' sharing of their work-related thoughts may vary from day to day. Consequently, we conducted a diary study to observe the proposed cognitive spillover-crossover mechanism and the buffering mechanism on a daily level. To avoid common method bias (Podsakoff et al., 2012), we separated the daily measurement of work rumination from the measurement of the other variables. Moreover, to examine the hypothesized inter–individual crossover effects from workers to their partners, we analyzed our daily observations using an actor-partner interdependence model (Cook & Kenny, 2005; Kenny & Ledermann, 2010).

Sample and procedure

In total, 60 heterosexual and cohabiting dual–earner couples in which both partners worked at least 20 hours per week registered for study participation. Participating couples were recruited by psychology master's degree students in the course of a class; students' help with recruitment was voluntary and participants were not pressured to participate. First, participants completed an online questionnaire assessing background data and demographics.

This was followed by the diary phase: In two weeks of their choice, participants (i.e., both partners of a dyad) were instructed to respond to two online questionnaires per day, using a desktop computer or mobile device. All measurements were taken from each partner of each couple.

Via e–mail and SMS, we sent a link to the Time 1 questionnaire at 7 pm, assessing negative and positive rumination about work, and to the Time 2 questionnaire at 9 pm each day, assessing attention to the partner, sharing work-related thoughts with the partner, and relationship satisfaction. The two daily surveys remained available throughout the evening. We chose 7 pm as the starting time for the Time 1 questionnaire based on the assumption that the majority of participants most likely had finished work for the day and thus already had some private time in which ruminative thoughts about work could develop. We further chose to send the Time 2 questionnaires at 9 pm in order to collect the data about couples' interactions as late as possible in the day, so that participants had enough time to spend with their partners, yet early enough to catch them before bedtime.

To increase the data quality and thus the validity of our analyses, we restricted our data set based on two quality criteria. First, we only included data of participants that were provided in the correct chronological order (i.e., data from Time 2 followed data from Time 1) and with at least 30 minutes passing between ending Time 1 and starting Time 2 questionnaires (the average time interval between filling in Time 1 and Time 2 questionnaire was 2.0 hours with a standard deviation [*SD*] of 1.0 hour). Secondly, we excluded daily rumination data if the participant reported that his or her last working hour was less than one hour before they started the Time 1 questionnaire (as we believed this would not provide enough time for them to develop ruminative thoughts about work).

Our final data file included 42 dual–earner couples (84 participants) and 579 dyadic observations on working days. All participants lived in Germany or Austria. Most reported having no children (69.0%). Mean age was 36.9 years (*SD* = 11.6). Three participating couples were work–linked in the sense that both partners had the same occupation (1 couple), worked for the same organization (1 couple), or both (1 couple). Participants worked on average 40.9 hours per week (*SD* = 11.2) and had spent an average of 7.3 years (*SD* = 8.6) in their current job; 15.7% (i.e., 13 participants) reported being self–employed. Drawing on the classification of occupations of the United Nations (International Labour Office, 2012), our sample comprised 43.9% professionals or associate professionals, 21.7% service and sales workers, 18.1% clerical support workers, 13.3% managers, and 2.4% craft or related trades workers.

Measures

All variables were measured via participants' self–rating of questionnaires items in the form of personal statements. All items were provided in German. Where necessary, we translated the items from English to German. Participants responded to all items using 7–point Likert scales. The alpha reliabilities of the applied scales are displayed in Table 2.

Negative and positive rumination about work. We assessed participants' work–related thoughts outside working hours at Time 1 with the negative and positive work rumination scale (Frone, 2015) which comprises two subscales: Negative rumination about work as thinking about work experiences outside of working hours the participant appraised as negative and positive rumination about work as thinking about work experiences the participant appraised as positive. We adapted three items capturing negative rumination about work (e.g., "Today, outside working hours, I replayed negative work events in my mind") and three items capturing positive rumination about work (e.g., "Today, outside working hours, I

remembered good things that happened at work") for application to a daily–diary study. We asked participants to rate the items on a scale from 1 (not at all) to 7 (to a very large extent) in order to capture the extent of their rumination about work.

Attention to the partner. Based on (Lavie et al., 2004), we defined attention to the partner as the extent in which the participants paid attention to their partners during the evening hours after work they spent together. We measured the construct with the following three items from Danner-Vlaardingerbroek et al.'s (2013) psychological availability scale capturing its cognitive component and thus a person's ability to direct psychological resources at the partner. The items, which we adapted to the daily-diary design, read: "When I was with my partner today," "…all my attention belonged to her/him," "…I listened to her/him attentively," and "…my thoughts were not distracted but were completely with her/him." Participants were asked whether they either totally disagreed (1) or totally agreed (7) with these statements.

Sharing work-related thoughts with the partner. We measured sharing work-related thoughts with the partner with one item that we created for this study: "Today, my partner and I talked about something about my job that kept me thinking," Participants were asked to rate the statements on a scale from 1 (not at all) to 7 (to a very large extent).

Relationship satisfaction. We measured relationship satisfaction with statements the participants either totally disagreed (1) or totally agreed (7) with. Three statements were taken from the quality marriage index (Norton, 1983) and adapted to the daily–diary design. For example, one item reads "Today, the relationship with my partner made me very happy."

Control variables. We controlled for *the time the partners spent together outside their working hours* on the respective study day and modeled it as an additional independent variable predicting attention to the partner. Therefore, we asked the participants in the Time 2

questionnaire with one item to indicate the total amount of hours they had spent together with their partner on this day during their waking hours. The time the two partners of a couple spend together is important as it is unlikely (and unnecessary) to pay attention to each other when they are asleep or involved in activities separately from each other.

Data preparation

We prepared our data for the conduction of multilevel path modeling that simultaneously analyzes intraindividual (and in our case also interindividual) differences on the day-level nested within persons (see e.g., Zhang et al., 2009). Therefore, we first matched the Time 1 with Time 2 questionnaire data for each respective day and person into one multilevel data file. Consequently, we had a data set in which each participant had one row for each day he or she participated. In this row, his or her data from Time 1 and Time 2 were linked, enabling us to examine the hypothesized intra–individual spillover effects from workers to workers (i.e., *actor effects*).

Secondly, for measuring bidirectional effects in interpersonal relationships, we further prepared our data set in terms of an actor-partner interdependence model (see e.g., Cook & Kenny, 2005; Kenny & Ledermann, 2010). This specifically allowed us to examine the hypothesized inter–individual crossover effects from workers to their partners (i.e., *partner effects*), simultaneous to the actor effects. For this purpose, we doubled the participants' daily data in a way that, for every day he or she participated, every participant now had two entries: in one row the participant was an actor and in the other row he or she was a partner.

Construct Validity

To examine the distinctiveness of our measures (i.e., construct validity), we conducted multilevel confirmatory factor analyses (Muthén & Muthén, 2017). A five–factor model, with all items loading on their respective factors (i.e., negative rumination, positive rumination,

attention to the partner, sharing work-related thoughts with the partner, and relationship satisfaction) on the within–person level (i.e., day–level) and the between–person (i.e., person–level), showed acceptable model fit and fitted our data significantly better than alternative models with a fewer number of factors. Table 1 displays the estimated fit indices and the Satorra–Bentler scaled chi–square difference test results.

[Insert Table 1 about here]

Statistical analyses

We conducted multilevel path modeling using Mplus 8 (Muthén & Muthén, 2017) which decomposed the variance of all study variables into their day–level and person–level components (Zhang et al., 2009). With respect to the hypothesis test, we were particularly interested in the day-level results because they represent the presumed daily variation of the psychological constructs within a person. Moreover, we examined the 95% confidence intervals of the indirect associations between negative and positive rumination about work and both partners' relationship satisfaction via actor's attention to the partner, applying the Monte Carlo method (Preacher & Selig, 2010) with 1,000,000 repetitions.

We tested our hypotheses in two separate multilevel path models: One model contained all hypothesized paths following the predictor negative rumination; the other model included all hypothesized paths following the predictor positive rumination. We did so because we aimed to prove our proposed cognitive spillover-crossover effects valid for both negative and positive rumination about work. Thereby, we focused more on showing our mechanism's incremental validity to the affective spillover-crossover mechanism emphasized in previous research than on proving the additional variance explained by positive rumination as compared to a model with negative rumination.

Results

Preliminary analysis for gender invariance

Since we did not assume gender variance in the hypothesized effects, we prepared by means of an data actor–partner interdependence model. Consequently, we could simultaneously examine how much the male partner is influenced by his female partner and how much the female partner is influenced by her male partner. We confirmed the legitimacy of this procedure by first testing for gender-related differences in participants' responding behavior and secondly testing for gender-related differences in the interrelations of the variables of our model.

First, a measurement invariance check rules out the possibility that statistical results are biased by psychometric responses to the questionnaire differing between male and female respondents (Gistelinck et al., 2018; Putnick & Bornstein, 2016). Thus, gender invariance is assumed if the χ^2 fit index of a measurement model that assumes that certain study parameters are gender equal does not significantly differ from the χ^2 of models allowing the study parameters to differ between men and women. Following Muthén and Muthén (2017), we conducted configural (i.e., no parameters constrained equal between men and women), metric (i.e., factor loadings constrained equal), and scalar invariance (i.e., factor loadings and item intercepts constrained equal) tests simultaneously.

The model fit of the metric invariance model did not significantly differ from the configural model (Satorra–Bentler scaled $\Delta\chi^2 = 11.27$, correction factor = 1.20, $\Delta df = 10$, $p = .337$), thus our data showed full metric invariance. As the metric model was significantly better than the scalar model (Satorra–Bentler scaled $\Delta\chi^2 = 26.79$, correction factor = 0.99, $\Delta df = 9$, $p < .05$), the data yielded partial scalar invariance. After allowing the intercepts of one item measuring relationship satisfaction (i.e., "Today we got along very well") to differ between the two genders (women's $M = 5.86$; men's $M = 5.65$), the fit of the scalar model

assuming equal item intercepts no longer differed significantly from the metric model (Satorra–Bentler scaled $\Delta\chi^2 = 14.70$, correction factor = 0.99, $\Delta df = 9$, $p = .100$). Single noninvariant items are unlikely to affect the mean of the latent variable on which we based our hypothesis tests (Byrne et al., 1989; Cheung & Rensvold, 2002). Consequently, we assume that participants' gender did not influence their responding behavior considerably.

Secondly, we tested for gender invariance of the correlations between the five latent variables. Thereby, we modeled all possible correlation paths between the five latent variables (i.e., 15). A structural equation model allowing correlations to vary between women and men did not fit the data significantly better than a structural equation model constraining the correlations of all study variables to be equal for female and male participants (Satorra–Bentler scaled $\Delta\chi^2 = 37.51$, correction factor = 1.14, $\Delta df = 27$, $p = .086$). We conclude that participants' gender did not influence the relationship of the focal variables, allowing us to test our hypotheses by means of gender–invariant multilevel analyses based on an actor–partner interdependence model.

Preliminary analysis for within-person consistencies

Before finally testing our hypotheses, we further examined the degree of within-person consistencies in participants' responses to the items defining a variable at the day-level. Table 1 presents the ICC (intra–class correlation coefficient) referring to the percentage of consistency (as the opposite of variation) calculated with the following formula (see Asparouhov, 2006): variance between person / (variance between person + variance within person). As the ICC of our focal variables ranged between 29% (thought sharing with the partner) and 69% (relationship satisfaction), there was not substantial within-person consistency, so a day-level data analysis is statistically justified as participants' responses varied throughout the days of their study participation.

[Insert Table 2 about here]

Hypotheses test

Table 2 displays the means, standard deviations, intra–class correlations, zero–order correlations, and reliabilities (Cronbach's alphas were estimated using a multilevel approach in Mplus; see Geldhof et al., 2014) on the day- and person-levels based on a model with all study variables (which was separate from the two models in which we tested our hypotheses). Table 3 and Table 4 show the standardized regression estimates on the day–level based on the two path models for the hypotheses test (one containing negative work rumination and all hypothesized paths, the other containing positive work rumination and all hypothesized paths).

[Insert Table 3 about here]

[Insert Table 4 about here]

In favor of Hypotheses 1a and 1b, actors' day–specific negative and positive rumination about work were associated with their reduced attention to their partners.[9] The following two hypotheses predicted that the actor's attention to the partner on a given day relates positively to the actor's and the partner's relationship satisfaction on that day. As displayed in Table 3,

[9] As can be seen in Table 2, there is no significant correlation between negative and positive rumination and attention to the partner, yet the main effect in the path models yielded significance. In the correlation, these relationships most likely suffer from omitted variable bias, since the interaction term as a theoretically relevant factor is excluded. Thus, testing main effects and interaction terms in the same model is recommended to increase the interpretational value of regression coefficients (Jaccard et al., 1990; Li et al., 2019).

in both models the actor's attention to the partner positively related to both partners' relationship satisfaction. These findings support Hypotheses 2 and 3.

Consequently, when considering the actor's reduced attention to the partner as a mediator, rumination about work indirectly predicted reduced relationship satisfaction for both actor (negative rumination model: β = -.10, *SE* = .05, 95% confidence interval [CI] [-.1923, -.0193]; positive rumination: β = -.12, *SE* = .05, 95% CI [-.2015 -.0496]) and partner (negative rumination: β = -.05, *SE* = .04, 95% CI [-.1288, -.0026]; positive rumination: β = -.06, *SE* = .04, 95% CI [-.394, -.0035]). These results confirm our Hypotheses 4 and 5.

As further hypothesized, actor's sharing of work-related thoughts with the partner attenuated the negative effect of negative and positive work rumination on the actor's attention to the partner. Simple slopes indicated that, under low levels (i.e., 2 on a scale from 1 to 7) of actor's thought sharing with the partner, both negative rumination (*B* = -0.36, *SE* = .08, $p < .001$) and positive rumination (*B* = -0.31, *SE* = .08, $p < .001$) have significant negative associations with actor's attention to the partner. The associations decrease under medium levels (i.e., 4) of actor's thought sharing with the partner (negative rumination: *B* = -0.23, *SE* = .06, $p < .001$; positive rumination: *B* = -0.13, *SE* = .06, $p < .05$) and finally lose their significance under high levels (i.e., 6) of actor's thought sharing with the partner (negative rumination: *B* = -0.10, *SE* = .09, $p = .312$; positive rumination: *B* = 0.05, *SE* = .09, $p = .602$). These results are in favor of Hypotheses 6a and 6b.[10] The interactions between

[10] In order to show that no conversation between partners attenuates the relationship between rumination and attention, but that it is crucial to talk about actors' work-related thoughts, we conducted another analysis with couples' conversation about the partner's work-

negative and positive rumination and sharing work-related thoughts and their effect on attentions to the partner are illustrated in Figures 2 and 3, respectively.

Finally, as expected, actor's sharing of work-related thoughts with the partner attenuated the indirect effect between rumination and both partners' relationship satisfaction via the actor's attention to the partner: The interaction turned around the indirect negative effect of negative work rumination on actor's (β = .15, *SE* = .08, 95% CI [.0421, .2886]) and partner's (β = .08, *SE* = .05, 95% CI [.0068, .1946]) relationship satisfaction, and also the indirect negative effect of positive work rumination on the actor's (β = .20, *SE* = .07, 95% CI [.1044, .3168]) and the partner's (β = .11, *SE* = .06, 95% CI [.0065, .2234]) relationship satisfaction due to the actor's increased attention to the partner. These results support Hypotheses 7a, 7b, 8a, and 8b.

[Insert Figure 2 about here]

[Insert Figure 3 about here]

Discussion

Rumination about work outside working hours is known to facilitate work spillovers into private life where it does not only affect workers' psychological state and wellbeing but also crosses over to their partners due to their interactions (Bakker & Demerouti, 2013). Research emphasizes the role of negative work rumination in an affective spillover-crossover mechanism that harms the wellbeing of workers and of their romantic relationships (Green et

---

related thoughts as a moderator. This analysis yielded no significant interaction effect on actor's attention to the partner (negative rumination: *B* = -0.01, *p* = .852; positive rumination: *B* = 0.02, *p* = .664).

al., 2011; King & DeLongis, 2014). So far we lack knowledge on the impact of positive work rumination on couples' interactions and on alternative, non-affective spillover-crossover mechanisms explaining previous findings of workers' withdrawal (e.g., Story & Repetti, 2006) from the partner which is known to relate negatively to relationship satisfaction (Johnson et al., 2018; Tandler et al., 2020). Further, it should be noted that although only adverse effects have been shown for workers' relationships, we currently miss some practical implications on how workers and their partners can counteract a harmful spillover-crossover mechanism. By conducting this study, we have contributed to filling these three research gaps.

First, our results confirm our hypothesized cognitive spillover-crossover mechanism based on the load theory of selective attention (Lavie et al., 2004). More precisely, our results show that, at the day–level, both negative and positive rumination about work relate to workers' reduced attention to the partner during their time together after work. That is, on days workers had to think more than usual about work outside working hours, they also reported being less attentive to their partners than usual, and this effect arose regardless of whether their work-related thoughts were negative or positive. In turn, on days workers paid more attention to their partners than they do on average, they and their partners felt more satisfied with their relationship than they did on average. Our findings are in line with prior research that links negative rumination about work to tension (King & DeLongis, 2014) and negative emotional displays within romantic relationships (Green et al., 2011). Yet, our findings also extend this line of research and specify a cognitive mechanism predicting an indirect detrimental impact of any kind of ruminative thoughts about work on workers' romantic relationship without implying a preceding strong affect triggered at work. Thus, our cognitive spillover-crossover mechanism has incremental value to the negative-affective

spillover-crossover mechanisms shown by previous studies (e.g., Debrot et al., 2018; King & DeLongis, 2014; Rodríguez-Muñoz et al., 2018).

Secondly, to our knowledge, this study was the first to integrate positive work rumination in a conceptual spillover-crossover model and thus to report the consequences of workers' positive rumination about work on their partners. More precisely, we showed that, just like their negative counterpart, positive thoughts about work reduce workers' attention to their partners during their private time together and so indirectly lower both partners' relationship satisfaction on the same day. Detrimental crossover effects following positive work rumination are insofar interesting because previous studies indicated mostly beneficial spillover effects of positive work rumination on workers' wellbeing. However, these effects were mostly shown in terms of higher levels of affective wellbeing indicators such as high (Sonnentag & Grant, 2012; Weigelt et al., 2019) and low activated positive mood (Fritz & Sonnentag, 2006; Meier et al., 2016) and behaviors facilitating health (Frone, 2015) and do not reveal the impact of positive rumination on the cognitive components of workers' wellbeing such as satisfaction (for the distinction between affective and cognitive wellbeing see e.g., Organ & Near, 1985).

Thirdly, by demonstrating a mechanism that buffers the damaging cognitive spillover from work rumination to attention to the partner outside of working hours, we suggest a way for couples to actively intervene in the chain of action and to take control of their own happiness. More precisely, we proposed and proved that the sharing of their negative or positive work-related thoughts attenuated the negative relationship of rumination on attention to the partner. By following the load theory of selective attention (Lavie et al., 2004), we suspect that this is due to a promoted resolution of workers' thoughts about work with the help of dyadic coping together with the partner (see e.g., Bodenmann, 1997; Lin et al., 2016).

Resolving the work issue makes the limited attentional resources of working memory available again, which workers can now direct to the partner. Correspondingly, a couple's conversation about work even reverses the harmful indirect effect of negative and positive work ruminations on both partners' relationship satisfaction into a beneficial effect.

We can think of one alternative explanation why thought sharing might function as a buffering mechanism in the cognitive spillover-crossover model that is also in line with the load theory of selective attention (Lavie et al., 2004). By discussing the work issue, the couple might trigger an elaboration process that fosters the deep encoding and storing of the information on workers' minds in the long–term memory which subsequently releases attentional resources in the working memory (Bartsch et al., 2018). Talking with others about their thoughts should encourage elaboration because talking forces to elaborate one's thoughts by ordering them in the mind and then expressing them in whole sentences that contain all relevant details so that another person can comprehend the issue (Dunlosky & Hertzog, 2001). Focusing on concrete details such as what occurred where, when, and why has been shown to reduce rumination within depressive individuals (Watkins et al., 2012).

Our study also connects to research on work-nonwork boundaries and workers' boundary management in terms of separating versus integrating the two life domains (Kossek et al., 2012). In this context, talking about work with the partner can be framed as "cross–realm talk" (Nippert-Eng, 1996) and thus as an activity integrating work and private life. Integrating work and private life is traditionally viewed critically as it easily evokes a conflict between the two life domains over scarce resources such as time and energy (Schoellbauer et al., in press). However, in today's 24/7 working society, a strict separation between work and private life is increasingly becoming an unrealizable ideal (Duxbury & Smart, 2011), so it seems increasingly necessary to find ways to deal with the blurring boundaries between work

and private life. Thus, pointing toward a beneficial process of an integrating activity is a further unique contribution of this study.

Strengths and limitations

Our work has both strengths and limitations. Starting with strengths, we emphasize the sound theoretical foundation of our hypothesized psychological mechanisms based on the load theory of selective attention (Lavie et al., 2004) which we further embedded into the intuitive spillover–crossover framework (Bakker & Demerouti, 2013). This is especially important as authors have suggested that effective theory borrowing is crucial to advance research on the work-family interface (Matthews et al., 2016). Unfortunately, psychology is known for its focus on empirical investigation while often neglecting the development of theories within its disciplines which constitutes a limitation as compared to other sciences such as physics (Borghi & Fini, 2019).

On a methodological level, we applied a diary design and thus added a day–level perspective to the spillover–crossover literature that is accounting for the daily variation of the focal variables within a person and a couple. The daily–diary design further allowed us to outline the cognitive spillover-crossover mechanism as well as the buffering mechanism within a certain time. When investigating psychological processes, time should always be considered a crucial factor (Navarro et al., 2015). Moreover, because participants' reports within the diary questionnaires referred to their most recent experiences and behaviors, we minimized hindsight bias. Finally, we anticipated concerns about common method bias (Podsakoff et al., 2012) by separating the daily measurement of negative and positive work rumination from the measurement of the other variables.

Our study also shows limitations—especially of methodological nature—that potential follow-up studies should consider. First and foremost, we sufficiently tested the proposed

spillover-crossover mechanism, yet one could argue we did not capture all relevant mediators in the process. More precisely, we argued that work rumination reduces workers' attention to the partner because work-related thoughts occupy the limited attentional resources of workers' working memories. Strictly speaking, however, our study proved the relationship between rumination and attention to the partner. For us, the occupation of cognitive resources was logically implied by reduced attention and its measurement was not possible anyway with a questionnaire design based on self-reports. Likewise, we argued that attention to the partner relates positively to relationship satisfaction because it is a necessary precondition for interactions to happen between the partners. Yet, we did not capture couples' interactions because it seemed too sophisticated to ask the participants to rate the actual interactions they had with their partner nested within their time together (which they also could spend non-interacting) during an evening after work.

Moreover, in our hypothesized cognitive spillover-crossover mechanism, we focused on thoughts and attentional processes, and such internal psychological states are difficult to assess outside of self–reports (Spector, 2019). Yet, participants' self–reports are known to be prone to biases including central or extreme response tendencies. Finally, our sample consisted mainly of white–collar workers, which potentially limits our findings' generalizability.

Implications for future research

Future research should not only overcome the limitations of our study, but also address in more detail two topics that we introduced into spillover crossover research. First, as positive work rumination is known to beneficially affect workers' mood (e.g., Meier et al., 2016; Weigelt et al., 2019), the investigation of its impact on couples' affective interactions after

work would be a relevant contribution to the literature. It may even reveal a positive-affective mechanism in which work beneficially impacts the relationship dynamics of workers and their partners. Consequently, at some point future research should also address both the previously established affective (via the affective tone of couples' interactions) and the cognitive spillover-crossover mechanism (via attention) simultaneously in order to empirically investigate their interplay and to estimate their incremental value to each other.

Secondly, future research should capture couples' thought sharing in more detail in order to specify the proposed buffering mechanism. In this study, we captured couples' talk about workers' work-related thoughts with only one item and thus did not distinguish between the sharing of positive and negative thoughts. As our results were in favor of our hypotheses, this apparently does did matter much with regard to the postulated cognitive spillover-crossover mechanism, yet could add another layer when examining attention processes and rumination in the future. Moreover, future research should clarify the mechanism underlying the disclosed buffering effect of thought sharing. We only speculated that it is dyadic coping that supported the resolving of workers' thoughts, so we still lack knowledge on the level of emotional and practical support sought after by the worker and provided by the partner in conversations (see Shrout et al., 2006) and the partners' appraisal regarding whether their conversation about a work issue was constructive or destructive (Carroll et al., 2013).

Conclusion and practical implications

We outlined and empirically demonstrated a cognitive spillover-crossover mechanism linking negative and positive rumination about work to couples' lower relationship satisfaction on the same day via workers' lower attention to the partner. Yet, most importantly, we emphasized that workers are not helplessly at the mercy of work spilling over into and affecting their private life—on the contrary. Sharing their thoughts about work with

each other seems to be a practical way for couples to deal with the detrimental consequences of their ruminative thoughts about work on the daily quality of their relationship. It is a way for couples to actively intervene in the chain of action and to take control of their own happiness. Furthermore, if they cope with it successfully, partners may even end up benefiting from ruminating about work outside their working hours, at least with regard to their relationship satisfaction. Talking about work, however, probably serves more than just dyadic support or elaboration and thus the release of attentional resources. Especially if romantic partners do not have similar occupations or work for the same organization, talking about work could be a chance to get a glimpse into each other's work lives, greatly increasing their intimacy.

References

Asparouhov, T. (2006). General multi-level modeling with sampling weights. *Communications in Statistics - Theory and Methods*, *35*, 439–460. https://doi.org/10.1080/03610920500476598

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. 54–71). Psychology Press.

Bartsch, L. M., Singmann, H., & Oberauer, K. (2018). The effects of refreshing and elaboration on working memory performance, and their contributions to long-term memory formation. *Memory & Cognition*, *46*, 796–808. https://doi.org/10.3758/s13421-018-0805-9

Bodenmann, G. (1997). Dyadic coping: A systemic-transactional view of stress and coping among couples: Theory and empirical findings. *Revue Européenne de Psychologie Appliquée*, *47*, 137–140.

Borghi, A. M., & Fini, C. (2019). Theories and explanations in psychology. *Frontiers in Psychology, online publication*.

Brosschot, J. F., Pieper, S., & Thayer, J. F. (2005). Expanding stress theory: Prolonged activation and perseverative cognition. *Psychoneuroendocrinology*, *30*, 1043–1049. https://doi.org/10.1016/j.psyneuen.2005.04.008

Byrne, B. M., Shavelson, R. J., & Muthén, B. (1989). Testing for the equivalence of factor covariance and mean structures: The issue of partial measurement invariance. *Psychological Bulletin*, *105*, 456–466. https://doi.org/10.1037/0033-2909.105.3.456

Cardenas, R. A., Major, D. A., & Bernas, K. H. (2004). Exploring work and family distractions: Antecedents and outcomes. *International Journal of Stress Management, 11*, 346–365. https://doi.org/10.1037/1072-5245.11.4.346

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*, *35*, 530–545. https://doi.org/10.1007/s10591-013-9237-7

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, *9*, 233–255. https://doi.org/10.1207/S15328007SEM0902_5

Clauss, E., Hoppe, A., O'Shea, D., González Morales, M. G., Steidle, A., & Michel, A. (2018). Promoting personal resources and reducing exhaustion through positive work reflection among caregivers. *Journal of Occupational Health Psychology*, *23*, 127–140. https://doi.org/10.1037/ocp0000063

Cook, W. L., & Kenny, D. A. (2005). The actor–partner interdependence model: A model of bidirectional effects in developmental studies. *International Journal of Behavioral Development*, *29*, 101–109. https://doi.org/10.1080/01650250444000405

Cowlishaw, S., Evans, L., & McLennan, J. (2010). Work–family conflict and crossover in volunteer emergency service workers. *Work & Stress*, *24*, 342–358. https://doi.org/10.1080/02678373.2010.532947

Danner-Vlaardingerbroek, G., Kluwer, E. S., Van Steenbergen, E. F., & Van Der Lippe, T. (2013). Knock, knock, anybody home? Psychological availability as link between work and relationship. *Personal Relationships*, *20*, 52–68. https://doi.org/10.1111/j.1475-6811.2012.01396.x

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, 19*, 2283–2301. https://doi.org/10.1007/s10902-017-9922-6

Diener, E. (2000). Subjective well-being: The science of happiness and a proposal for a national index. *American Psychologist, 55*, 34–43. https://doi.org/10.1037/0003-066X.55.1.34

Donahue, E. G., Forest, J., Vallerand, R. J., Lemyre, P.-N., Crevier-Braud, L., & Bergeron, É. (2012). Passion for work and emotional exhaustion: The mediating role of rumination and recovery. *Applied Psychology: Health and Well-Being, 4*, 341–368. https://doi.org/10.1111/j.1758-0854.2012.01078.x

Donato, S., Parise, M., Iafrate, R., Bertoni, A., Finkenauer, C., & Bodenmann, G. (2015). Dyadic coping responses and partners' perceptions for couple satisfaction: An actor–partner interdependence analysis. *Journal of Social and Personal Relationships, 32*, 580–600. https://doi.org/10.1177/0265407514541071

Dunlosky, J., & Hertzog, C. (2001). Measuring strategy production during associative learning: The relative utility of concurrent versus retrospective reports. *Memory & Cognition, 29*, 247–253. https://doi.org/10.3758/BF03194918

Duxbury, L., & Smart, R. (2011). The "myth of separate worlds": An exploration of how mobile technology has redefined work-life balance. In S. Kaiser, M. J. Ringlstetter, D. R. Eikhof, & M. Pina e Cunha (Eds.), *Creating Balance?* (pp. 269–284). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-16199-5_15

Eurofound and the International Labour Office. (2017). *Working anytime, anywhere: The effects on the world of work*. Publications Office of the European Union and the

International Labour Office. https://www.eurofound.europa.eu/sites/default/files/wpef18007.pdf

Ezzedeen, S. R., & Swiercz, P. M. (2007). Development and initial validation of a cognitive-based work-nonwork conflict scale. *Psychological Reports*, *100*, 979–999. https://doi.org/10.2466/pr0.100.3.979-999

Falconier, M. K., Jackson, J. B., Hilpert, P., & Bodenmann, G. (2015). Dyadic coping and relationship satisfaction: A meta-analysis. *Clinical Psychology Review*, *42*, 28–46. https://doi.org/10.1016/j.cpr.2015.07.002

Falconier, M. K., & Kuhn, R. (2019). Dyadic coping in couples: A conceptual integration and a review of the empirical literature. *Frontiers in Psychology*, *10*, article 571. https://doi.org/10.3389/fpsyg.2019.00571

Fritz, C., & Sonnentag, S. (2006). Recovery, well-being, and performance-related outcomes: The role of workload and vacation experiences. *Journal of Applied Psychology*, *91*, 936–945. https://doi.org/10.1037/0021-9010.91.4.936

Frone, M. R. (2015). Relations of negative and positive work experiences to employee alcohol use: Testing the intervening role of negative and positive work rumination. *Journal of Occupational Health Psychology*, *20*, 148–160. https://doi.org/10.1037/a0038375

Gistelinck, F., Loeys, T., Decuyper, M., & Dewitte, M. (2018). Indistinguishability tests in the actor-partner interdependence model. *British Journal of Mathematical and Statistical Psychology*, *71*, 472–498. https://doi.org/10.1111/bmsp.12129

Green, S. G., Bull Schaefer, R. A., MacDermid, S. M., & Weiss, H. M. (2011). Partner reactions to work-to-family conflict: Cognitive appraisal and indirect crossover in

couples. *Journal of Management*, *37*, 744–769. https://doi.org/10.1177/0149206309349307

International Labour Office. (2012). *International Standard Classification of Occupations: ISCO-08*. International Labour Office.

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

Johnson, M. D., Horne, R. M., Hardy, N. R., & Anderson, J. R. (2018). Temporality of couple conflict and relationship perceptions. *Journal of Family Psychology*, *32*, 445–455. https://doi.org/10.1037/fam0000398

Kenny, D. A., & Ledermann, T. (2010). Detecting, measuring, and testing dyadic patterns in the actor–partner interdependence model. *Journal of Family Psychology*, *24*, 359–366. https://doi.org/10.1037/a0019651

King, D. B., & DeLongis, A. (2014). When couples disconnect: Rumination and withdrawal as maladaptive responses to everyday stress. *Journal of Family Psychology*, *28*, 460–469. https://doi.org/10.1037/a0037160

Kirkegaard Thomsen, D. K., Tønnesvang, J., Schnieber, A., & Olesen, M. H. (2011). Do people ruminate because they haven't digested their goals? The relations of rumination and reflection to goal internalization and ambivalence. *Motivation and Emotion*, *35*, 105–117. https://doi.org/10.1007/s11031-011-9209-x

Korunka, C., & Kubicek, B. (2017). *Job demands in a changing world of work*. Springer International Publishing. https://doi.org/10.1007/978-3-319-54678-0_1

Kossek, E. E., Ruderman, M. N., Braddy, P. W., & Hannum, K. M. (2012). Work–nonwork boundary management profiles: A person-centered approach. *Journal of Vocational Behavior, 81*, 112–128. https://doi.org/10.1016/j.jvb.2012.04.003

Laurenceau, J.-P., Barrett, L. F., & Rovine, M. J. (2005). The interpersonal process model of intimacy in marriage: A daily-diary and multilevel modeling approach. *Journal of Family Psychology*, *19*, 314–323. https://doi.org/10.1037/0893-3200.19.2.314

Lavie, N. (2010). Attention, distraction, and cognitive control under load. *Current Directions in Psychological Science, 19*, 143–148. https://doi.org/10.1177/0963721410370295

Lavie, N., Hirst, A., de Fockert, J. W., & Viding, E. (2004). Load theory of selective attention and cognitive control. *Journal of Experimental Psychology: General*, *133*, 339–354. https://doi.org/10.1037/0096-3445.133.3.339

Lavie, N., & Tsal, Y. (1994). Perceptual load as a major determinant of the locus of selection in visual attention. *Perception & Psychophysics*, *56*, 183–197. https://doi.org/10.3758/BF03213897

Lazarus, R. S., & Folkman, S. (1987). Transactional theory and research on emotions and coping. *European Journal of Personality*, *1*, 141–169. https://doi.org/10.1002/per.2410010304

Li, M., Sharp, B. M., Bergh, D. D., & Vandenberg, R. (2019). Statistical and methodological myths and urban legends in strategic management research: The case of moderation analysis. *European Management Review*, *16*, 209–220. https://doi.org/10.1111/emre.12319

Lin, W.-F., Chen, L. H., & Li, T.-S. (2016). Are “we” good? A longitudinal study of we-talk and stress coping in dual-earner couples. *Journal of Happiness Studies*, *17*, 757–772. https://doi.org/10.1007/s10902-015-9621-0

Macdonald, J. S. P., & Lavie, N. (2011). Visual perceptual load induces inattentional deafness. *Attention, Perception, & Psychophysics*, *73*, 1780–1789. https://doi.org/10.3758/s13414-011-0144-4

Martin, L. L., & Tesser, A. (1996). Some ruminative thoughts. In R. S. Wyer (Ed.), *Ruminative thoughts* (pp. 1–46). Lawrence Erlbaum.

Matthews, R. A., Wayne, J. H., & McKersie, S. J. (2016). Theoretical approaches to the study of work and family: Avoiding stagnation via effective theory borrowing. In T. D. Allen & L. T. Eby (Eds.), *The Oxford handbook of work and family* (pp. 23–35). Oxford University Press.

Meier, L. L., & Cho, E. (2019). Work stressors and partner social undermining: Comparing negative affect and psychological detachment as mechanisms. *Journal of Occupational Health Psychology*, *24*, 359–372. https://doi.org/10.1037/ocp0000120

Meier, L. L., Cho, E., & Dumani, S. (2016). The effect of positive work reflection during leisure time on affective well-being: Results from three diary studies. *Journal of Organizational Behavior*, *37*, 255–278. https://doi.org/10.1002/job.2039

Mellings, T. M. B., & Alden, L. E. (2000). Cognitive processes in social anxiety: The effects of self- focus, rumination and anticipatory processing. *Behaviour Research and Therapy*, *38*, 243–257.

Michl, L. C., McLaughlin, K. A., Shepherd, K., & Nolen-Hoeksema, S. (2013). Rumination as a mechanism linking stressful life events to symptoms of depression

and anxiety: Longitudinal evidence in early adolescents and adults. *Journal of Abnormal Psychology, 122*, 339–352. https://doi.org/10.1037/a0031994

Muthén, L. K., & Muthén, B. O. (2017). *Mplus user's guide (8th edition)*. Muthén & Muthén.

Navarro, J., Roe, R. A., & Artiles, M. I. (2015). Taking time seriously: Changing practices and perspectives in work/organizational psychology. *Revista de Psicología Del Trabajo y de Las Organizaciones [Journal of Work and Organizational Psychology], 31*, 135–145. https://doi.org/10.1016/j.rpto.2015.07.002

Nippert-Eng, C. (1996). Calendars and keys: The classification of "home" and "work." *Sociological Forum, 11*, 563–582. https://doi.org/10.1007/BF02408393

Norton, R. (1983). Measuring marital quality: A critical look at the dependent variable. *Journal of Marriage and the Family, 45*, 141–151. https://doi.org/10.2307/351302

Organ, D. W., & Near, J. P. (1985). Cognition vs affect in measures of job satisfaction. *International Journal of Psychology, 20*, 241–253. https://doi.org/10.1080/00207598508247735

Podsakoff, P. M., MacKenzie, S. B., & Podsakoff, N. P. (2012). Sources of method bias in social science research and recommendations on how to control it. *Annual Review of Psychology, 63*, 539–569. https://doi.org/10.1146/annurev-psych-120710-100452

Preacher, K. J., & Selig, J. P. (2010). *Monte Carlo method for assessing multilevel mediation: An interactive tool for creating confidence intervals for indirect effects in 1-1-1 multilevel models [Computer software]*. http://quantpsy.org/

Putnick, D. L., & Bornstein, M. H. (2016). Measurement invariance conventions and reporting: The state of the art and future directions for psychological research. *Developmental Review, 41*, 71–90. https://doi.org/10.1016/j.dr.2016.06.004

Repetti, R. L. (1989). Effects of daily workload on subsequent behavior during marital interaction: The roles of social withdrawal and spouse support. *Journal of Personality and Social Psychology, 57*, 651–659.

Rodríguez-Muñoz, A., Sanz-Vergel, A. I., Antino, M., Demerouti, E., & Bakker, A. B. (2018). Positive experiences at work and daily recovery: Effects on couple's well-being. *Journal of Happiness Studies, 19*, 1395–1413. https://doi.org/10.1007/s10902-017-9880-z

Rogers, S. J., & May, D. C. (2003). Spillover between marital quality and job satisfaction: Long-term patterns and gender differences. *Journal of Marriage and Family, 65*, 482–495. https://doi.org/10.1111/j.1741-3737.2003.00482.x

Rosa, H. (2011). Beschleunigung und Depression—Überlegungen zum Zeitverhältnis der Moderne [Acceleration and depression—Reflections on time relations of modernity]. *Psyche – Zeitschrift Für Psychoanalyse [Psyche - Journal For Psychoanalysis], 65*, 1041–1060.

Rusbult, C. E., & Buunk, B. P. (1993). Commitment processes in close relationships: An interdependence analysis. *Journal of Social and Personal Relationships, 10*, 175–204. https://doi.org/10.1177/026540759301000202

Ruvolo, A. P. (1998). Marital well-being and general happiness of newlywed couples: Relationships across time. *Journal of Social and Personal Relationships, 15*, 470–489. https://doi.org/10.1177/0265407598154002

Schoellbauer, J., Hartner-Tiefenthaler, M., & Kelliher, C. (in press). ICT-enabled work extension and its consequences: A paradoxical situation between high performance and low wellbeing. In C. Korunka (Ed.), *Flexible working practices and approaches:*

Psychological and social implications of a multifaceted phenomenon. Springer Nature Switzerland AG.

Sears, M. S., Repetti, R. L., Robles, T. F., & Reynolds, B. M. (2016). I just want to be left alone: Daily overload and marital behavior. *Journal of Family Psychology, 30*, 569–579. https://doi.org/10.1037/fam0000197

Segerstrom, S. C., Tsao, J. C. I., Alden, L. E., & Craske, M. G. (2006). Worry and rumination: Repetitive thought as a concomitant and predictor of negative mood. *Cognitive Therapy and Research, 24*, 671–688. https://doi.org/10.1023/A:1005587311498

Shrout, P. E., Herman, C. M., & Bolger, N. (2006). The costs and benefits of practical and emotional support on adjustment: A daily diary study of couples experiencing acute stress. *Personal Relationships, 13*, 115–134. https://doi.org/10.1111/j.1475-6811.2006.00108.x

Sonnentag, S., & Fritz, C. (2015). Recovery from job stress: The stressor-detachment model as an integrative framework. *Journal of Organizational Behavior, 36*, 72–103. https://doi.org/10.1002/job.1924

Sonnentag, S., & Grant, A. M. (2012). Doing good at work feels good at home, but not right away: When and why perceived prosocial impact predicts positive affect. *Personnel Psychology, 65*, 495–530. https://doi.org/10.1111/j.1744-6570.2012.01251.x

Spector, P. E. (2019). Introduction: The challenge–hindrance stressor model. *Journal of Organizational Behavior, 40*, 947–948. https://doi.org/10.1002/job.2404

Story, L. B., & Repetti, R. (2006). Daily occupational stressors and marital behavior. *Journal of Family Psychology*, *20*, 690–700. https://doi.org/10.1037/0893-3200.20.4.690

Tandler, N., Krüger, M., & Petersen, L.-E. (2020). Better battles by a self-compassionate partner? The mediating role of personal conflict resolution styles in the association between self-compassion and satisfaction in romantic relationships. *Journal of Individual Differences*, advance online publication. https://doi.org/10.1027/1614-0001/a000333

Tremmel, S., Sonnentag, S., & Casper, A. (2019). How was work today? Interpersonal work experiences, work-related conversations during after-work hours, and daily affect. *Work & Stress*, *33*, 247–267. https://doi.org/10.1080/02678373.2018.1496158

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*, 182–194. https://doi.org/10.1037/a0036011

Volmer, J., Binnewies, C., Sonnentag, S., & Niessen, C. (2012). Do social conflicts with customers at work encroach upon our private lives? A diary study. *Journal of Occupational Health Psychology*, *17*, 304–315. https://doi.org/10.1037/a0028454

Watkins, E. R., Taylor, R. S., Byng, R., Baeyens, C., Read, R., Pearson, K., & Watson, L. (2012). Guided self-help concreteness training as an intervention for major depression in primary care: A Phase II randomized controlled trial. *Psychological Medicine*, *42*, 1359–1371. https://doi.org/10.1017/S0033291711002480

Weigelt, O., Gierer, P., & Syrek, C. J. (2019). My mind is working overtime—Towards an integrative perspective of psychological detachment, work-related rumination, and

work reflection. *International Journal of Environmental Research and Public Health, 16*, 2987. https://doi.org/10.3390/ijerph16162987

Zhang, Z., Zyphur, M. J., & Preacher, K. J. (2009). Testing multilevel mediation using hierarchical linear models: Problems and solutions. *Organizational Research Methods, 12*, 695–719. https://doi.org/10.5465/ambpp.2008.33716518

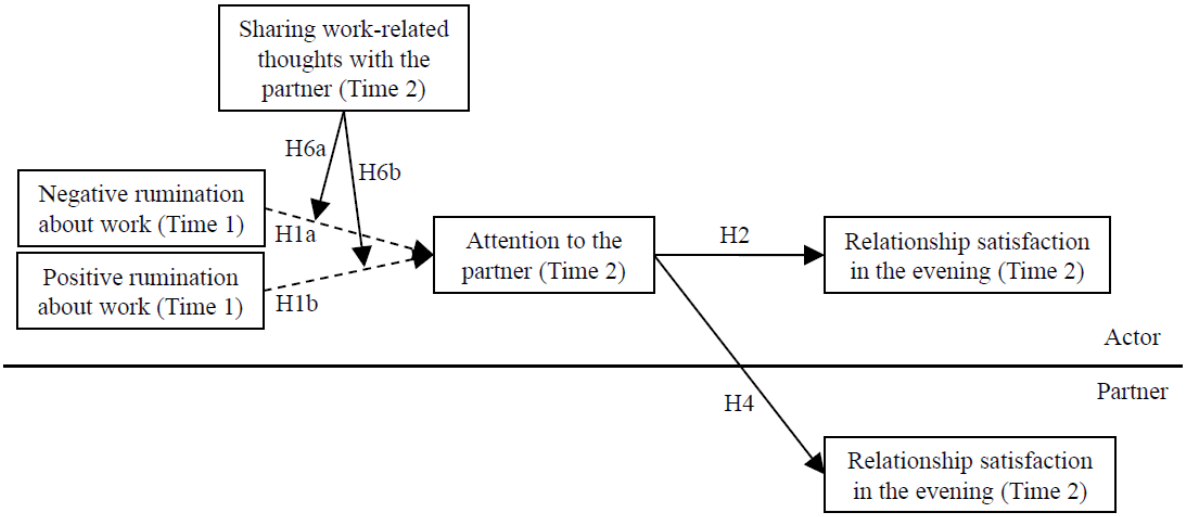

Figure 1. Overall conceptual model with the hypothesized cognitive spillover-crossover mechanism and the buffering mechanism (H6). *Note*: The term "actor" refers to the worker and the term "partner" refers to the worker's partner. The hypotheses referring to the indirect relationship between work rumination to actor's (H3) and partner's relationship satisfaction (H5) via actor's attention to the partner as well as the moderated mediation hypotheses (H7 and H8) are not displayed.

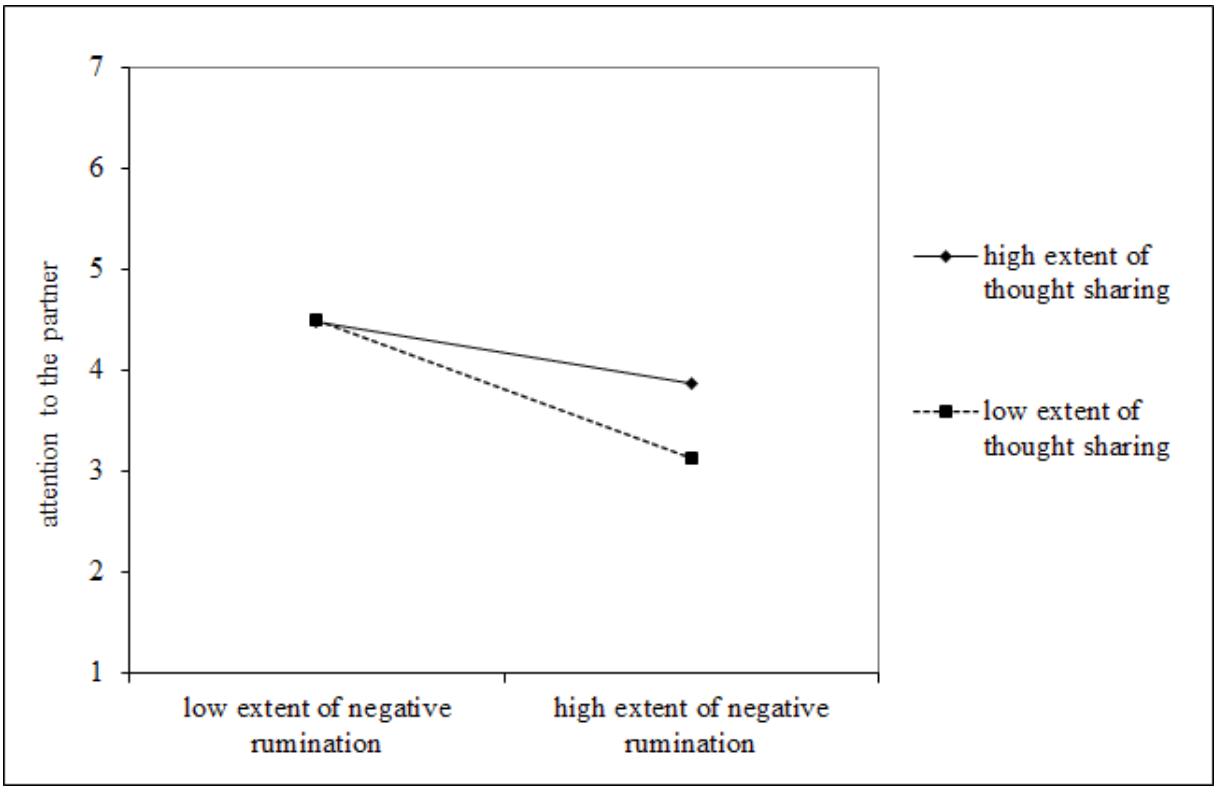

Figure 2. Interaction effect of negative rumination and sharing work-related thoughts with the partner on actor's attention to the partner

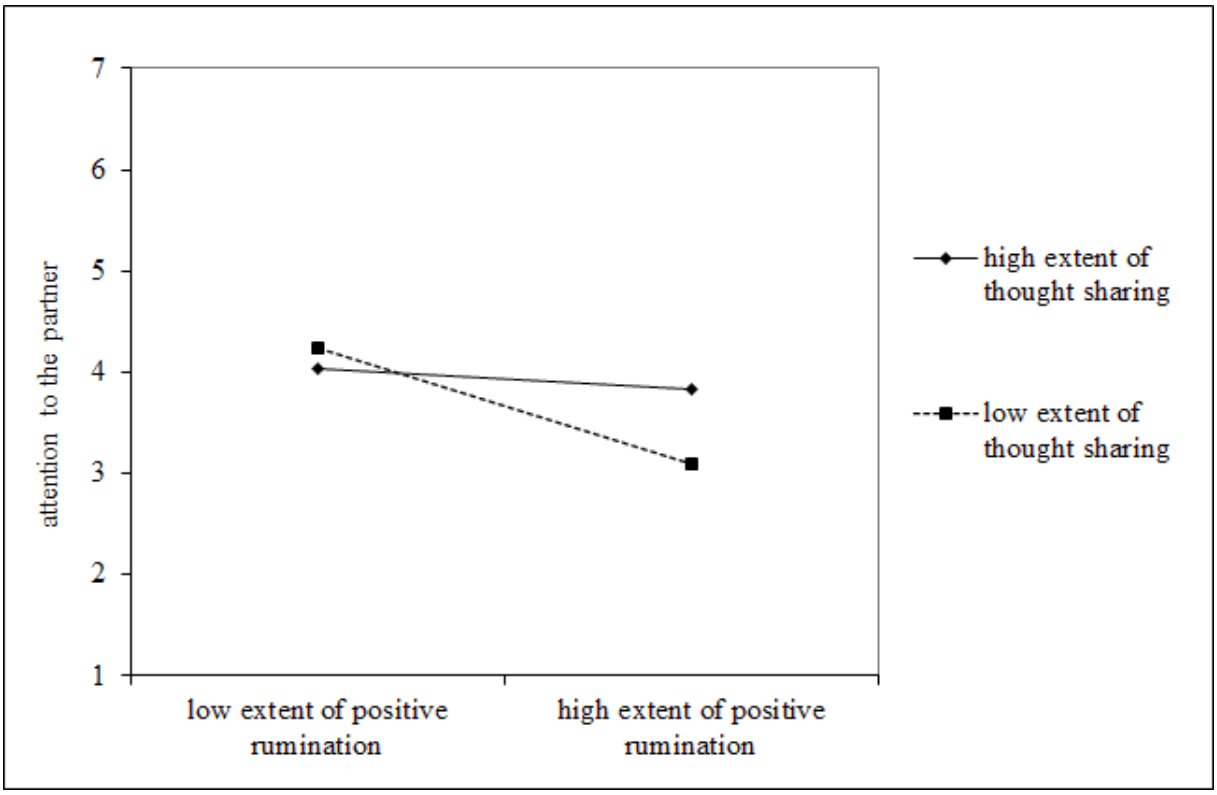

Figure 3. Interaction effect of positive rumination and sharing work-related thoughts with the partner on actor's attention to the partner

Table 1. Confirmatory factor analysis and Satorra–Bentler scaled chi–square difference testing

Model	χ^2	df	CFI	RMSEA	Compared to model	SB–$\Delta\chi^2$	SB–CF	Δdf	p
5 (neg. rumination, pos. rumination, attention to partner, thought sharing, and relationship satisfaction as one factor each)	280.84	100	.91	.05					
4 (neg. and pos. rumination as one factor; attention to partner, thought sharing, and relationship satisfaction as one factor each)	435.22	110	.84	.07	5	181.00	0.85	10	< .001
3 (neg. and pos. rumination as one factor; attention to partner and relationship satisfaction as one factor; thought sharing as one factor)	635.31	118	.74	.08	4	248.00	0.79	8	< .001

2 (neg. and pos. rumination and thought sharing as one factor; attention to partner and relationship satisfaction as one factor)	680.31	124	.72	.08	3	198.43	0.07	6	< .001
1 (neg. rumination, pos. rumination, attention to partner, thought sharing, and relationship satisfaction as one factor)	1254.55	128	.44	.12	2	3623.53	0.14	4	< .001

CFA = Comparative fit index, RMSEA = Root mean square error of approximation, SB = Satorra–Bentler, CF = Correction factor

Table 2. Means, standard deviations, intra–class correlations, zero–order correlations, and reliabilities of the study variables

Variables	Person–level			Day–level									
	M	SD	α	SD	α	ICC	1	2	3	4	5	6	7
1. Actor's negative work rumination (T1)	2.54	0.93	.91	0.99	.74	.47		.38***	-.03	.21**	-.08	-.05	.04
2. Actor's positive work rumination (T1)	2.77	0.74	.93	1.05	.66	.34	.86***		.02	.11†	.04	-.01	-.04
3. Actor's attention to the partner (T2)	4.93	1.00	.99	0.86	.77	.58	-.53***	-.35**		.04	.39***	.19†	.16*
4. Actor's thought sharing with partner (T2)	3.00	0.99		1.35		.29	.53**	.65***	.12		.16*	.13	.19**
5. Actor's relationship satisfaction (T2)	5.34	1.08	.95	0.72	.74	.69	-.41***	-.24†	.84***	.20		.31***	.18*
6. Partner's relationship satisfaction (T2)	5.38	1.04	.96	0.76	.76	.66	-.12	.08	.49***	.37**	.60***		.10†
7. Actor's time with the partner (T2)	2.85	1.16		1.97		.26	-.35**	-.09	.48***	.17	.33*	.28*	

T = Time. ICC = Intra–class correlation coefficient. Figures above the diagonal are day–level correlations; below the diagonal are person–level correlations. *** $p < .001$, ** $p < .01$, * $p < .05$, † < .10.

Table 3. Day-level regression estimates from the multilevel path model including negative work rumination

	Actor's attention to the partner (Time 2)	Actor's relationship satisfaction (Time 2)	Partner's relationship satisfaction (Time 2)
Actor's negative work rumination (Time 1)	-.23* (.09)		
Actor's attention to the partner (Time 2)		.42*** (.08)	.23* (.10)
Actor's thought sharing with the partner (Time 2)	-.20* (.10)		
Actor's negative work rumination × thought sharing	.36** (.13)		
Actor's time spent with the partner (Time 2)	.18** (.06)		

Standardized regression estimates and standard errors (in parentheses) are reported, *** $p <$ .001, ** $p < .01$, * $p < .05$ (two–tailed)

Table 4 Day-level regression estimates from the multilevel path model including positive work rumination

	Actor's attention to the partner (Time 2)	Actor's relationship satisfaction (Time 2)	Partner's relationship satisfaction (Time 2)
Actor's positive work rumination (Time 1)	-.26*** (.07)		
Actor's attention to the partner (Time 2)		.45*** (.08)	.24* (.11)
Actor's thought sharing with the partner (Time 2)	-.27** (.09)		
Actor's positive work rumination × thought sharing	.44*** (.09)		
Actor's time spent with the partner (Time 2)	.18** (.06)		

Standardized regression estimates and standard errors (in parentheses) are reported,

*** $p < .001$, ** $p < .01$, * $p < .05$ (two–tailed)

Nachdruck von Schoellbauer, Sonnentag, Prem, und Korunka (2021)

Schoellbauer, J., Sonnentag, S., Prem, R., & Korunka, C. (2021). I'd rather know what to expect... Work unpredictability as contemporary work stressor with detrimental implications for employees' daily wellbeing. *Work & Stress*. Online-Veröffentlichung. https://doi.org/10.1080/02678373.2021.1976881

I'd rather know what to expect... Work unpredictability as contemporary work stressor with detrimental implications for employees' daily wellbeing

Julia Schoellbauer, Sabine Sonnentag, Roman Prem, and Christian Korunka

Author Notes

Julia Schoellbauer, Department of Occupational, Economic, and Social Psychology, Faculty of Psychology, University of Vienna, Vienna, Austria.

Sabine Sonnentag, Department of Psychology, Faculty of Social Sciences, University of Mannheim, Mannheim, Germany.

Roman Prem, Institute of Psychology, University of Graz, Graz, Austria.

Christian Korunka, Department of Occupational, Economic, and Social Psychology, Faculty of Psychology, University of Vienna, Vienna, Austria.

Correspondence concerning this article should be addressed to Julia Schoellbauer, Department of Occupational, Economic, and Social Psychology, Faculty of Psychology, University of Vienna, Vienna, Austria. E-mail: julia.schoellbauer@univie.ac.at

Abstract

Particularly in knowledge-intensive jobs, employees are increasingly challenged by complex and dynamically changing work tasks. These developments make it difficult for employees to anticipate a day's upcoming work tasks and associated activities including methods, time requirements, and potential problems arising in the work process. We present three arguments why this work unpredictability represents a contemporary occupational stressor causing that affects employees until beyond working hours and is thus associated with lower daily wellbeing in the evening: Work unpredictability can be perceived as a lack of control at work, as a lack of mastery expectancies, and it might add high-effort planning and self-regulation demands to employees' daily psychological workload. In a diary study with 105 employees, we collected 666 observations at three daily measurement occasions over two weeks. The results supported our hypotheses and demonstrated that work unpredictability relates negatively to evening serenity via employees' elevated strain levels after work. These relationships were also found when controlling for time pressure as a representative of an established daily work stressor. We conclude that work unpredictability is a so far neglected work stressor that should receive more research attention in the future.

Keywords: work anticipation, cognitive activation theory of stress, stress reaction, multi-level path model

Introduction

Over the last decades, occupations characterised by the performance of knowledge-intensive work with a heavy reliance on information and communication technology experienced a shift from regularly recurring line operations to situation-sensitive project work (Schoper et al., 2018). These developments brought two major challenges for occupational groups in the constantly growing service sector, including managers, professionals (e.g. science, engineering), service and sales workers, and clerical support workers (derived from the classification of occupations of the United Nations; International Labour Organization, 2016). The first challenge is that, due to the flexible prioritisation of projects within organisations dependent on the market situation, employees' work tasks can dynamically change at any time (Mohr & Wolfram, 2010). The second challenge is the increase in complex work tasks, as project work involves irregularly changing activities and thus has a lower proportion of routine tasks (Schoper et al., 2018).

These profound changes in the world of work have been accompanied by a considerable fluctuation in the ability of employees to predict their daily work tasks and processes. "Predictability involves a relatively high stability of work and a lack of unexpected changes, which characterised the earlier industrial era which had stable production systems" (Väänänen et al., 2008, p. 2264). However, nowadays, the possibility that the prioritisation of projects due to organisational strategy can change any time makes it difficult for employees to predict which work tasks they will have to accomplish in a day (Väänänen et al., 2008). Moreover, with increasing task complexity, difficulties in anticipating the task completion process raised as well, including the methods and time needed to perform the work activities as well as any problems that may come up in the work process (Mohr & Wolfram, 2010).

The first purpose of this study is to provide theoretical reasoning why work unpredictability represents a contemporary, daily varying work stressor. Based on cognitive activation theory of stress (CATS; Ursin & Eriksen, 2004), we define a work stressor as employees' perception of a mismatch between what they think is required from them in a certain situation and what they would have desired themselves. Drawing on stress and motivation literature, we present three arguments why this applies to work unpredictability: First, work unpredictability is likely to be perceived as a lack of control which hinders employees from feeling autonomous. Second, work unpredictability hinders employees from taking anticipatory actions and can thus cause low expectancies to master one's work successfully (Meurs & Perrewé, 2011) and increase associated feelings of incompetence. Feeling autonomous and competent have both been described as innate human needs whose satisfaction and frustration, respectively, influence work-related motivation and wellbeing (Deci et al., 2017). Third, work unpredictability is associated with less low-effort routine work activities and more high-effort planning and regulation demands that add to employees' psychological workload (Mohr & Wolfram, 2010). High levels of workload are known to be a daily varying stressful work experience (Ilies et al., 2010).

The second purpose of this study is to provide empirical evidence for a relationship between work unpredictability and employees' daily wellbeing. Drawing again on CATS (Ursin & Eriksen, 2004), we hypothesise that employees' work unpredictability is associated with a stress reaction that sustains beyond their working hour of a day and, in turn, links higher levels of day-specific work unpredictability to lower levels of their serenity in the evening on the same day. To test our hypotheses, we conducted a daily diary study among employees in knowledge-intensive jobs. This approach enables us to consider daily variations in the perception and interpretation of work situations and individuals' psychological

responses to them (see also Ohly et al., 2010). We chose serenity as an indicator of wellbeing because it is a low activated positive emotional state (Cropanzano et al., 2003) that indicates a reduction of stressor-induced elevated strain, enabling mental recovery outside of working hours (Sonnentag & Fritz, 2007). Daily serenity and thus calming down psychologically after the encounter of a work stressor is critical because, in the long-term, sustained stress reactions are pathogenic pathways (Brosschot et al., 2005) leading to chronic physical and psychological impairments such as cardiovascular disease, burnout, and reduced life satisfaction (Sonnentag & Frese, 2012).

Our study represents a notable and necessary addition to the work stress literature. Research so far acknowledged the role of predictability as a work resource that relates to higher wellbeing (Flovik et al., 2019) and buffers the detrimental impact of stressful work situations (Mohr & Wolfram, 2010; Rosen et al., 2020), but failed to see the relevance of work unpredictability for wellbeing. However, related empirical findings on the unpredictability of work schedules (Scholarios et al., 2017) and of major organisational changes (Nielsen et al., 2006) provided evidence for a detrimental influence on employees' wellbeing and thus indicate that work unpredictability is more than just the absence of work predictability. More specifically, as it seems to be a work characteristic with raising salience in knowledge-intensive jobs, it is crucial to investigate the unpredictability of work tasks and activities (further referred to simply as work unpredictability) and its potential to harm employees' wellbeing on a daily level.

Work unpredictability as daily work stressor

Based on Mohr and Wolfram's (2010) definition of work predictability, we define work unpredictability as employees' inability to anticipate which work-related tasks and activities

they will have to perform on a day, including methods, time requirements, and potential problems arising in the process. This new form of work unpredictability is likely to be prone to daily variations (e.g. on certain days employees might face more difficulties to predict what lies ahead than on other days). It further differs from the unpredictability of longer-term events such as major organisational changes (see Nielsen et al., 2006) and career developments such as job insecurity (Vander Elst et al., 2012) that are nevertheless thought of to be detrimental for employees' wellbeing.

CATS (Ursin & Eriksen, 2004) elaborates that individuals tend to evaluate an environmental stimulus as a stressor if they perceive a discrepancy between their actual experiences and what they would have desired. If this discrepancy is accompanied by negative outcome expectancies, a stress reaction will be triggered (Ursin & Eriksen, 2004). Negative outcome expectancies refer to the subjective belief that a situation will not end well for oneself, whereas positive outcome expectancies refer to the subjective belief of being able to master the current situation which is associated with only a mild stress reaction that fades quickly (Meurs & Perrewé, 2011).

We present three reasons why work unpredictability is likely to be perceived as a discrepancy between what is and what would have been desired followed by negative consequences. First, work unpredictability can be experienced as a lack of control at work. The perception of control over one's life is "a major focus of interest in understanding the stress process and in explicating the possible links among stressors, psychological wellbeing, health, and functioning" (Price et al., 2002, p. 304). More precisely, as individuals have an innate need to experience ownership of their actions (e.g. to plan and to make decisions for themselves) and to act with a sense of volition (referred to as the need for autonomy; Deci et al., 2017), a perceived lack of control at work will cause a discrepancy with their desire for

control over their work activities. As work unpredictability may impede employees' planning and decision-making, it seems likely that employees' experience an inability to predict their work tasks and activities as a lack of control at work. In other words, we argue that work unpredictability can make employees aware of their lack of control at work, thus emphasising a discrepancy associated with negative personal consequences.

Second, work unpredictability can be associated with decreased expectancies to master one's workday successfully. While work predictability permits to take specific proactive actions in order to adapt to upcoming situations (Lazarus, 1991), the inability to foresee whether or not particular challenging situations might occur at work hinders individuals from "psychologically defend against or distort the stressor" (Meurs & Perrewé, 2011, p. 1050). They may also struggle to take specific anticipatory actions, for example seeking additional resources in a timely manner because they were confronted with a last-minute task change. Consequently, by actually decreasing their scope of action, work unpredictability may lower employees' prospects to master the upcoming work tasks and activities successfully. A lack of mastery expectancies, however, may cause a discrepancy as individuals have an innate desire to feel capable of mastering their environment (i.e. need for competence; Van den Broeck et al., 2008). The frustration of this need poses a personal threat and reduces employees' work-related motivation and wellbeing (Deci et al., 2017).

Third, work unpredictability makes work more intellectually demanding due to high effort planning and self-regulation demands. Whereas work predictability enables the implementation of routines that allow action regulation on an automatic, lower-demanding level, employees that are not able to foresee their work tasks and activities have to constantly develop action plans and to evaluate their actions, a situation associated with the exertion of high-level intellectual processes and cognitive overload (Mohr & Wolfram, 2010). Acts of

intellectual regulation require psychological efforts and thus add to employees' psychological workload (i.e. all currently perceived work demands and tasks) on a given day (Ilies et al., 2010). As high levels of workload up to cognitive overload are negatively associated with wellbeing (Bowling et al., 2015), we argue that employees may evaluate the unpredictability of work as a stressor due to the associated high workload, which is a discrepancy with a more desirable moderate level of workload. A negative relationship between psychological workload and performance (Fan & Smith, 2017) further suggests that employees might expect negative outcomes from this perceived discrepancy.

Our reasoning may not be conclusive for work unpredictability alone, it also applies to other, well-known work stressors such as time pressure and interruptions. Similar to our arguments why work unpredictability is a daily work stressor, Sonnentag et al. (2018) stated that work-related time pressure and interruptions may be associated with low goal achievement and high workload. However, time pressure conceptionally differs from the unpredictability of work tasks and activities insofar as work unpredictability does imply that one lacks information to foresee what is coming up next, but not that one has to rush in order to achieve the work goals. Moreover, while interruptions are inherently unpredictable, they are typically distractions from a primary task that delay goal achievement (Baethge & Rigotti, 2013). This is not the case for work unpredictability.

Sustained stress reaction and daily wellbeing

Stressors cause a stress reaction (Sonnentag & Frese, 2012) that remains persistent, even after the working hours have ended and the initial stressor is no longer present (Meurs & Perrewé, 2011). Individuals' psychological reaction to a stressor is mostly conceptualised as high activated negative feelings of strain, irritation or anxiety (Sonnentag & Frese, 2012). The stress reaction is supposed to put the individual in an uncomfortable position in order to

prompt them to take action and remove the cause of stress (Ursin & Eriksen, 2004). Actions to deal with a stressor are manifold and include "worry and rumination about the stressor, attempts to deal with the work-related problems, or engagement in additional work tasks during nonwork time" (Sonnentag & Fritz, 2015, p. 91). The stress reaction (i.e. feelings of strain) will sustain until the discrepancy between what is and what is desired could be dissolved (Ursin & Eriksen, 2004).

In the context of work unpredictability, feelings of strain may sustain beyond working hours because employees may continuously take actions that aim to cope with the aftermath of their lack of control, lack of mastery expectancies, or high psychological workload, or that aim to prevent these circumstances in the future. Employees might, for example, use their time after work to create a plan on how to handle the next situation in which the supervisor changes the prioritisation of tasks or projects, or to do research outside working hours in order to get familiar with a new project so that they can anticipate the next work steps and workdays. Anyway, constantly thinking about work outside working hours confronts them with the work stressor and thus re-create the stress reaction, even beyond the working hours of one day (Sonnentag & Fritz, 2015). Previous empirical findings accordingly linked low levels of perceived control (Vander Elst et al., 2012) and a frustration of one's need for competence at work (Bartholomew et al., 2011) to increased levels of employees' negative emotions on the same day. Moreover, Ilies et al. (2010) showed that high workload relates to higher feelings of strain after work on the same day. Consequently, we hypothesise that work unpredictability is associated with employees' higher levels of strain reported after work on the particular day.

Hypothesis 1: The higher employees' perceived work unpredictability on a particular day, the higher their level of strain after work on the same day.

The stress reaction and its duration is key in explaining the connection between stressors and more distant outcomes such as health and wellbeing (Brosschot & Thayer, 1998), yet it is often neglected by empirical stress research (Meurs & Perrewé, 2011). People feel subjectively well when they feel many pleasant and few unpleasant emotions (Cummins, 2010; Diener, 2000), and individuals' affective states appear to be particularly mutable following stressful experiences (DeLongis et al., 1988). In this study, we assess serenity as a measure of positive feelings such as being calm and relaxed (see Abele-Brehm & Brehm, 1986) that are thought to be beneficial for employees as they put them in a low activated psychological state in which exhausted energy reserves can be restored (Sonnentag & Fritz, 2007). However, before a calm state of serenity can be achieved after work, employees' physiological as well as psychological activation associated with the stress reaction must decrease (Geurts & Sonnentag, 2006).

A sustained stress reaction marked by feelings of strain will hinder employees from engaging in relaxing activities that would be needed to psychologically calm down after work (Sonnentag & Fritz, 2007) and to reach a comfortable state of serenity. Especially a person's positive affective state can significantly fluctuate within the course of a day (Saksvik-Lehouillier et al., 2021). Positive affect further seems be influenced by negative feelings as empirical findings showed that the higher the strain employees felt following work stressors such as time pressure (Sonnentag et al., 2018), technical difficulties and ambiguous work tasks (Ohly & Schmitt, 2015), the less positive emotions they felt on the same day. Consequently, we hypothesise an indirect relationship between work unpredictability and lower levels of serenity in the evening via employees' strain after work as mediator.

Hypothesis 2: Perceived work unpredictability will indirectly relate to lower serenity in the evening of the same day via higher levels of strain after work.

Method

As work unpredictability, strain, and serenity are each reflecting individual experiences and psychological states that are subject to intrapersonal variation from day to day, we conducted a diary study to observe the hypothesised path model on a daily level. To reduce common method bias (Podsakoff et al., 2012) and thus to increase the informative value of our study, we separated the daily measurement of all focal variables. Moreover, we included two control variables into our study: First, to demonstrate that work unpredictability causes a stress reaction independently of the influence of other common daily varying work stressors on participants' after-work strain, we included daily time pressure in our study. Second, to underline the specific relevance of the sustained stress reaction for employees to develop high levels of serenity during their off-work hours until the evening, we controlled for after-work serenity when regressing evening serenity on after-work strain on the day-level.

Sample and procedure

Participants were recruited by psychology master's degree students in the course of a class; students' help with recruitment was an optional class task and thus voluntary. The students were instructed to recruit employees who work at least 20 hours in knowledge-intensive jobs because as we assumed that work unpredictability is especially salient for this occupational group (Beerheide & Katenkamp, 2011; Flovik et al., 2019). In the course of recruitment, a total of 126 individuals that met our inclusion criteria announced their interest to take part in the study and filled out an initial online questionnaire that collected information on demographics and on the job.

After receiving their completed initial questionnaire, the first author invited the participants to respond to three questionnaires per day over the course of two consecutive work weeks. From Monday to Friday, participants received the link via SMS or e-mail to the

first daily questionnaire at 5 pm (which they should fill in at the end of the workday), to the second at 7 pm (which they should fill in about one to two hours after work), and to the third at 9 pm (which they should fill in before going to bed). We collected a total of 846 datasets from the at-work questionnaire (capturing work unpredictability and time pressure), 812 from the after-work questionnaire (capturing strain and serenity), and 750 from the evening questionnaire (capturing serenity). We matched day-level datasets from the same individual and for the same day if they were provided in the correct chronological order. Data matching was anonymously based on a code each participant entered on each questionnaire and resulted in 666 day-level observations nested within 105 individuals.

As 21 participants failed to provide day-level data and thus were excluded from the final sample, we tested for systematic attrition. Therefore, we conducted a two-sample t-test and compared the means of the dropped-out participants (N = 21) and those from the final study sample (N = 105). We examined differences in sociodemographic and occupational characteristics. Dropped out participants did not differ significantly from those in the final sample with regard to gender, age, education, job tenure, occupation, working hours per week, leadership position, and job satisfaction. These results indicated that the attrition of our study participants was random and not systematically biased.

In the final sample, participants' mean age was 34.8 years (SD = 11.5), 56.2% were female. They worked on average 39.6 hours per week (including overtime, SD = 9.3) and reported a mean position tenure of 6.6 years (SD = 8.7). Over a third of the sample (35.2%) reported having leadership responsibilities. Categorisation based on the classification of occupations of the United Nations (International Labour Organization, 2016) indicated that our sample consisted of professionals (41.2%), clerical support workers (20.6%), service and sales workers (18.6%), and managers (13.7%). Among the represented occupations, service

and sales workers (M= 2.6, SD = 0.9), professionals (M= 2.6, SD = 1.1) and clerical support workers (M= 2.6, SD = 2.0) reported the highest mean perceptions of work unpredictability, followed by managers (M= 2.1, SD = 0.8).

Measures

Questionnaires were provided in German. Participants' were asked to rate the questionnaires items – which were all phrased as personal statements – on a 7-point Likert scale ranging from 1 (fully disagree) to 7 (fully agree). Reliability estimates (Cronbach's alpha) of all scales are displayed in Table 1.

[Insert Table 1 about here]

Work unpredictability

We assessed the level of work unpredictability participants perceived during a workday in the first diary questionnaire of a day. We adapted four items from Schyns and Paul (2004) that had already been used to measure predictability in previous research (Mohr & Wolfram, 2010). We made sure that the adapted items explicitly focussed on employees' desire for more work predictability on a given workday in order to capture their perception of a discrepancy between their actual work situation today and what they would have desired (which is what makes an environmental stimulus a stressor in the first place; Ursin & Eriksen, 2004). The items measured the perceived unpredictability of work tasks (i.e. "When I think back to my day at work, I would have liked to know earlier…what work tasks I have to accomplish today"), associated work activities (i.e. "…what's facing me at work today"), their time requirements (i.e. "…how much time it would take to complete today's work tasks"), and related problems (i.e. "…what problems come with today's work tasks").

Strain

We measured participants' sustained stress reaction after work by their high activated negative feelings with the second daily questionnaire. We applied three items from the German mood survey (Abele-Brehm & Brehm, 1986) and asked participants to rate whether they felt "strained", "irritated", and "grumpy" at that moment.

Serenity

We assessed participants' serenity in the evening as indicators for their day-specific wellbeing in the third questionnaire of a day. We used three items from the German mood survey (Abele-Brehm & Brehm, 1986) capturing low activated positive feelings and asked participants to indicate whether they felt "serene", "relaxed", and "calm".

Control variables

First, to demonstrate that work unpredictability causes a stress reaction that goes beyond the influence of time pressure (as a representative of another common work stressor), we included participants' daily time pressure in our study. Time pressure is defined as the extent to which workers perceive that they do not have enough time to complete their work tasks or need to work faster than usual (Semmer et al., 1999). We assessed time pressure in the first daily questionnaire immediately after work unpredictability with three items from the instrument for stress-oriented job analysis (Semmer et al., 1999) adapted to the diary study design. A sample item reads "Today, at work, I was under time pressure".

We argue that time pressure is likely to cause a discrepancy between what is and what is desired due to similar reasons as work unpredictability: As time pressure stems from external inputs such as constraints or deadline or a failed planning of the employee, it may be

associated with a lack of control at work. Moreover, it holds the risk of not being able to accomplish all work task of the day (i.e. a lack of mastery expectancy) and needs a high effort investment (see Sonnentag et al., 2018) that adds to employees' daily psychological workload. However, in contrast to work unpredictability time pressure is an acknowledged work stressor with daily variations and a well-documented association with strain that can outlast working hours (Baethge & Rigotti, 2013). Furthermore, the stress reaction following time pressure was related to lower wellbeing (e.g. Höge, 2009).

Second, we controlled for after-work serenity (measured in the second daily questionnaire with the same items as in the evening) when regressing evening serenity on after-work strain. This approach should demonstrate that higher levels of strain after work following work unpredictability predict lower levels of employees' evening serenity beyond the predictive power of their prior state of serenity as reported after work. However, we controlled for after-work serenity only on the focal day-level (and not on the person-level) after centering the variable around the group mean (see Paccagnella, 2006). We did so because of the difference between a person's mood, which refers to milder affective states of longer duration and often is present outside a person's awareness, and emotional state determined by their presently salient feelings (Cropanzano et al., 2003) that can "ebb and flow over the course of a day" (Russell & Carroll, 1999, p. 5). Accordingly, as their aggregated estimates are not sensitive to varying feelings within a few hours, emotional states tend to have high stabilities on the person-level (see Sonnentag & Lischetzke, 2018).

Multi-level confirmatory factor analysis

To determine the distinctiveness of our measures, we conducted a multi-level confirmatory factor analyses with Mplus 8 (Muthén & Muthén, 2017), using a robust

maximum likelihood estimation (MLR). The hypothesised five-factor model (i.e. work unpredictability, time pressure, strain, after-work serenity, and evening serenity as one factor each) showed a good model-fit, $\chi^2(188) = 291.14$, comparative fit index (CFI) = .98, Tucker-Lewis index (TLI) = 0.97, root mean square error of approximation (RMSEA) = .03, and Akaike Information Criterion (AIC) = 30,092.97. The five-factor model fitted our data significantly better than the best-fitting four-factor model (strain and after-work serenity as one common factor), $\chi^2(196) = 525.10$, CFI = .93, TLI = 0.91, RMSEA = .05, AIC = 30,317.75, Sattora-Bentler scaled $\Delta\chi^2 = 228.53$ (considering a scaling correction factor of 1.05), $\Delta df = 8$, $p < .001$. We found a low but significant correlation between work unpredictability and time pressure. The five factor-model further had a better fit than the best-fitting three-factor model (work unpredictability and time pressure as well as strain and after-work serenity as one common factor), $\chi^2(202) = 1{,}027.42$, CFI = .80, TLI = 0.76, RMSEA = .08, AIC = 30,934.74, Sattora-Bentler scaled $\Delta\chi^2 = 953.20$ (correction factor of 0.77), $\Delta df = 14$, $p < .001$. The hypothesised five factor-model had a better fit than the best-fitting two-factor model (work unpredictability and time pressure as well as strain, after-work serenity, and evening serenity as one common factor), $\chi^2(206) = 1{,}319.83$, CFI = .76, TLI = 0.72, RMSEA = .09, AIC = 31,137.14, Sattora-Bentler scaled $\Delta\chi^2 = 874.65$ (correction factor of 1.24), $\Delta df = 18$, $p < .001$, and finally also a better fit than the one-factor model, $\chi^2(154) = 2{,}097.35$, CFI = .60, TLI = 0.54, RMSEA = .12, AIC = 31,988.42, Sattora-Bentler scaled $\Delta\chi^2 = 1{,}355.19$ (correction factor of 1.43), $\Delta df = 20$, $p < .001$. These results indicate that the study variables can be distinguished from one another.

Method of data analysis

As day-level data is nested within persons, we tested all hypotheses by means of a multilevel path model using Mplus 8 (Muthén & Muthén, 2017) which separated the variance

of all study variables into their between person (i.e. person-level) and the focal within person (i.e. day-level) components (Zhang et al., 2009). We examined the hypothesised indirect associations between work unpredictability and serenity in the evening via afterwork strain (Hypothesis 2) using the Monte Carlo method (Preacher & Selig, 2010) with 1,000,000 repetitions and a 95% confidence interval (CI).

Results

Preliminary analyses

The means, standard deviations, and zero-order correlations among the variables on the day-level and the person-level are shown in Table 1. Before testing the hypotheses, we examined between-person (i.e. person-level) and within-person (i.e. day-level) reliabilities, within-person consistencies, and the empirical distinctiveness of work unpredictability and the control variable time pressure. First, Cronbach's alphas were estimated using a multi-level approach in Mplus (see Geldhof et al., 2014). Alpha estimates ranged, on the person-level, from .91 to .99 and, on the day-level, from .75 to .86 (see Table 1). This indicated that our data were derived from reliable scales.

Second, we calculated the intra-class correlation coefficients (ICCs) which reflect the percentage of within-person consistencies (as the opposite of variation) in participants' responses to the items defining a variable at the day-level, calculated with the following formula (see Asparouhov, 2006): variance between person / (variance between person + variance within person). The ICCs (also shown in Table 1) ranged from 32% (strain after work) to 60% (work unpredictability), indicating that participants' responses varied throughout the days of their study participation and justifying a day-level data analysis.

Third, we investigated the empirical distinctiveness of work unpredictability and time pressure as representative of another work stressor with similar implications for employees'

daily wellbeing. Data showed a low but significant correlation between the two variables that could also be distinguished by the confirmatory factor analysis: The five-factor model with all items loading on their respective factors – that thus distinguished between work unpredictability and time pressure – on the day and on the person-level fitted our data significantly better than all alternative models with a fewer number of factors. These preliminary results indicate that both work stressors can be statistically distinguished and are thus in favour of work unpredictability's discriminant validity.

Hypotheses testing

Table 2 shows the significant direct regression estimates (direct effects) between the variables on the day-level derived from our multi-level path model including after-work serenity and time pressure at work as control variables. We report standardised estimates using the Mplus function StdYX for linear regression that "uses the variances of the continuous latent variables as well as the variances of the background and outcome variables for standardisation" (Muthén & Muthén, 2017, p. 799).

[Insert Table 2 about here]

In support of Hypothesis 1, our findings show that the higher participants' perceived work unpredictability on a day, the higher their strain levels after work on the same day. This finding is in favour of Hypothesis 1 proposing a positive association between work

unpredictability and employees' stress reaction that sustains beyond working hours and beyond the impact of time pressure at work.[11]

When considering sustained strain after work as a mediator, higher levels of strain after work linked the unpredictability of a workday to lower levels of serenity in the evening ($\gamma = -.05$, SE = .02, 95% CI [−.0459, −.0003]). These results are in favour of Hypotheses 2 proposing an indirect negative relationship between work unpredictability and employees' wellbeing in the evening. The significant indirect effect further shows that after-work strain adds to the variance of lower levels of evening serenity beyond the influence of their prior state of serenity reported after work.[12]

Discussion

Given the rise of non-routine and dynamically changing project work in knowledge-intensive jobs (see Schoper et al., 2018), the goal of our study was to contribute to the understanding of work unpredictability as contemporary work stressor within this particular occupational group. We argued that employees may associate the unpredictability of their daily work tasks and activities as a lack of control at work, a lack of mastery expectancies, or an increase of high-effort intellectual work demands adding to their psychological workload.

---

[11] The association between work unpredictability and after-work strain was significant even when time pressure was not included in the analysis ($\gamma = .26$, SE = .05).

[12] The association between after-work strain and evening serenity was significant even when after-work serenity was not included in the analysis ($\gamma = -.13$, SE = .03, 95% CI [−.1814, −.0746]).

Either way, there might be days when employees experience a discrepancy between what is and what they would have desired along with the risk not being able to master their unpredictable work tasks and activities – a situation causing a stress reaction (i.e. feelings of strain) that sustains until the perceived discrepancy could be dissolved (Ursin & Eriksen, 2004).

Following CATS (Ursin & Eriksen, 2004), we proposed that high levels of work unpredictability cause a stress reaction that sustains beyond the working hours of a day and, in turn, relate to lower levels of employees' wellbeing in the evening before going to bed. Results of our diary study supported our hypotheses: On days when employees were less able to foresee their work tasks and activities in terms of work methods, required time, and associated problems, they felt more strained, irritated, and grumpy after work as compared to days when they perceived less work unpredictability. And this relationship was significant even after considering the effects of time pressure as another daily work stressor with well documented negative implications for employees' affective states during and after work (e.g. Baethge & Rigotti, 2013; Sonnentag et al., 2018). Furthermore, on days when employees reported to feel more strained, irritated, and grumpy after work, they also felt less serene, relaxed, and calm in the evening before going to bed than on workdays they felt less strain after work.

To our knowledge, our study is the first to conceptualise the unpredictability of work tasks and activities as a distinct work characteristic that is more than just the absence of work predictability (which has been describes as job resource; Mohr & Wolfram, 2010; Rosen et al., 2020), but a work stressor itself with negative implications for employees' wellbeing. Our study further contributes to the stress literature by emphasising the relevance of the stress reaction and its duration in explaining the connection between stressors and more distant

health and wellbeing outcomes (Brosschot & Thayer, 1998). As this link is often neglected by empirical stress research (Meurs & Perrewé, 2011), it is important that two of our findings provided support for it: First, work unpredictability and evening serenity were not directly associated but mediated via after-work strain. Second, the negative relationship between after-work strain and evening serenity was significant even after controlling for after-work serenity. This demonstrates that higher levels of strain after work following a work stressor statistically account for lower levels of evening serenity beyond the share of variance explained by their state of serenity a couple of hours before.

Limitations

Despite the new insights this study has facilitated, it has also some limitations. First, we applied a rather uncommon measure of work unpredictability which can be considered a limitation, especially when it comes to its comparability with other work stressors. We adapted the items of Schyns and Paul (2004) according to CATS (Ursin & Eriksen, 2004), stating that only a perceived discrepancy between one's experiences and desires accounts for the transformation of a stimulus into a stressor. To measure the difference between the actual experiences (as subtrahend) and the desires (as minuend), we formulated the items in a way in which the participants indicated their wish for more predictability on the particular workday (i.e. "I would have liked to know earlier…"). In contrast, we captured time pressure traditionally by asking participants directly about the experienced time pressure (items derived from Semmer et al., 1999) rather than the perceived discrepancy. We argue that our measurement of work unpredictability more validly depicts the actual experience of the specific stressor, yet it can be considered a limitation when it comes to its comparability with other work stressors such as time pressure.

Second, we did not distinguish work unpredictability from other work stressors besides time pressure. Although we conceptually separated work unpredictability from time pressure and interruptions (as representative of other daily varying work stressors), we only included items for time pressure into our questionnaire in order not to jeopardise the success of our rather elaborate study with three daily measurements. We could however show that work unpredictability is a statistically unique factor and relates to after-work strain beyond the impact of time pressure, but we did not demonstrate its distinctiveness from interruptions.

Third, as we conducted our study among employees with knowledge-intensive jobs, our findings do not provide information about the experience of other workers. We did so because we argued that this occupational group is especially challenged by the unpredictability of their work tasks and activities. Yet, of course, employees in other jobs may also experience work unpredictability. Future research should aim to further explore the distribution of this work characteristic. For example, collecting data from a broader sample would enable a comparison between the experiences of various occupational groups.

Avenues for future research

In order to maintain a healthy and thriving workforce, it is relevant to recognise and to further investigate work unpredictability which we introduced as contemporary work stressor. We specifically invite future research to examine other possible aspects of work unpredictability, its differences across jobs, and its relationship to other work experiences, such as motivation and procrastination – as elaborated in the following. The first avenue for future research could be the examination of other possible aspects of work unpredictability. We focused on employees' inability to foresee their work tasks and activities of a workday in terms of methods, time requirements, and potential problems. However, over the last decades, work has, for example, also changed in terms of the implementation of flexible working

arrangements (Korunka & Kubicek, 2017) that potentially add unpredictability of daily working hours and locations to the working life of many employees.

A second avenue for future research could be the investigation of differences across jobs. Although we focused on the day-level, we observed the hypothesised relationships between work unpredictability, strain, and serenity also at the person-level (see Table 2). These results not only reveal daily variations in work unpredictability between an employee's workdays, but also differences in the average levels of perceived work unpredictability among multiple employees of varying occupations. Consequently, different knowledge-intensive occupations might face different levels of unpredictability (e.g. office clerks might face more work unpredictability than managers who are more involved in the organisational strategies that determine task changes) which should be addressed by future studies.

A third avenue for future research is the investigation of the relationship between work unpredictability and other work experiences, such as motivation and procrastination. It seems likely that, over a certain period of time, certain critical levels of work unpredictability will have negative implications for workers' intrinsic work motivation. We argued that employees might associate their inability to foresee their workday with a lack of control or low expectancies to master their workdays successfully. Both the need for autonomy and the need for competence are crucial antecedents to develop intrinsic motivation which refers to employees' personal interest in and enjoyment of their work activities (Deci et al., 2017).

Moreover, an inability to foresee work activities might foster procrastination. Work procrastination refers to the delaying to begin or proceed an intended course of action which is usually seen as unfavourable work behaviour (Steel, 2007). However, procrastination has also been touted out as functional strategy to avoid rushing into things and wait until new information comes along (Chu et al., 2005). Consequently, employees experiencing

uncomfortable high levels of work unpredictability might procrastinate in an attempt to decrease their negative outcome expectancies or to increase their positive outcome expectancies, respectively. And this delay of action will further decrease their intellectual effort and self-regulation (see Prem et al., 2018) and thus reduce work unpredictability's affect as a stressor due to increased psychological workload.

Practical implications for the management of work

Although a certain degree of work unpredictability is probably unavoidable given the increasing complexity and dynamics of tasks associated with project work, we can think of some measures that counteract the detrimental implications of work unpredictability for employees' wellbeing. Following the stress process described by CATS (Ursin & Eriksen, 2004), these measures may either aim to reduce individuals' perception of work unpredictability per se (and thus the discrepancy between what is and what would have been desired) or their negative outcome expectancies following a perceived work unpredictability.

In order to reduce work unpredictability, organisations and supervisors should foster the transparency of their strategies as well as fast and accessible communication methods including early warnings when projects and their prioritisation are about to change. This might be achieved either directly by implementing strict communication guidelines or indirectly by supporting a climate of mutual exchange and transparency among the staff of various working teams and across hierarchies. This way, employees will receive more information on potential project changes enabling them to anticipate their upcoming tasks.

In order to reduce negative outcome expectancies, organisations and supervisors should foster employees' learning from stressful situations. "If employees are allowed to make mistakes without being subjected to punishment or abuse and they are encouraged to learn from their mistakes, they will be more likely to anticipate positive outcomes and interpret

their environment as challenging as opposed to threatening" (Meurs & Perrewé, 2011, p. 1057). In such a safe environment, regular feedback processes will further increase employees' chances to learn from their prior work experiences (Chiaburu & Harrison, 2008) and thus to develop skills and self-efficacy beliefs (Holman & Wall, 2002). High skills and self-efficacy beliefs foster employees' attitude to evaluate stressors as personal challenge associated with positive outcome expectancies (Meurs & Perrewé, 2011). However, employees can also take the chance and learn from their co-workers' experiences which can be fostered by mentoring or the sharing of work experiences between team members.

Conclusion

Our diary study contributes to the literature by showing that perceived unpredictability of a workday's tasks and activities has detrimental implications for employees' evening wellbeing due to a stress reaction that sustains beyond working hours. With these findings, we underpin our theoretical argument that work unpredictability is a stressful, daily varying work experience that can be associated with a lack of control, a lack of competence expectancies, and high workload. In order to maintain a healthy and thriving workforce, it is relevant to recognise and to further investigate this contemporary work stressor salient in the context of knowledge-intensive work. Beyond that, we invite future research to examine other possible aspects of work unpredictability, its differences across jobs, and its relationship to other work experiences, such as motivation and procrastination.

References

Abele-Brehm, A., & Brehm, W. (1986). Zur Konzeptualisierung und Messung von Befindlichkeit: Die Entwicklung der "Befindlichkeitsskalen" (BFS) [Conceptualizing

and assessing mood: The development of a mood survey (BFS)]. *Diagnostica*, *32*, 209–228.

Asparouhov, T. (2006). General multi-level modeling with sampling weights. *Communications in Statistics - Theory and Methods*, *35*, 439–460. https://doi.org/10.1080/03610920500476598

Baethge, A., & Rigotti, T. (2013). Interruptions to workflow: Their relationship with irritation and satisfaction with performance, and the mediating roles of time pressure and mental demands. *Work & Stress*, *27*, 43–63. https://doi.org/10.1080/02678373.2013.761783

Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thøgersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin*, *37*, 1459–1473. https://doi.org/10.1177/0146167211413125

Beerheide, E., & Katenkamp, O. (2011). Wissensarbeit im Innovationsprozess [Knowledge work in the innovation process]. In J. Howaldt, R. Kopp, & E. Beerheide (Eds.), *Innovationsmanagement 2.0* (pp. 67–99). Gabler. https://doi.org/10.1007/978-3-8349-6743-5_4

Bowling, N. A., Alarcon, G. M., Bragg, C. B., & Hartman, M. J. (2015). A meta-analytic examination of the potential correlates and consequences of workload. *Work & Stress*, *29*, 95–113. https://doi.org/10.1080/02678373.2015.1033037

Brosschot, J. F., Pieper, S., & Thayer, J. F. (2005). Expanding stress theory: Prolonged activation and perseverative cognition. *Psychoneuroendocrinology*, *30*, 1043–1049. https://doi.org/10.1016/j.psyneuen.2005.04.008

Brosschot, J. F., & Thayer, J. F. (1998). Anger inhibition, cardiovascular recovery, and vagal function: A model of the link between hostility and cardiovascular disease. *Annals of Behavioral Medicine, 20,* 326–332. https://doi.org/10.1007/BF02886382

Chiaburu, D. S., & Harrison, D. A. (2008). Do peers make the place? Conceptual synthesis and meta-analysis of coworker effects on perceptions, attitudes, OCBs, and performance. *Journal of Applied Psychology, 93,* 1082–1103. https://doi.org/10.1037/0021-9010.93.5.1082

Chun Chu, A. H., & Choi, J. N. (2005). Rethinking procrastination: Positive effects of" active" procrastination behavior on attitudes and performance. *The Journal of Social Psychology*, *145*, 245–264. https://doi.org/10.3200/SOCP.145.3.245-264

Cropanzano, R., Weiss, H. M., Hale, J. M. S., & Reb, J. (2003). The structure of affect: Reconsidering the relationship between negative and positive affectivity. *Journal of Management*, *29*, 831–857. https://doi.org/10.1016/S0149-2063(03)00081-3

Cummins, R. A. (2010). Subjective wellbeing, Homeostatically protected mood and depression: A synthesis. *Journal of Happiness Studies*, *11*, 1–17. https://doi.org/10.1007/s10902-009-9167-0

Deci, E. L., Olafsen, A. H., & Ryan, R. M. (2017). Self-determination theory in work organizations: The state of a science. *Annual Review of Organizational Psychology and Organizational Behavior, 4*, 19–43. https://doi.org/10.1146/annurev-orgpsych-032516-113108

DeLongis, A., Folkman, S., & Lazarus, R. S. (1988). The impact of daily stress on health and mood: Psychological and social resources as mediators. *Journal of Personality and Social Psychology, 54,* 486–495.

Diener, E. (2000). Subjective well-being: The science of happiness and a proposal for a national index. *American Psychologist*, *55*, 34–43. https://doi.org/10.1037/0003-066X.55.1.34

Fan, J., & Smith, A. P. (2017). The impact of workload and fatigue on performance. In L. Longo & M. C. Leva (Eds.), *Human Mental Workload: Models and Applications* (Vol. 726, pp. 90–105). Springer International Publishing. https://doi.org/10.1007/978-3-319-61061-0_6

Flovik, L., Knardahl, S., & Christensen, J. O. (2019). How leadership behaviors influence the effects of job predictability and perceived employability on employee mental health – A multilevel, prospective study. *Scandinavian Journal of Work, Environment & Health*, *45*, 134–145. https://doi.org/10.5271/sjweh.3880

Geldhof, G. J., Preacher, K. J., & Zyphur, M. J. (2014). Reliability estimation in a multilevel confirmatory factor analysis framework. *Psychological Methods*, *19*, 72–91. https://doi.org/10.1037/a0032138

Geurts, S. A. E., & Sonnentag, S. (2006). Recovery as an explanatory mechanism in the relation between acute stress reactions and chronic health impairment. *Scandinavian Journal of Work, Environment & Health*, *32*, 482–492. https://doi.org/10.5271/sjweh.1053

Höge, T. (2009). When work strain transcends psychological boundaries: An inquiry into the relationship between time pressure, irritation, work-family conflict and psychosomatic complaints. *Stress and Health*, *25*, 41–51. https://doi.org/10.1002/smi.1226

Holman, D. J., & Wall, T. D. (2002). Work characteristics, learning-related outcomes, and strain: A test of competing direct effects, mediated, and moderated models. *Journal of*

Occupational Health Psychology, 7, 283–301. https://doi.org/10.1037/1076-8998.7.4.283

Ilies, R., Dimotakis, N., & De Pater, I. E. (2010). Psychological and physiological reactions to high workloads: Implications for well-being. *Personnel Psychology, 63*, 407–436. https://doi.org/10.1111/j.1744-6570.2010.01175.x

International Labour Organization. (2016). *ISCO-08 Structure, index correspondence with ISCO-88*. https://www.ilo.org/public/english/bureau/stat/isco/isco08/index.htm

Korunka, C., & Kubicek, B. (2017). *Job demands in a changing world of work*. Springer International Publishing. https://doi.org/10.1007/978-3-319-54678-0_1

Lazarus, R. S. (1991). Progress on a cognitive-motivational-relational theory of emotion. *American Psychologist, 46*, 819–834. https://doi.org/10.1037/0003-066X.46.8.819

Meurs, J. A., & Perrewé, P. L. (2011). Cognitive activation theory of stress: An integrative theoretical approach to work stress. *Journal of Management, 37*, 1043–1068. https://doi.org/10.1177/0149206310387303

Mohr, G., & Wolfram, H.-J. (2010). Stress among managers: The importance of dynamic tasks, predictability, and social support in unpredictable times. *Journal of Occupational Health Psychology, 15*, 167–179. https://doi.org/10.1037/a0018892

Muthén, L. K., & Muthén, B. O. (2017). *Mplus user's guide (8th edition)*. Muthén & Muthén.

Nielsen, M. L., Rugulies, R., Christensen, K. B., Smith-Hansen, L., & Kristensen, T. S. (2006). Psychosocial work environment predictors of short and long spells of registered sickness absence during a 2-year follow up. *Journal of Occupational and Environmental Medicine, 48*, 591–598. https://doi.org/10.1097/01.jom.0000201567.70084.3a

Ohly, S., & Schmitt, A. (2015). What makes us enthusiastic, angry, feeling at rest or worried? Development and validation of an affective work events taxonomy using concept mapping methodology. *Journal of Business and Psychology, 30,* 15–35. https://doi.org/10.1007/s10869-013-9328-3

Ohly, S., Sonnentag, S., Niessen, C., & Zapf, D. (2010). Diary studies in organizational research: An introduction and some practical recommendations. *Journal of Personnel Psychology, 9,* 79–93. https://doi.org/10.1027/1866-5888/a000009

Paccagnella, O. (2006). Centering or not centering in multilevel models? The role of the group mean and the assessment of group effects. *Evaluation Review, 30,* 66–85. https://doi.org/10.1177/0193841X05275649

Preacher, K. J., & Selig, J. P. (2010). *Monte Carlo method for assessing multilevel mediation: An interactive tool for creating confidence intervals for indirect effects in 1-1-1 multilevel models [Computer software]*. http://quantpsy.org/

Prem, R., Scheel, T. E., Weigelt, O., Hoffmann, K., & Korunka, C. (2018). Procrastination in daily working life: A diary study on within-person processes that link work characteristics to workplace procrastination. *Frontiers in Psychology, 9,* 1087. https://doi.org/10.3389/fpsyg.2018.01087

Price, R. H., Choi, J. N., & Vinokur, A. D. (2002). Links in the chain of adversity following job loss: How financial strain and loss of personal control lead to depression, impaired functioning, and poor health. *Journal of Occupational Health Psychology, 7,* 302–312. https://doi.org/10.1037/1076-8998.7.4.302

Rosen, C. C., Dimotakis, N., Cole, M. S., Taylor, S. G., Simon, L. S., Smith, T. A., & Reina, C. S. (2020). When challenges hinder: An investigation of when and how challenge

stressors impact employee outcomes. *Journal of Applied Psychology*, *105*, 1181–1206. https://doi.org/10.1037/apl0000483

Russell, J. A., & Carroll, J. M. (1999). On the bipolarity of positive and negative affect. *Psychological Bulletin*, *125*, 3–30.

Saksvik-Lehouillier, I., Nordhaug, L., Owesen, S. M., & Karlsen, H. R. (2021). The rhythm of affect, autonomy, competence and relatedness: A pilot diary study. *Chronobiology International*, *38*, 480–488. https://doi.org/10.1080/07420528.2020.1867156

Scholarios, D., Hesselgreaves, H., & Pratt, R. (2017). Unpredictable working time, well-being and health in the police service. *The International Journal of Human Resource Management*, *28*, 2275–2298. https://doi.org/10.1080/09585192.2017.1314314

Schoper, Y.-G., Wald, A., Ingason, H. T., & Fridgeirsson, T. V. (2018). Projectification in Western economies: A comparative study of Germany, Norway and Iceland. *International Journal of Project Management*, *36*, 71–82. https://doi.org/10.1016/j.ijproman.2017.07.008

Schyns, B., & Paul, T. (2004). Entwicklung einer Aufgabenanalyse für Fuehrungskräfte [Development of a task analysis for leaders]. In W. Bungard, B. Koop, & C. Liebig (Eds.), *Psychologie und Wirtschaft leben. Aktuelle Themen der Wirtschaftspsychologie in Forschung und Praxis* (pp. 253–258). Huethig.

Semmer, N. K., Zapf, D., & Dunckel, H. (1999). IISTA - Instrument zur stressbezogenen Tätigkeitsanalyse [Instrument for stress-oriented job analysis]. In H. Dunckel (Ed.), *Handbuch psychologischer Arbeitsanalyseverfahren* (pp. 179–204). vdf.

Sonnentag, S., & Frese, M. (2012). Stress in organizations. In W. C. Borman, D. R. Ilgen, & R. J. Klimoski (Eds.), *Comprehensive handbook of psychology: Vol. 12. Industrial and organizational psychology* (pp. 453–491). Wiley.

Sonnentag, S., & Fritz, C. (2007). The recovery experience questionnaire: Development and validation of a measure for assessing recuperation and unwinding from work. *Journal of Occupational Health Psychology*, *12*, 204–221. https://doi.org/10.1037/1076-8998.12.3.204

Sonnentag, S., & Fritz, C. (2015). Recovery from job stress: The stressor-detachment model as an integrative framework. *Journal of Organizational Behavior*, *36*, 72–103. https://doi.org/10.1002/job.1924

Sonnentag, S., & Lischetzke, T. (2018). Illegitimate tasks reach into afterwork hours: A multilevel study. *Journal of Occupational Health Psychology*, *23*, 248–261. https://doi.org/10.1037/ocp0000077

Sonnentag, S., Reinecke, L., Mata, J., & Vorderer, P. (2018). Feeling interrupted-being responsive: How online messages relate to affect at work. *Journal of Organizational Behavior*, *39*, 369–383. https://doi.org/10.1002/job.2239

Steel, P. (2007). The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychological Bulletin*, *133*, 65–94. https://doi.org/10.1037/0033-2909.133.1.65

Ursin, H., & Eriksen, H. R. (2004). The cognitive activation theory of stress. *Psychoneuroendocrinology*, *29*, 567–592. https://doi.org/10.1016/S0306-4530(03)00091-X

Väänänen, A., Koskinen, A., Joensuu, M., Kivimäki, M., Vahtera, J., Kouvonen, A., & Jäppinen, P. (2008). Lack of predictability at work and risk of acute myocardial infarction: An 18-year prospective study of industrial employees. *American Journal of Public Health*, *98*, 2264–2271. https://doi.org/10.2105/AJPH.2007.122382

Van den Broeck, A., Vansteenkiste, M., De Witte, H., & Lens, W. (2008). Explaining the relationships between job characteristics, burnout, and engagement: The role of basic psychological need satisfaction. *Work & Stress*, *22*, 277–294. https://doi.org/10.1080/02678370802393672

Vander Elst, T., Van den Broeck, A., De Witte, H., & De Cuyper, N. (2012). The mediating role of frustration of psychological needs in the relationship between job insecurity and work-related well-being. *Work & Stress*, *26*, 252–271. https://doi.org/10.1080/02678373.2012.703900

Zhang, Z., Zyphur, M. J., & Preacher, K. J. (2009). Testing multilevel mediation using hierarchical linear models: Problems and solutions. *Organizational Research Methods*, *12*, 695–719. https://doi.org/10.5465/ambpp.2008.33716518

Table 1. Means, standard deviations, reliabilities, intraclass correlations and zero-order correlations on the day-level and the person-level.

	Person-level			Day-level							
Variables	*M*	*SD*	α	*SD*	α	ICC	1	2	3	4	5
1. Work unpredictability (at work)	2.50	1.07	.99	0.87	.76	.60		.25***	.26***	-.20***	-.08
2. Time pressure (at work)	2.79	0.95	.91	1.14	.75	.41	.54***		.15***	-.17***	-.05
3. Strain (after work)	2.27	0.70	.94	1.02	.84	.32	.49***	.46***		-.71***	-.46***
4. Serenity (after work)	4.98	0.86	.97	1.02	.86	.42	-.36***	-.30**	-.82***		.53***
5. Serenity (in the evening)	5.27	0.80	.98	0.90	.82	.44	-.48***	-.37***	-.83***	.97***	

Note. ICC = Intraclass correlation coefficient, α = Cronbach's alpha reliability estimates. Correlation coefficients above the diagonal are day-level (N = 666), below the diagonal are person-level correlations (N = 105). *** $p < .001$, ** $p < .01$ (two-tailed).

Table 2. Direct effects from the multilevel path model on the day-level and the person-level.

Day-level estimates	Strain (after work)	Serenity (in the evening)
Work unpredictability (at work)	.23*** (.05)	.05 (.08)
Time pressure (at work)	.09* (.05)	.04 (.04)
Strain (after work)		-.21*** (.06)
Serenity (after work)		.40*** (.06)
Person-level estimates	Strain (after work)	Serenity (in the evening)
Work unpredictability (at work)	.33*** (.13)	-.09 (.12)
Time pressure (at work)	.28*** (.13)	.10 (.12)
Strain (after work)		-.88*** (.07)

N = 105 participants, 666 daily observations, standardized regression estimates, and standard errors (in parentheses) are reported. *** $p < .001$, * $p < .05$.