Christian Korunka *Editor*

Flexible Working Practices and Approaches

Psychological and Social Implications

Springer

Flexible Working Practices and Approaches

Christian Korunka
Editor

Flexible Working Practices and Approaches

Psychological and Social Implications

Springer

Editor
Christian Korunka
Faculty of Psychology
University of Vienna
Wien, Austria

ISBN 978-3-030-74127-3 ISBN 978-3-030-74128-0 (eBook)
https://doi.org/10.1007/978-3-030-74128-0

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface: Flexible Work: An Important Trend in New Ways of Working

Many aspects of the world of work are becoming more and more flexible. The shift towards increased workplace flexibility began to accelerate some decades ago with the emergence of new forms of flexible working time schedules that, in places, replaced the conventional nine to five working day. Telework, now a "classic" form of workplace flexibility, started as a response to the 1970s oil crisis and developed in a wide variety of ways, both inside and outside of office buildings. Permanent contracts, usually specifying a 40-hour week, were replaced by many forms of flexible contract. All these developments have made new demands on the employees affected, but they have also brought opportunities. While there are many descriptions of the advantages of flexible work, many empirical studies also confirm a wide range of adverse effects on the quality of working life. The chapters in this book—state of the art contributions from experts in the field—may help to clarify the picture.

Recent empirical studies, often based on representative samples of the workforce (e.g., ILO/Eurofound, 2017), show that many aspects of work are rapidly becoming more flexible: trends that have been accelerated by the COVID-19 pandemic. Four forms of workplace flexibility can often be distinguished (see also Korunka, 2020):

Flexibility in time. This ranges from flexible time schedules (usually with core times where employees need to work in their offices) to part-time work and trust-based working hours. In the latter case, fixed working times are dropped, and work is regulated not by time-schedules but by agreed, checked, work targets.

Flexibility in place. Telework settings were implemented in a few organizations already decades ago, but usually only for small numbers of employees. In telework, employees have a clearly defined second workplace, besides their office desk, usually in their homes. More recently, facilitated by the newer digital technologies, workplace mobility has, for some, undergone a step-change with the idea of the fixed workplace, such as the main office, being abandoned. Work may be performed anywhere, and usually at any time. Based on recent ILO data (2017), about 12% of European workplaces could be described as offering highly mobile work.

Flexibility in work organization. Project work, which until a few decades ago meant only narrowly defined projects, is today a widely used form of work management. Temporary projects have permanently replaced the conventional line structure in many organizations. One example of flexible organizing is virtual teams collaborating via computer screens across multi-site and multi-national organizations; there are also several different concepts of agile management.

Flexibility in work relations. Triggered by the 2008 economic crisis, many permanent work contracts with benefit packages were replaced by temporary and/or part-time work contracts. An extreme form of such a contract is "work on demand", where employees only work when they are needed, on an hourly or daily basis. Many companies have also moved from permanent contracts to labor leasing contracts. In the most advanced form of such developments, like the "gig" economy, people all over the world work on a pay-per-piece basis, with neither job-security nor traditional employment benefits. While such contracts might offer positive opportunities for some employees (e.g., in low-income countries), for many others they result only in high levels of uncertainty.

This book is the third in a series of edited volumes dealing with current developments in the world of work and their effects on the quality of working life. The first volume dealt with the effects of information and communication technologies (Korunka & Hoonakker, 2014). The second focused on the new demands faced by employees in a changing world of work (Korunka & Kubicek, 2017). The aim of the present volume is to give an expert overview of these trends and developments from an interdisciplinary perspective; it is based on work and organizational psychology, with a clear focus on the quality of working life for the employees affected. The book brings together a number of internationally recognized experts in their fields, and the chapters reflect the main topics of workplace flexibility in research and practice.

Job Demands, Job Resources and the Quality of Working Life

The first five chapters give overviews of job demands, job resources and the quality of working life in flexible working conditions.

From a very general perspective, one could argue that autonomy and job control increase in all flexible working conditions. As is shown in the chapter of Edo Meyer, Julia Schöllbauer and Christian Korunka, however, these concepts have historically been described and understood in many different ways, and current empirical studies in flexible working conditions are prompting further reinterpretations. The limits of high amounts of job control as a resource are becoming obvious in flexible working conditions. The chapter aims to clarify different understandings of autonomy and job control from a historical perspective.

The following chapter, by Bettina Kubicek, Roman Prem, Vera Baumgartner, Lars Uhlig and Christian Korunka, focuses on new job-demands related to flexible working conditions. The authors observe four cognitive demands made by flexible

work, all related to some degree to increases in autonomy: planning of working times, planning of working places, structuring of working tasks and coordinating with others. The authors describe two processes, one related to stress, the other to learning, that link these demands to quality of working life outcomes. The new demands and the processes described were confirmed in a series of empirical studies.

The increasing flexibilization of work leads to new challenges in how people reconcile work and non-work life: challenges that are intensified by the opportunities offered by new information and communication technologies (ICT). Christine Syrek, Jana Kühnel, Inga Nägel and Tim Vahle-Hinz discuss central theories dealing with the construction of boundaries between work and non-work domains in flexible working conditions. Based on their own empirical studies, they offer suggestions on how developments in ICT may be used to manage the balance between work and non-work, especially in flexible working conditions.

The flexibilization of work is also accompanied by its intensification, which, in turn, is related to the increased importance of recovery from work. The chapter by Saija Mauno and Ulla Kinnunen describes the role of work intensification as a new demand in the current world of work. They develop a model which links the contexts in which work takes place with the new demands of intensification and then with consequences on people's lives, in and out of their working situation. Psychological detachment and recovery are described as especially important aspects of working life in flexible working conditions.

As an important addition to the first four chapters, which focus on general aspects of flexible working conditions and their role in the quality of working life, the chapter by Sandra Ohly and Claude Draude introduces a different perspective. It focuses on how potentially differently men and women use ICT in flexible working conditions. Empirical data from diary studies confirm that the occupational role overrides potential differences that might arise because of different gender roles. This is encouraging, as it offers an alternative perspective to studies confirming a reactivation of traditional gender roles in COVID-19-induced home office settings.

The Role of Technology in Flexible Work

Workplace flexibility is not conceivable without the support of ICT, which is not only a crucially important driver for the development of flexibility in the workplace but also plays an independent role in its impact—positive and negative—on quality of working life. Moreover, technologies supporting new distributions of work, like crowd work, also induce massive changes in the organization of work. The following four chapters deal with the complex relations between ICT and workplace flexibility.

Technology in the workplace offers a series of opportunities and challenges. The chapter by Yannick Griep, Ivana Vranjes, Madelon van Hooff, Debby Beckers and Sabine Geurts focuses on three technologies: telework, automation, and algorithmic

management. They give an overview of the complex effects of these technologies on performance, work-life balance and the social aspects of work. They show that all these technologies can have both positive and negative effects on employees. An especially important part of this chapter is the critical discussion of the role of algorithmic management in guiding and evaluating workers.

Another form of workplace flexibility is mobile multilocational work, described in Matti Vartiainen's chapter. In this form of work, workers use locations outside their primary workplaces and communicate via a range of electronic tools, and potentially experience both challenges and hindrances simultaneously. The permanent change of physical location can result in a continuous search for a place to work. Especially excellent ICT support is needed in dealing with the problems inherent in this type of work.

Mobile devices are the technological basis for work at various work locations. This 'ICT-enabled work extension' allows workers to share their work content and engage in work-related communications. The chapter by Julia Schöllbauer, Martina Hartner-Tiefenthaler and Clare Kelliher offers a systematic review of empirical studies analyzing the consequences of such work-extending behaviors. The authors confirm one of the many paradoxes of flexible work: among workers who engage in work-extending behaviors, work-related performance is higher, and well-being is lower.

The final chapter in this section deals with the work using online platforms. Lena Hünefeld, Sophie-Charlotte Meyer and Nils Backhaus describe platform work as a new form of employment which has particular consequences for employees' quality of working life.

They show that while it is associated with opportunities similar to those offered by other forms of flexible work, it also introduces disadvantages such as a lack of predictability, lack of communication and support and increased stress.

Employment Contracts, Job Insecurity and Law Aspects

The final chapters in the book deal with new forms of employment contracts, precarious employment, job insecurity resulting from such employment conditions, and related aspects of labor law.

Non-standard forms of employment are very different from permanent, open-ended and full-time employment. Increasing flexibility goes hand in hand with rising numbers of new forms of non-standard employment. Anna Tanimoto, Isabelle Ferré, Hernandez, Johnny Hellgren and Magnus Sverke describe these non-standard forms and their effects on the quality of working life. They observe that, although the range of types of non-standard employment is extensive, they are all related to some mostly negative indicators of quality of working life. Individual preferences of employees play a more important here than in standard employment forms.

New forms of employment are often accompanied by job insecurity for the employees. Hans De Witte and Anahí Van Hootegem describe the largely adverse effects of job insecurity on well-being, motivation and performance. They

demonstrate that job insecurity functions not as a challenge stressor (as is sometimes claimed), but as a hindrance stressor with all the negative effects of such a stressor. There is, therefore, overwhelming evidence that the mostly negative effects of job insecurity can be seen as a price of the increase in flexibilization.

Precarious employment is another form of employment often associated with workplace flexibility. Christophe Vanroelen, Mireia Julià and Karen Van Aerden describe this form of employment as an overlooked determinant of workers' health and well-being. They emphasize that precarious employment is not randomly distributed among the working population, but is much more common among society's least advantaged groups, which further illuminates the societal polarization effects of flexible working conditions.

The final chapter of the book adds another, often overlooked perspective to the discussion of flexible working conditions. Adrián Todoli Signes discusses the developments in labor law in relation to flexible work. External working and performance control present the law with particular new dimensions and challenges. Signes describes the risks of new control technologies and the related challenges for labor law.

First of all, I would like to thank my colleagues from the European Network of Organizational and Work Psychologists (ENOP) for their support and participation in this book project. I also would like to thank all the contributors and chapter authors for their interesting contributions! Virtual meetings during the book's development (including on one occasion with all the authors simultaneously) were an excellent example of working together flexibly from different places; they also worked well in attuning the chapters with each other. The internal review process further improved the chapters and so the whole book.

I also want to thank Elisabeth Dorfinger for her editorial support and the people from Springer New York for their help and support in bringing the book project to fruition. I believe that the comprehensive range of expertise presented in this volume will both support future research efforts in flexible working conditions and assist practitioners in their efforts to design and improve flexible work in their organizations.

Vienna, Austria
February 2021

Christian Korunka

References

ILO/Eurofound. (2017). *Working Anytime, anywhere. The effects on the world of work*. Brussels: Eurofound https://www.eurofound.europa.eu/publications/report/2017/working-anytime-anywhere-the-effects-on-the-world-ofwork.

Korunka, C. (2020). Working with digital technologies: Complexity, acceleration and paradoxical effects. In: H. Schaffers, M. Vartiainen, & J. Bus (Eds.), *Digital innovation and the future of work* (River Publishers series in information science and technology). Rivers Publishers.

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

Korunka, C., & Kubicek, B. (2017) (Eds.). *Job demands in a changing world of work*. Springer.

About the Book

The current world of work can be described by a strong increase in flexible working practices and approaches. Flexibilities in working times, in working places, in work organization and in work relations are observed many work places and further supported by new information and communication technologies. Many psychological and social implications of these phenomena can be observed. The book brings together a group of internationally recognized experts in the field of flexible work. The chapters describe the current state of the art of research and empirically based practices in this field.

Contents

Contributors

Nils Backhaus Federal Institute of Occupational Health and Safety, Berlin, Germany

Vera Baumgartner University of Vienna, Vienna, Austria

Debby G. J. Beckers Radboud University, Nijmegen, The Netherlands

Hans De Witte KU Leuven, Leuven, Belgium
North-West University, Potchefstroom, South Africa

Claude Draude University of Kassel, Kassel, Germany

Isabelle Ferré Hernandez Stockholm University, Stockholm, Sweden

Sabine A. E. Geurts Radboud University, Nijmegen, The Netherlands

Yannick Griep Radboud University, Nijmegen, The Netherlands
Stockholm University, Stockholm, Sweden

Martina Hartner-Tiefenthaler Technical University of Vienna, Vienna, Austria

Johnny Hellgren Stockholm University, Stockholm, Sweden

Lena Hünefeld Federal Institute of Occupational Health and Safety, Berlin, Germany

Sabina Hodzic University of Graz, Institute of Psychology, Universitätsplatz 2, Graz, Austria

Mireia Julià Universitat Pompeu Fabra, Barcelona, Spain

Clare Kelliher Cranefield University, Bedfordshire, UK

Ulla Kinnunen Tampere University, Tampere, Finland

Christian Korunka University of Vienna, Vienna, Austria

Bettina Kubicek University Graz, Graz, Austria

Jana Kühnel University of Vienna, Vienna, Austria

Matti Vartiainen Aalto University, Helsinki, Finland

Saija Mauno Tampere University, Tampere, Finland

Edo Meyer University of Vienna, Vienna, Austria

Sophie-Charlotte Meyer Federal Institute of Occupational Health and Safety, Berlin, Germany

Inga J. Nägel Macromedia University of Applied Sciences, Freiburg, Germany

Sandra Ohly University of Kassel, Kassel, Germany

Roman Prem University Graz, Graz, Austria

Julia Schöllbauer University of Vienna, Vienna, Austria

Magnus Sverke Stockholm University, Stockholm, Sweden

Christine J. Syrek University of Applied Sciences Bonn-Rhein-Sieg, Sankt Augustin, Germany

Anna S. Tanimoto Stockholm University, Stockholm, Sweden

Adrián Todolí Signes University of Valencia, Valencia, Spain

Lars Uhlig University of Vienna, Vienna, Austria

Tim Vahle-Hinz Psychologische Hochschule Berlin, Berlin, Germany

Karen Van Aerden Vrije Universiteit Brussel, Brussel, Belgium

Madelon M. L. van Hooff Radboud University, Nijmegen, The Netherlands

Anahí Van Hootegem KU Leuven, Leuven, Belgium

Christophe Vanroelen Vrije Universiteit Brussel, Brussel, Belgium
Universitat Pompeu Fabra, Barcelona, Spain

Ivana Vranjes Tilburg University, Tilburg, The Netherlands

The original version of this book was revised. The correction is available at https://doi.org/10.1007/978-3-030-74128-0_14

About the Editor

Christian Korunka PhD. holds a chair for Work and Organizational Psychology at the Faculty of Psychology, University of Vienna, Austria. He has conducted many empirical studies in the areas of new forms of work, flexible work, the role of ICT at work places, and quality of working life. His studies were published in more than 90 journal articles, about 100 book chapters and he was the editor of about 10 books.

Research Perspectives from Job Control to Flexibility: Historical Outline, Depiction of Risks, and Implications for Future Research

Edo Meyer, Julia Schöllbauer, and Christian Korunka

1 Introduction

Job autonomy, control, decision latitude, and flexibility – many terms for a worker's possibility to exert influence on their own working life – have found their way into the literature over the years. Despite the diverse terminology, all these terms have, from a humanist perspective, the core idea of workers' agency. The possibility of shaping one's own work and consequently one's own life is not only relevant to handling work demands (e.g., Semmer, 1984; Udris & Frese, 1988) but is also a central component of motivation (Hackman & Oldham, 1976) and a self-determined life (Ryan & Deci, 2000).

The terms autonomy and control are often used interchangeably, but they can be defined in different ways. Webster's dictionary defines autonomy as the quality or state of being self-governing. The term refers to an individual's subjective experience of having autonomy over their own life (e.g., Ryan & Deci, 2000). Control, however, refers to the actual decision latitude that is granted to someone (e.g., the individual worker) by someone or something (e.g., a supervisor or an organization; see Hacker & Richter, 1990). Thus, the terms job control and decision latitude describe a worker's scope of action from an external point of view or an individual's work-related discretion as a general job characteristic, whereas the term job autonomy expresses a worker's inner perception or appraisal of their scope of action or granted job control.

The question of the appropriate scope of action for individuals at work has a long history in labor science. Adam Smith (1776) recognized the lack of room for maneuver as a problem of mechanical work, yet ideas of rigid process control, such as

E. Meyer (✉) · J. Schöllbauer · C. Korunka
University of Vienna, Vienna, Austria
e-mail: edo.meyer@univie.ac.at; julia.schoellbauer@univie.ac.at; christian.korunka@univie.ac.at

C. Korunka (ed.), *Flexible Working Practices and Approaches*,
https://doi.org/10.1007/978-3-030-74128-0_1

scientific management, were still influential until the early twentieth century (Taylor, 1911). With more humanistic ideas entering management theories, it became clear that the assembly line approach needed to be viewed critically. Repetitive tasks led to a demotivated workforce, whose productivity decreases under rigid rules. The widely circulated Hoxie Report summarized the US Trade Union's objections to the effects of scientific management regarding working conditions and the welfare of workers and society. It noted, inter alia, that scientific management considers the worker as a mere instrument of production and reduces him or her to a semiautomatic attachment to the machine or tool. This is because the specialization of work displaces and represses skilled workers while depriving them of "thought, initiative, sense of achievement and joy in [their] work" (Hoxie, 1915, p. 171).

The final rejection of scientific management and human reductionism led to important considerations of workers' job control in the design of work (Bar-on, 1990). Founded in 1946, the Tavistock Institute of Human Relations has made its goal the interdisciplinary research into group processes and conflicts as antecedents of workers' psychological welfare (Trist et al., 1997). Influenced by the work of Kurt Lewin, initial studies by the institute have drawn attention to the need for group autonomy and a "scope of flexibility in the workplace" in order to achieve interchangeability of roles within a work group and, thus, workers' "mutual understanding and tolerance" (Trist & Bamforth, 1951, p. 38). Further experiments on the quality of working life in Sweden (Agurén et al., 1976) and Norway (Herbst, 1985) demonstrated the benefits of a movement away from rigid control of workers by the management.

As the homo economicus gradually lost its importance – at least in labor science – as the dominant view on human nature, it became clear that work processes must be enriched by extended possibilities of action in order to increase workers' autonomous work motivation and, thus, their well-being. In the 1960s and 1970s, influenced by theories such as expectancy theory (Vroom, 1964) and goal-setting theory (Locke, 1968), the scientific paradigm shifted toward workers' autonomous motivation to work and its inherent link to the job control provided by the management. In 1987, the National Institute for Occupational Safety and Health in the USA organized an interdisciplinary workshop to review the state of knowledge on job discretion (or job control). Sauter et al. (1990) summarized the conclusions and emphasized the important role of high job control in work designs.

Workers' perceived job autonomy has been associated with experienced meaningfulness of work and internal work motivation (Fried & Ferris, 1987), higher job satisfaction (Dollard & Winefield, 1998), lower turnover intentions (Kossek et al., 2006), more learning experiences (Wielenga-Meijer et al., 2010), lower risk of cardiovascular diseases (Fishta & Backé, 2015), and better physical health (Ng & Feldman, 2015). Several theories have been developed that center job control as a core job characteristic influencing workers' performance and well-being. Two of the most prevalent theories are the demand–control model (Karasek, 1979) and the job characteristics model (Hackman & Oldham, 1975), both of which will be discussed below.

2 Job Autonomy and Control in Classic Theory

2.1 Control as the Counterweight of Demands

One of the most influential theories integrating the concept of workers' job control has been Karasek's (1979) job demand–control model. Karasek presented two important parameters: job demands and job decision latitude (i.e., job control). The theory postulates that workers experience occupational strain when the job demands are high, but they have little room for maneuver due to a small decision latitude on how to meet their job demands. Although Karasek (1979) initially provided empirical confirmation of his model, his samples were limited to male employees from Sweden and the USA.

In later works, Karasek specified the concept of decision latitude by distinguishing between the subdimensions of skill discretion (i.e., workers' flexibility to decide what skills to employ) and decision authority (i.e., workers' possibilities to make decisions about their work; Karasek et al., 1998). This distinction is similar to Hackman and Oldham's job characteristics' skill variety and autonomy (Hackman & Oldham, 1975, see Chapter 1.2). This distinction has also been criticized, since skill discretion and decision latitude should not be combined theoretically (Kain & Jex, 2010). Another important criticism is the lack of organizational factors such as control over scheduling or the use of technology (Jones et al., 1998). Technology, in particular, is an aspect of a lot of modern jobs that cannot be ignored.

Since 1979, there have been multiple advancements and additions to the original job demand–control model. The most influential extension of the model integrated the factor of social support (Johnson & Hall, 1988), and this has been acknowledged by the authors of the original model (Karasek & Theorell, 1990). According to the job demand–control–support model, next to job demands and job control, the extent of social support workers' experience functions as an additional determinant of occupational strain (Johnson, 1989). Consequently, other variables, such as organizational position (Westman & Eden, 1992), proactive personality (Parker & Sprigg, 1999), and self-efficacy (Salanova et al., 2002), have been explored as possible additions to the model.

Over the years, two different views on the theoretical interaction between job demands and control have emerged: an *additive hypothesis*, according to which demand and control have independent effects on strain, and a *buffer hypothesis*, according to which control acts as a moderator between demands and strain. An extensive review by Van der Doef and Maes (1999) showed that there has been slightly more support for the additive hypothesis. A later review by De Lange et al. (2003) found only 1 study out of 19 with support for the buffer hypothesis. The difference between the two perspectives is an important one, since the buffer hypothesis may favor enlargement of job control without consideration for the level of demands, whereas the additive hypothesis predicts that a sole increase in job control is insufficient to prevent strain.

2.2 Autonomy as a Prerequisite for Work Motivation

In motivational theories such as the job characteristics model (Hackman & Oldham, 1975), the individual perception of job control is usually referred to as autonomy. The intention of such theories is to design an instrument that measures job characteristics with a focus on enhancing work motivation and job satisfaction. Hackman and Oldham (1975) identified five job characteristics that are key to workers' job satisfaction, growth satisfaction, and internal work motivation: skill variety, task identity, task significance, feedback from the job, and autonomy. The idea was that, if work performance depends on a worker's own initiatives and decisions, the worker simultaneously experiences greater meaning in their job and greater personal responsibility for their own successes and failures at work, which further enhances their work-related experiences in terms of job satisfaction, growth satisfaction, and internal work motivation (Hackman & Oldham, 1975).

Hackman and Oldham (1976) conceptualized job autonomy as "the degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out" (p. 258). Based on their definition, autonomy can be present in the choice of the procedures as well as in the chronological planning of work. However, as job autonomy was assessed as one global construct, several researchers suggested that a multidimensional instrument be developed to capture different facets of autonomy (Breaugh, 1985; Breaugh, 1999; Fried, 1991; Wall et al., 1995). Based on the job characteristics model (Hackman & Oldham, 1975), yet influenced by claims for more specificity of autonomy, the work design questionnaire (WDQ) was developed by Morgeson and Humphrey (2006). To reflect the increasing complexity of work organization, the WDQ distinguishes between decision-making autonomy (i.e., workers' ability to exert personal initiative or judgment while carrying out work), methods autonomy (i.e., workers' discretion about the methods applied to meet work goals), and scheduling autonomy (i.e., workers' scope of action regarding the order in which things are done on the job).

2.3 The Thin Line Between Resource and Demand

A differentiated view on job control in work was provided by Hacker (1973) and Volpert (1974) with action regulation theory, which focuses on the regulation and requirements of goal-directed behavior. Developed in East Germany (and published mainly in the German language), the theory has received less attention from the English-speaking scholars. Yet it adds further depth to the concept of job control. Action regulation theory uses the term *decision latitude*, which it describes as a systemic, organizational, dynamic, and contradictory concept. The term itself refers to a multidimensional situation that exists for individuals or groups. It is contradictory in so far as it can be beneficial by granting degrees of freedom at work for the

individual, yet it leads to challenges by creating more responsibilities (Hacker & Richter, 1990; Hacker, 2003). To fulfill responsibilities, it is necessary to plan goals and predict outcomes. Without transparency of the situation and the foreseeing of intermediate and final results, there are no well-founded decisions (Frese, 1988). Without predictability, there is no well-founded drafting and planning of the possible long-term goals. Thus, considerable prerequisites for applicable control in the work environment must be taken into consideration.

Higher levels of job control inherently come with more responsibilities, which means that more work-related choices have to be made. However, it has been proven that having more choice is not always preferable (Schwartz et al., 2002). Exerting job control causes cognitive effort, especially if it involves considering conflicts or several goals that are difficult to reconcile. Increased responsibilities and decision-making demands can turn certain aspects of control into a necessity, and unprotected attempts involving this kind of contradiction and decision management can cause stress (Ulich, 1979). Contemporary research on decision-making and multi-option situations suggests that satisficing (i.e., searching through alternatives until the first acceptable option is found) is a more beneficial strategy than maximizing (i.e., searching through alternatives until the best option is found; see Cheek & Ward, 2019; Kokkoris, 2016).

The insight that job control is not only hard to classify with regard to demands and resources but is also contradictory in itself becomes more important with the emergence of new ways of working. Technological advances have profoundly changed the organization of work in numerous industries (Holtgrewe, 2014). These advances provide flexibility not only regarding what and how to work (e.g., decision latitude, method autonomy) but also regarding when and where to work (see Allvin et al., 2013). These developments raise the question of whether classic theories, such as the job demand–control model (Karasek, 1979) or the job characteristics model (Hackman & Oldham, 1975), are still sufficient for predicting contemporary work experiences and behaviors.

3 ICT-Enabled Flexibility Adds More Layers to the Classic Concept

The digitalization of information, the codification of knowledge, and the access to centered data storage via different types of (mobile) networks fundamentally change workflows, the nature of tasks, and, by extension, jobs themselves (Flecker et al., 2013). These changes may no longer be fully represented in existing models of work design. Especially in ICT-enabled work, new management practices have been implemented that foster flexible forms of work (Allvin et al., 2013; Eurofound, 2015). In particular, ICT-based work enables asynchronous communication, which makes the performance of work, even in teams, independent of time (e.g., Allvin et al., 2011); it also allows remote, distributed work practices and thus a decoupling

of work from a fixed physical location (the "placelessness" of work; Flecker & Schönauer, 2016). As a result, unifying occupational framework concepts, such as a regular workplace and steady office hours, no longer correspond to many modern work arrangements (Allvin et al., 2013). Additionally, the trend of work "projectification" has been observed, shifting routinized line operations to dynamic, goal-oriented, and situation-sensitive project work and introducing concepts such as management by objectives (Schoper et al., 2018).

Temporal and spatial work flexibility add new dimensions to the classic concept of job control, as decision latitude, method, or scheduling autonomy refers only to the work task or activity itself, not to the surrounding conditions in which it is carried out. However, workers' discretion with regard to their working times and places and its implication for the performance of work have been studied for decades under the terms *flexi-time* or *telework arrangements* (Messenger & Gschwind, 2016; Nijp et al., 2012). However, the difference today is "omnipresent connectivity" (Holtgrewe, 2014). In the virtual office, work is omnipresent, and flexibility has the potential to grant the worker more control; at the same time, however, such omnipresence and flexibility can transfer even more responsibilities and demands from the management to the worker. Thus, like job control, flexibility is a potentially contradictory and multidimensional construct, whose effects on the individual worker's motivation and well-being can differ greatly.

3.1 Workers as Objects or Subjects of Control

Who benefits from changing working conditions toward more flexibility – individuals or organizations? In that regard, it is important to consider whether individual workers are the objects or subjects of job control within flexible working conditions, as advances in ICT have led to both decreases and increases in individual job control. Depending on the type of work organization, the worker's position can be on a continuum that ranges from being the object of control due to being flexibly deployed by the management and to being the subject of control due to being in control of the situation. This duality of flexibility regarding the locus of control has also been expressed by other terminologies, such as numerical versus functional flexibility (Kalleberg, 2001), company-centered versus worker-centered flexibility (Gareis & Korte, 2002), flexibility through substitution versus flexibility through empowerment (Allvin et al., 2011), or employer-oriented versus employee-oriented flexibility (Hornung & Höge, 2019).

On the one hand, where workers are the objects of control, ICT-enabled flexibility provides organizations with more possibilities to flexibly adapt their human resources (Kalleberg, 2001). The standardization of work processes and tasks makes the individual worker increasingly exchangeable (Allvin et al., 2011). Organizations are enabled to reduce costs by using workers who are not their regular, full-time employees, leading to a growth of organizations' use of flexible staffing arrangements (i.e., nonstandard employment relations such as part-time, temporary, and

contract work) and the outsourcing of certain work tasks (Kalleberg, 2001). The trend of outsourcing certain work tasks has led to the new economic branch of crowd work (Flecker & Meil, 2010). Temporary limited work and outsourcing are a threat to workers' internal motivation and well-being, because these trends foster job insecurity (Burgoon & Dekker, 2010) and deprive workers from playing a meaningful part within the social structure of an organization characterized by shared goals and values. In other words, modern jobs with employer-oriented flexibility lack job control; thus, they lack the important job characteristic that decreases workers' occupational strain (see job demand–control model; Karasek, 1979) and provides the experience of meaningfulness, internal motivation, and well-being (see job characteristics model; Hackman & Oldham, 1976).

On the other hand, there is employee-oriented flexibility, which manifests itself in four dimensions (Allvin et al., 2013): The first dimension of flexibility refers to workers' control over their work performance, which is fostered by projectification processes and thus by the specification of distal work goals, but not by the methods of how to reach them. Second, project work and management by objectives also enable work with a flexible social constellation. This flexibility of collaboration enables employees to work in variable teams and thus with coworkers with whom they autonomously choose to collaborate. The third dimension of flexibility refers to the time during which work is performed. Under employee-oriented flexible working conditions, workers have increased discretion over their own working hours and off-work time. This temporal flexibility goes beyond classic forms of scheduling autonomy (Hackman & Oldham, 1976; Morgeson & Humphrey, 2006), which primarily emphasized workers' control over arranging the sequence of their work tasks. Finally, the use of mobile technological devices enables the potential variability of workers' physical workplaces (e.g., flexible work arrangements such as voluntary telework). Spatial flexibility refers to the workers' discretion in deciding at which location they perform their work.

Employee-oriented flexible forms of work follow a common rationale that can be summarized as a shift from an external locus of control imposed by an organization to workers' increased self-control (Pongratz & Voß, 2003; Voß & Pongratz, 1998). Thus, work flexibilization has been touted as a key to helping workers manage paid work and private responsibilities (Allen et al., 2013). In particular, dual-earner families – who make up the largest proportion of all families in the European Union (Eurofound, 2014) – can benefit from spatial and temporal work flexibility to coordinate how they meet their work and private demands (Ropponen et al., 2016). Workers' discretion in terms of how, when, where, and with whom they perform their work not only provides them with control but also transfers associated planning and decision tasks from the jurisdiction of the organization to the individual worker; furthermore, it has the major organizational benefit of reducing operative costs (Demerouti et al., 2014). A self-regulated workforce enables organizations to enhance their adaptability and efficiency by reducing hierarchy levels and bureaucratic, centrally regulated mechanisms (Teece et al., 2016). As ICT-enabled globalization, decentralization, and flexible production create competition (Flecker et al., 2013), organizations strive to master the challenges of this increased competition

not only by increasing their numerical flexibility but also by the complete utilization of human resources – a social process also known as the subjectivation of work.

3.2 The Critical Process of Work Subjectivation and Indirect Control

Decades of working in environments designed to foster autonomous work motivation (see also Hackman & Oldham, 1976; Morgeson & Humphrey, 2006) have increased individuals' willingness to show a high degree of personal engagement at work, thereby turning the subjectivity of employees into a resource for employers (Flecker & Hofbauer, 1998). The sociological term *subjectivation of work* (Moldaschl & Voß, 2002) refers to the purposeful utilization of subjectivity in work processes (e.g., qualities and skills such as self-organization, cooperation, conflict-solving, and empathy; von Streit, 2011), which fundamentally changes the relation between employees and organizations (Voß & Pongratz, 1998).

In addition to their task-specific skills and knowledge, workers are required to display socially and organizationally desirable qualities and skills (Hornung & Höge, 2019). The organization deliberately delegates managerial activities to its workers – often without financial compensation and under the guise of employee-oriented flexible work – in order to seize their subjective production potential, which is a situation referred to by sociologists as indirect organizational control (Krause et al., 2012; Sauer, 2011; Voß, 1998). In other words, increasing workers' control to influence work processes opens the way to their exploitation if the organization takes advantage of its workers' increased work engagement and internalization of organizational goals (Hornung & Höge, 2019).

A similar mechanism in the context of ICT-enabled work was first described by Huws et al. (1996) and defined as the *autonomy paradox* (Mazmanian et al., 2013; Pérez-Zapata et al., 2016; Shevchuk et al., 2019). It describes a situation where a worker restricts his/her own autonomy, such as by working long hours, even though the worker could, in theory at least, choose when to work. Even with a high amount of working time control, the individual is still driven by deadlines and goals set by the employer or the socio-normative work environment; the worker may, therefore, work even more hours than if he/she were in a job characterized by fixed working times. This mechanism happens unconsciously, since the worker often perceives high levels of job autonomy while being indirectly controlled by external forces. It is an example of the importance of the distinction between objective dimensions of job control that come with responsibilities, possibilities, and necessities and the perceived autonomy of the worker.

Drawing on self-determination theory (Ryan & Deci, 2000), it can be argued that high levels of workers' temporal, spatial, performance-related, or collaboration-related control (see Allvin et al., 2013) foster the satisfaction of individuals' need for autonomy. The satisfaction of the basic human needs for autonomy, competence,

and relatedness further fosters workers' self-determination, internal work motivation, and, as a consequence, subjective well-being (Ryan & Deci, 2000). Thus, as long as workers perceive autonomy, they will most likely perform their work in a highly motivated and happy way, but this situation can change quickly if they come to realize how they are in fact externally determined by their environment. And with their self-determination, they also lose an important resource shielding them from experiencing occupational strain (Karasek, 1979) or burnout symptoms due to high work demands (Fernet et al., 2004). By transparently distinguishing the exercise of (direct) control from the exercise of indirect control, it is possible to shed light on the unseen mechanisms of control that arise with work flexibilization and thus to resolve the autonomy paradox. Related contemporary phenomena have been referred to as tied autonomy (Väänänen & Toivanen, 2018), the connectivity paradox (Leonardi et al., 2010), and the recovery paradox (Sonnentag, 2018).

4 How to Approach Work Flexibility in the Future

Work flexibility can be a new, extended form of job control, yet it is not an unconditional job resource because job control comes with new work demands (such as self-control demands) as well as with reduced organizational regulations that formerly secured workers from self-exploitation. Global economic developments, such as work intensification (Korunka et al., 2015), long-hours culture (Chatzitheochari & Arber, 2009), and a growing number of flexibly working people (Holtgrewe, 2014), are associated with increasing work demands with which workers have to deal. Moreover, there are the first empirical indications that contemporary high levels of decision latitude may no longer be exclusively beneficial for workers. In a study by Kubicek et al. (2014), eldercare workers with low and high levels of job control experienced less work engagement than those with medium levels of job control; and Stiglbauer and Kovacs (2018) reported detrimental effects of high levels of job control on subjective well-being, which were most evident for method and scheduling control.

It has been argued that these "too-much-of-a-good-thing effects" of job control (Stiglbauer & Kovacs, 2018, p. 520) can arise from the fact that modern, flexible work environments simultaneously increase other work demands (see Warr, 1994). Paralleling the claims of action regulation theory (Hacker & Richter, 1990), Warr (1990) proposed in his vitamin model that job characteristics, such as job control, can have nonlinear or even curvilinear relations with work-related well-being, such as burnout or job satisfaction. He explained this relationship by using the metaphor of consuming vitamins: just as certain vitamins will have adverse effects if taken in a high dosage, more job control puts additional responsibilities and work tasks on workers. Being in control of one's job implicitly demands the self-regulation of one's own behaviors in order to choose and plan appropriate work tasks, optimal procedures, places, times, and collaboration partners to achieve the overall work goals. Correspondingly, ICT-enabled forms of job control – such as working time

flexibility – and their high level of self-organization are associated with intensified workloads that workers have to master on top of the regular tasks they are primarily paid to do (Cañibano, 2011; Höge & Hornung, 2013; Kelliher & Anderson, 2010). This is in line with the aforementioned additive hypothesis of the job demand–control model, according to which increasing control may not buffer the strain effect of job demands (Kain & Jex, 2010). There is some empirical support for an existing buffer if the form of control matches the type of demand (Sargent & Terry, 1998). With this in mind, we identify increasing self-control demands as a possible match to extended job control.

4.1 Self-control Demands

Work settings require the ability to override actions, feelings, and emotions that would interfere with the work process (Baumeister et al., 2007; de Ridder et al., 2012; Schmidt & Neubach, 2007; Schmidt and Diestel, 2015). The increasing demand for adaptability, flexibility, and self-regulation in today's work (Cascio, 2003) requires workers to exert self-control, regulate their emotions, monitor goals, and perform unattractive tasks (Vohs & Baumeister, 2011). Diestel and Schmidt (2012) referred to these contemporary job characteristics as self-control demands and showed that they mediate the long-term relationship between workers' experienced workload and emotional exhaustion. Ter Hoeven and van Zoonen (2015) also pointed toward self-control demands indirectly relating to flexible work, finding that flexible-working employees are more often, and thus more negatively, affected by interruptions due to their high dependence on technological devices.

The ability to self-regulate can be described as the exercise of control over oneself (Koval et al., 2015) and is thus closely related to the concept of job control and workers' response to it. While job control refers to workers making plans and proactively exerting agency, self-control in the work setting describes the suppressing of distractions or the overcoming of dislikes that are connected to certain work tasks (Schmidt & Neubach, 2007). Self-regulation thus acts as a personal job resource, and depletion of this resource leads not only to less cognitive and behavioral control (Hagger et al., 2010) but also to more detrimental work behavior such as procrastination (Kühnel et al., 2016).

4.2 Self-exploitation Through Excessive Work Engagement

The deregulation of work combined with high levels of job control (Allvin et al., 2013) boosts workers' internal motivation (see Ryan & Deci, 2000) and thus working hours. The use of wireless Internet devices (Derks & Bakker, 2014; Towers et al., 2006) enables employees to work even outside working hours, such as in the evenings, at weekends, or during vacations (Boswell & Olson-Buchanan, 2007;

Ďuranová & Ohly, 2016; Hassler & Rau, 2016), which considerably intensifies the share of their work in relation to their overall life. In the long term, work intensification is negatively associated with job satisfaction and well-being (Korunka et al., 2015).

Flexible organizational practices, with their opportunities for self-organization and personal growth, simultaneously put additional work demands on workers and thus may induce stressful situations. Occupational strain then stimulates self-exploitative behaviors as a form of dysfunctional coping mechanism: *self-endangering work* aims to attain work goals but has detrimental consequences for workers' welfare and ability to work, at least in the long term (Dettmers et al., 2016). Krause et al. (2015) labeled both the prolonging of working hours and the striving to intensify the output of working hours as self-endangering coping behaviors. Workers using self-endangering work strategies to cope with flexible working demands face more health impairment than workers using other passive or active coping strategies, such as denial or the search for support strategies (Deci et al., 2016).

5 Conclusion and Practical Implications

In summary, modern working conditions within organizations can create a moral dilemma. On the one hand, ICT-enabled extended job control provides workers with the necessary flexibility to manage work and private demands (Ropponen et al., 2016), as well as with the motivational profit from feeling self-determined (see Ryan & Deci, 2000). On the other hand, work subjectivation processes potentially transform workers into puppets that have to work harder than specified in their employment contract and are unknowingly steered by invisible strings pulled by indirect control mechanisms (Krause et al., 2012; Sauer, 2011). To examine these phenomena scientifically, a clear distinction between active job control, indirect forms of control, and perceived job autonomy is essential. It is important to keep the contradictory nature of job control in mind, especially in jobs that lack boundaries. In this chapter, we have disentangled the often synonymously used terms of *job autonomy*, *job control*, and *flexibility in work*.

By looking deeper into social mechanisms within organizations and their associated psychological consequences for organizations' members, we have to distinguish humanistic ideals of individuation, solidarity, and emancipation from the neoliberal ideologies of subjectivation, competition, and instrumentality (Hornung & Höge, 2019). Practical implications could point toward a more objective assessment of job characteristics such as job control – as the self-report of job control actually captures job autonomy – and to its careful adjustment in order to avoid indirect control and forms of subjectivation that facilitate workers' exploitation or self-endangering coping behaviors.

References

Agurén, S., Hansson, R., & Karlsson, K. G. (1976). *The Volvo Kalmar plant: The impact of new design on work organization*. Rationalization Council.

Allen, T. D., Johnson, R. C., Kiburz, K. M., & Shockley, K. M. (2013). Work-family conflict and flexible work arrangements: Deconstructing flexibility. *Personnel Psychology, 66*, 345–376. https://doi.org/10.1111/peps.12012

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

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.

Bar-On, D. (1990). Work and the struggle for a humane society. In F. Frei & I. Udris (Eds.), *Das Bild der Arbeit* (pp. 41–55). Verlag Hans Huber.

Baumeister, R. F., Vohs, K. D., & Tice, D. M. (2007). The strength model of self-control. *Current Directions in Psychological Science, 16*, 351–355.

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. https://doi.org/10.1177/0149206307302552

Breaugh, J. A. (1985). The measurement of work autonomy. *Human Relations, 38*, 551–570.

Breaugh, J. A. (1999). Further investigation of the work autonomy scales: Two studies. *Journal of Business and Psychology, 13*(3), 357–373. https://doi.org/10.1023/A:1022926416628

Burgoon, B., & Dekker, F. (2010). Flexible employment, economic insecurity and social policy preferences in Europe. *Journal of European Social Policy, 20*, 126–141. https://doi.org/10.1177/0958928709358789

Cañibano, A. (2011). Exploring the negative outcomes of flexible work arrangements. The case of a consultancy firm in Spain. *Journal of Management, 31*(4), 622–640.

Cascio, W. F. (2003). Changes in workers, work, and organizations. In W. C. Borman, D. R. Ilgen, & R. J. Klimoski (Eds.), *Industrial and organizational psychology* (Vol. 12, pp. 401–422). Wiley.

Chatzitheochari, S., & Arber, S. (2009). Lack of sleep, work and the long hours culture: Evidence from the UK time use survey. *Work, Employment & Society, 23*(1), 30–48. https://doi.org/10.1177/0950017008099776

Cheek, N. N., & Ward, A. (2019). When choice is a double-edged sword: Understanding maximizers' paradoxical experiences with choice. *Personality and Individual Differences, 143*, 55–61. https://doi.org/10.1016/j.paid.2019.02.004

de Lange, A. H., Taris, T. W., Kompier, M. A., Houtman, I. L. D., & Bongers, P. M. (2003). "The very best of the millennium": Longitudinal research and the demands-control(support) model. *Journal of Occupational Health Psychology, 8*(4), 282–305.

de Ridder, D. T. D., Lensvelt-Mulders, G., Finkenauer, C., Stok, F. M., & Baumeister, R. F. (2012). Taking stock of self-control: A meta-analysis of how trait self-control relates to a wide range of behaviors. *Personality and Social Psychology Review, 16*(1), 76–99. https://doi.org/10.1177/1088868311418749

Deci, N., Dettmers, J., Krause, A., & Berset, M. (2016). Coping in flexible working conditions—Engagement, disengagement and self-endangering strategies. *Journal Psychologie Des Alltagshandelns, 9*, 49–65.

Demerouti, E., Derks, D., ten Brummelhuis, L. L., & Bakker, A. B. (2014). New ways of working: Impact on working conditions, work–family balance, and well-being. In C. Korunka & P. Hoonakker (Eds.), *The impact of ICT on quality of working life* (pp. 123–141). Springer. https://doi.org/10.1007/978-94-017-8854-0_8

Derks, D., & Bakker, A. B. (2014). Smartphone use, work-home interference, and burnout: A diary study on the role of recovery. *Applied Psychology, 63*, 411–440. https://doi.org/10.1111/j.1464-0597.2012.00530.x

Dettmers, J., Deci, N., Baeriswyl, S., Berset, M., & Krause, A. (2016). Self-endangering work behavior. In M. Wiencke, M. Cacace, & S. Fischer (Eds.), *Healthy at work* (pp. 37–51). Springer International Publishing. https://doi.org/10.1007/978-3-319-32331-2_4

Diestel, S., & Schmidt, K.-H. (2012). Lagged mediator effects of self-control demands on psychological strain and absenteeism. *Journal of Occupational and Organizational Psychology, 85*(4), 556–578. https://doi.org/10.1111/j.2044-8325.2012.02058.x

Dollard, M. F., & Winefield, A. H. (1998). A test of the demand–control/support model of work stress in correctional officers. *Journal of Occupational Health Psychology, 3*(3), 243–264. https://doi.org/10.1037/1076-8998.3.3.243

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

Eurofound. (2014). *Third European quality of life survey – Quality of life in Europe: Families in the economic crisis*. Publications Office of the European Union.

Eurofound. (2015). *New forms of employment*. Publications Office of the European Union. http://dx.publications.europa.eu/10.2806/012203

Fernet, C., Guay, F., & Senécal, C. (2004). Adjusting to job demands: The role of work self-determination and job control in predicting burnout. *Journal of Vocational Behavior, 65*, 39–56.

Fishta, A., & Backé, E. M. (2015). Psychosocial stress at work and cardiovascular diseases: An overview of systematic reviews. *International Archives of Occupational and Environmental Health, 88*(8), 997–1014. https://doi.org/10.1007/s00420-015-1019-0

Flecker, J., & Hofbauer, J. (1998). Capitalising on subjectivity: The "new model worker" and the importance of being useful. In P. Thompson & C. Warhurst (Eds.), *Workplaces of the future* (pp. 104–123). Macmillan Press.

Flecker, J., & Meil, P. (2010). Organisational restructuring and emerging service value chains: Implications for work and employment. *Work, Employment and Society, 24*, 680–698. https://doi.org/10.1177/0950017010380635

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

Flecker, J., Haidinger, B., & Schönauer, A. (2013). Divide and serve: The labour process in service value chains and networks. *Competition & Change, 17*, 6–23. https://doi.org/10.1179/1024529412Z.00000000022

Frese, M. (1988). A theory of control and complexity: Implications for software design and integration of computer systems into the work place. In M. Frese & E. Ulich (Eds.), *Psychological issues of human-computer interaction in the work place* (pp. 313–337). North-Holland Publishing Co..

Fried, Y. (1991). Meta-analytic comparison of the job diagnostic survey and job characteristics inventory as correlates of work satisfaction and performance. *Journal of Applied Psychology, 76*, 690–697.

Fried, Y., & Ferris, G. R. (1987). The validity of the job characteristics model: A review and meta-analysis. *Personnel Psychology, 40*, 287–322.

Gareis, K., & Korte, W. B. (2002). ICTs and the adaptability of work arrangements in the EU. *ECIS 2002 Proceedings, Paper, 54*, 1101–1112.

Hacker, W. (1973). *Allgemeine Arbeits- und Ingenieurpsychologie: Psychische Struktur und Regulation von Arbeitstätigkeiten*. VEB Deutscher Verlag der Wissenschaften.

Hacker, W. (2003). Action regulation theory: A practical tool for the design of modern work processes? *European Journal of Work and Organizational Psychology, 12*(2), 105–130.

Hacker, W., & Richter, P. (1990). Psychische Regulation von Arbeitstätigkeiten – Ein Konzept in Entwicklung. In F. Frei & I. Udris (Eds.), *Das Bild der Arbeit* (pp. 125–142). Huber.

Hackman, J. R., & Oldham, G. R. (1975). Development of the job diagnostic survey. *Journal of Applied Psychology, 60*(2), 159–170. https://doi.org/10.1037/h0076546

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.

Hagger, M. S., Wood, C., Stiff, C., & Chatzisarantis, N. L. (2010). Ego depletion and the strength model of self-control: A meta-analysis. *Psychological Bulletin, 136*, 495–525.

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

Herbst, D. P. (1985). *Contextual design: Towards the development of socio-technical learning networks*. Work Research Institutes.

Höge, T., & Hornung, S. (2013). Perceived flexibility requirements: Exploring mediating mechanisms in positive and negative effects on worker well-being. *Economic and Industrial Democracy, 36*(3), 407–430.

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

Hornung, S., & Höge, T. (2019). Humanization, rationalization or subjectification of work? Employee-oriented flexibility between i-deals and ideology in the neoliberal era. *Business & Management Studies: An International Journal, 7*, 3090–3119. https://doi.org/10.15295/bmij.v7i5.1384

Hoxie, R. F. (1915). *Scientific management and labor*. D. Appleton and Company.

Huws, U., Podro, S., Gunnarsson, E., Weijers, T., Arvanitaki, K., & Trova, V. (1996). *Teleworking and Gender*. Institute of Employment Studies.

Johnson, J. V. (1989). Collective control: Strategies for survival in the workplace. *International Journal of Health Services, 19*, 469–480.

Johnson, J. V., & Hall, E. M. (1988). Job strain, work place social support, and cardiovascular disease: A cross-sectional study of a random sample of the Swedish working population. *American Journal of Public Health, 78*(10), 1336–1342.

Jones, F., Bright, J. E. H., Searle, B., & Cooper, L. (1998). Modeling occupational stress and health: The impact of the demand-control model on academic research and on workplace practice. *Stress Medicine, 14*, 231–236.

Kain, K., & Jex, S. (2010). Karasek's (1979) job demands-control model: A summary of current issues and recommendations for future research. In P. L. Perrewe & D. C. Ganster (Eds.), *New developments in theoretical and conceptual approaches to job stress* (pp. 237–268). Emerald Group Publishing Limited.

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

Karasek, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly, 24*, 285–308. https://doi.org/10.2307/2392498

Karasek, R. A., & Theorell, T. (1990). *Healthy work: Stress, productivity, and the reconstruction of the working life*. Basic Books.

Karasek, R., Brisson, C., Kawakami, N., Houtman, I., Bongers, P., & Amick, B. (1998). The Job Content Questionnaire (JCQ): An instrument for internationally comparative assessments of psychosocial job characteristics. *Journal of Occupational Health Psychology, 3*(4), 322–355.

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

Kokkoris, M. D. (2016). Revisiting the relationship between maximizing and well-being: An investigation of eudaimonic well-being. *Personality and Individual Differences, 99*, 174–178. https://doi.org/10.1016/j.paid.2016.04.099

Korunka, C., Kubicek, B., Paškvan, M., & Ulferts, H. (2015). Changes in work intensification and intensified learning: Challenge or hindrance demands? *Journal of Managerial Psychology, 30*(7), 786–800. https://doi.org/10.1108/JMP-02-2013-0065

Kossek, E. E., Lautsch, B. A., & Eaton, S. C. (2006). Telecommuting, control, and boundary management: Correlates of policy use and practice, job control, and work–family effectiveness. *Journal of Vocational Behavior, 68*(2), 347–367. https://doi.org/10.1016/j.jvb.2005.07.002

Koval, C. Z., van Dellen, M. R., Fitzsimons, G. M., & Ranby, K. W. (2015). The burden of responsibility: Interpersonal costs of high self-control. *Journal of Personality and Social Psychology, 108*(5), 750–766. https://doi.org/10.1037/pspi0000015

Krause, A., Dorsemagen, C., Stadlinger, J., & Baeriswyl, S. (2012). Indirekte Steuerung und interessierte Selbstgefährdung: Ergebnisse aus Befragungen und Fallstudien. Konsequenzen für das Betriebliche Gesundheitsmanagement. In B. Badura, A. Ducki, H. Schröder, J. Klose, & M. Meyer (Eds.), *Fehlzeiten-report 2012* (pp. 191–202). Springer. https://doi.org/10.1007/978-3-642-29201-9_20

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.

Kubicek, B., Korunka, C., & Tement, S. (2014). Too much job control? Two studies on curvilinear relations between job control and eldercare workers' well-being. *International Journal of Nursing Studies, 51*, 1644–1653. https://doi.org/10.1016/j.ijnurstu.2014.05.005

Kühnel, J., Bledow, R., & Feuerhahn, N. (2016). When do you procrastinate? Sleep quality and social sleep lag jointly predict self-regulatory failure at work. *Journal of Organizational Behavior, 37*, 983–1002.

Leonardi, P. M., Treem, J. W., & Jackson, M. H. (2010). The connectivity paradox: Using technology to both decrease and increase perceptions of distance in distributed work arrangements. *Journal of Applied Communication Research, 38*(1), 85–105. https://doi.org/10.1080/00909880903483599

Locke, E. A. (1968). Toward a theory of task motivation and incentives. *Organizational Behavior and Human Performance, 3*(2), 157–189. https://doi.org/10.1016/0030-5073(68)90004-4

Mazmanian, M., Orlikowski, W. J., & Yates, J. (2013). The autonomy paradox: The implications of mobile email devices for knowledge professionals. *Organization Science, 24*(5), 1337–1357.

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*(3), 195–208.

Moldaschl, M., & Voß, G. G. (Eds.). (2002). *Subjektivierung von Arbeit* (Vol. 2). Rainer Hampp Verlag.

Morgeson, F. P., & Humphrey, S. E. (2006). The work design questionnaire (WDQ): Developing and validating a comprehensive measure for assessing job design and the nature of work. *Journal of Applied Psychology, 91*, 1321–1339. https://doi.org/10.1037/0021-9010.91.6.1321

Ng, T. W. H., & Feldman, D. C. (2015). The moderating effects of age in the relationships of job autonomy to work outcomes. *Work, Aging and Retirement, 1*, 64–78.

Nijp, H., Beckers, D., Geurts, S., Tucker, P., & Kompier, M. (2012). Systematic review on the association between employee worktime control and work-non-work balance, health and well-being, and job-related outcomes. *Scandinavian Journal of Work, Environment & Health, 38*(4), 299–313.

Parker, S. K., & Sprigg, C. A. (1999). Minimizing strain and maximizing learning: The role of job demands, job control, and proactive personality. *Journal of Applied Psychology, 84*(6), 925–939.

Pérez-Zapata, O., Pascual, A. S., Álvarez-Hernández, G., & Castaño Collado, C. (2016). Knowledge work intensification and self-management: The autonomy paradox. *Work Organisation, Labour & Globalisation, 10*(2), 27–49. https://doi.org/10.13169/workorgalaboglob.10.2.0027

Pongratz, H. J., & Voß, G. G. (2003). From employee to 'entreployee': Towards a 'self-entrepreneurial' work force? *Concepts and Transformation, 8*(3), 239–254. https://doi.org/10.1075/cat.8.3.04pon

Ropponen, A., Känsälä, M., Rantanen, J., & Toppinen-Tanner, S. (2016). Organizational initiatives for promoting employee work-life reconciliation over the life course. A systematic review of intervention studies. *Nordic Journal of Working Life Studies, 6*, 79–100.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68.

Salanova, M., Peiro, J. M., & Schaufeli, W. B. (2002). Self-efficacy specificity and burnout among information technology workers: An extension of the job demand-control model. *European Journal of Work and Organizational Psychology, 11*(1), 1–25.

Sargent, L., & Terry, D. (1998). The effects of work control and job demands on employee adjustment and work. *Journal of Occupational and Organizational Psychology, 71*, 219–236.

Sauer, D. (2011). Indirekte Steuerung—Zum Formwandel betrieblicher Herrschaft. In W. Bonß & C. Lau (Eds.), *Macht und Herrschaft in der reflexiven Moderne* (pp. 358–378). Velbrück Wissenschaft.

Sauter, S. L., Murphy, L. R., & Hurrell, J. J. (1990). Prevention of work-related psychological disorders: A national strategy proposed by the National Institute for Occupational Safety and Health (NIOSH). *American Psychologist, 45*(10), 1146–1158. https://doi.org/10.1037/0003-066X.45.10.1146

Schmidt, K.-H., & Diestel, S. (2015). Self-control demands: From basic research to job-related applications. *Journal of Personnel Psychology, 14*(1), 49–60. https://doi.org/10.1027/1866-5888/a000123

Schmidt, K.-H., & Neubach, B. (2007). Self-control demands: A source of stress at work. *International Journal of Stress Management, 14*, 398–416. https://doi.org/10.1037/1072-5245.14.4.398

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.

Schwartz, B., Ward, A., Monterosso, J., Lyubomirsky, S., White, K., & Lehman, D. R. (2002). Maximizing versus satisficing: Happiness is a matter of choice. *Journal of Personality and Social Psychology, 83*(5), 1178–1197. https://doi.org/10.1037/0022-3514.83.5.1178

Semmer, N. (1984). *Streßbezogene Tätigkeitsanalyse. Psychologische Untersuchungen zur Analyse von Streß am Arbeitsplatz*. Hogrefe.

Shevchuk, A., Strebkov, D., & Davis, S. N. (2019). The autonomy paradox: How night work undermines subjective well-being of internet-based freelancers. *ILR Review, 72*(1), 75–100. https://doi.org/10.1177/0019793918767114

Smith, A. (1776). *The wealth of nations*. Bibliomania.com Ltd. Retrieved from the Library of Congress https://lccn.loc.gov/2002564559.

Sonnentag, S. (2018). The recovery paradox: Portraying the complex interplay between job stressors, lack of recovery, and poor well-being. *Research in Organizational Behavior, 38*. https://doi.org/10.1016/j.riob.2018.11.002

Stiglbauer, B., & Kovacs, C. (2018). The more, the better? Curvilinear effects of job autonomy on well-being from vitamin model and PE-fit theory perspectives. *Journal of Occupational Health Psychology, 23*, 520–536. https://doi.org/10.1037/ocp0000107

Taylor, F. W. (1911). *The principles of scientific management*. Harper & Brothers.

Teece, D., Peteraf, M., & Leih, S. (2016). Dynamic capabilities and organizational agility: Risk, uncertainty, and strategy in the innovation economy. *California Management Review, 58*, 13–35. https://doi.org/10.1525/cmr.2016.58.4.13

ter Hoeven, C. L., & van Zoonen, W. (2015). Flexible work designs and employee well-being: Examining the effects of resources and demands: Flexible work designs and employee well-being. *New Technology, Work and Employment, 30*(3), 237–255. https://doi.org/10.1111/ntwe.12052

Towers, I., Duxbury, L., Higgins, C., & Thomas, J. (2006). Time thieves and space invaders: Technology, work and the organization. *Journal of Organizational Change Management, 19*(5), 593–618. https://doi.org/10.1108/09534810610686076

Trist, E. L., & Bamforth, K. W. (1951). Some social and psychological consequences of the Longwall Method of Coal-Getting: An examination of the psychological situation and defences of a work group in relation to the social structure and technological content of the work system. *Human Relations, 4*(1), 3–38. https://doi.org/10.1177/001872675100400101

Trist, E. L., Emory, F., Murray, H., & Trist, B. (Eds.). (1997). *The social engagement of social science: A Tavistock anthology: The socio-ecological perspective*. University of Pennsylvania Press.

Udris, I., & Frese, M. (1988). Belastung, Streß, Beanspruchung und ihre Folgen. In D. Frey, C. Hoyos, & D. Stahlberg (Eds.), *Angewandte Psychologie. Ein Lehrbuch* (pp. S.428–S.447). Psychologie Verlags Union.

Ulich, E. (1979). *Motivation, Zufriedenheit – Gestaltung der Arbeitstätigkeit und Führung von Mitarbeitern*. Lebensversicherungs.-Ges.

Väänänen, A., & Toivanen, M. (2018). The challenge of tied autonomy for traditional work stress models. *Work & Stress, 32*(1), 1–5. https://doi.org/10.1080/02678373.2017.1415999

Van Der Doef, M., & Maes, S. (1999). The job demand-control (-Support) model and psychological well-being: A review of 20 years of empirical research. *Work & Stress, 13*, 87–114. https://doi.org/10.1080/026783799296084

Vohs, K. D., & Baumeister, R. F. (Eds.). (2011). *Handbook of self-regulation: Research, theory, and applications* (2nd ed.). Guilford Press.

Volpert, W. (1974). *Handlungsstrukturanalyse als Beitrag zur Qualifikationsforschung*. Pahl-Rugenstein.

von Streit, A. (2011). Entgrenzter Alltag—Arbeiten ohne Grenzen? Das Internet und die raum-zeitlichen Organisationsstrategien von Wissensarbeitern. .

Voß, G. G. (1998). Die Entgrenzung von Arbeit und Arbeitskraft. *Mitteilungen Aus Der Arbeitsmarkt-Und Berufsforschung, 31*, 473–487.

Voß, G. G., & Pongratz, H. J. (1998). Der Arbeitskraftunternehmer [The worker entrepreneur]. *Kölner Zeitschrift für Soziologie und Sozialpsychologie, 50*, 131–158.

Vroom, V. H. (1964). *Work and motivation*. Wiley.

Wall, T. D., Jackson, P. R., & Mullarkey, S. (1995). Further evidence on some new measures of job control, cognitive demand and production responsibility. *Journal of Organizational Behavior, 16*, 431–455.

Warr, P. B. (1990). Decision latitude, job demands, and employee well-being. *Work and Stress, 4*(4), 285–294.

Warr, P. B. (1994). A conceptual framework for the study of work and mental health. *Work and Stress, 8*, 84–97.

Westman, M., & Eden, D. (1992). Excessive role demand and subsequent performance. *Journal of Organizational Behavior, 13*, 519–529.

Wielenga-Meijer, E. G. A., Taris, T. W., Kompier, M. A. J., & Wigboldus, D. H. J. (2010). From task characteristics to learning: A systematic review. *Scandinavian Journal of Psychology, 51*, 363–375.

Cognitive Demands of Flexible Work

Bettina Kubicek, Roman Prem, Vera Baumgartner, Lars Uhlig, and Christian Korunka

1 Introduction

In recent decades, various technological developments, as well as strong and dynamic competition, have forced organizations to adopt an increasingly flexible work organization (Cascio & Montealegre, 2016; Grant & Parker, 2009). As a result, multiple trends in the redesign of modern workplaces can be observed. First, companies have granted their employees more flexibility regarding their working time and place. Recent figures indicate that about 26% of employees within the EU choose their working times entirely by themselves or can at least decide their working times within certain limits (Eurofound, 2017). A similar development can be observed with regard to workplace flexibility, although this is not yet as distinctive. In the EU, 17% of employees are able to regularly work from home or have the possibility for occasional or high mobile telework (Eurofound, 2017). In addition, project work has become ever more widespread, requiring employees to structure their work tasks and coordinate with others self-reliantly. These practices have led to a shift in the responsibility for the organization of work from central management to the employees (Allvin et al., 2011).

While these changes have often been praised as bringing new autonomy to employees, scholars have also pointed out that this flexibility might not come without costs for employees (e.g., Wilkinson, 1998). In flexible work regimes, decisions about time, place, structure, and coordination of work, traditionally handled by

B. Kubicek (✉) · R. Prem
University of Graz, Graz, Austria
e-mail: bettina.kubicek@uni-graz.at; roman.prem@uni-graz.at

V. Baumgartner · L. Uhlig · C. Korunka
University of Vienna, Vienna, Austria
e-mail: vera.baumgartner@univie.ac.at; lars.uhlig@univie.ac.at; christian.korunka@univie.ac.at

C. Korunka (ed.), *Flexible Working Practices and Approaches*,
https://doi.org/10.1007/978-3-030-74128-0_2

management, become part of the everyday tasks of employees. So, in addition to their core tasks, employees have to plan, structure, and coordinate work (Kubicek et al., 2015), giving rise to additional cognitive demands.

Such cognitive demands of flexible work have often been discussed, but the literature lacks either a comprehensive description of the phenomenon or a theoretical framework on their potential beneficial and detrimental consequences. As flexible work organization becomes increasingly prevalent (and is often called for by employees and employers alike), it is important to understand the demands that come with such work organization, as well as the mechanisms that link the cognitive demands to employee outcomes. Only then can potential detrimental effects be avoided and beneficial effects strengthened.

In this chapter, we describe the nature of these new cognitive demands of flexible work and discuss their potential consequences for employees. As with other models (Bakker & Demerouti, 2007; LePine et al., 2005), we propose that cognitive demands of flexible work are linked to two processes: a strain process and a learning process. We argue that engaging with cognitive demands of flexible work is cognitively effortful and can therefore lead to strain for employees (Frese & Zapf, 1994; Hockey, 2013; Schmitt et al., 2012) and promote work–home conflict. In addition to being strenuous, cognitive demands of flexible work may also help employees to learn new skills and competencies, because cognitively demanding work can have stimulating effects on learning at work (de Jonge et al., 2012; Frese & Zapf, 1994; Zacher & Frese, 2018). This could subsequently foster employees' cognitive flexibility, increase their work motivation, and support work–home enrichment. At the end of the chapter, we present and discuss initial empirical evidence regarding the proposed model and identify avenues for future research.

2 Cognitive Demands of Flexible Work

By cognitive demands of flexible work, we refer to the tasks of planning, structuring, and coordinating that today's employees face due to flexible work organization regarding time, place, work tasks, and performance. What was once regulated and defined by the organizations' management has been handed over to the individual workers, who now, to varying degrees, take responsibility for their work (Allvin et al., 2011). Specifically, employees have to plan their working times and places, structure their work tasks, and coordinate with others. In all these respects, the absence of organizationally defined rules puts demands on individual decision-making. In the absence of fixed working hours and a predefined workplace, employees have to decide individually when, where, and for how long to work. Without clearly structured tasks and predefined procedures, employees have to structure and plan their work tasks independently. And with less central coordination within and between teams by the management, employees have to coordinate their work with others; maintain relationships with coworkers, supervisors, and subordinates; and solve conflicts and problems themselves. To take a more detailed look at the

different cognitive demands of flexible work, we provide a short description of each of them in the next sections before presenting evidence of their relationships with flexible work organization. We also illustrate all four demands by using the job of an IT specialist as an example.

2.1 Planning of Working Times

The widespread introduction of flexible work schedules as well as global collaboration across different time zones has led to a high flexibility in organizations, as well as in wider society, regarding the time of work (Allvin et al., 2011; Eurofound, 2017; Wegman et al., 2018). Work hours are often no longer defined by the organization; rather, employees themselves decide and plan on which days, at what hours, and for how long they work. In these decisions, employees are not fully autonomous, as they usually have to consider certain obligations both at work (e.g., meetings, task demands, deadlines) and in their private lives (e.g., family life, friends, or other obligations) (Väänänen et al., 2020). Moreover, working days, starting and ending working hours, and the timing of work breaks can vary substantially for employees, making coordination within and between the domains of work and private life even more complex and less predictable. This temporal flexibility leads to additional cognitive demands for employees to plan and choose their working hours. In Fig. 1, we show, using data from a sample of 549 employees of a logistics company, how high use of flextime (M = 4.12, SD = 0.83) comes with substantially higher demands to plan working times compared to low flextime use (M = 3.37, SD = 0.97; 95%-CI [−0.906, −0.599]), $t_{547} = -9.640$, $p < 0.001$).

For example, an IT specialist might have to plan to start her workday early to be able to have virtual meetings with colleagues working in a different time zone, and she might also have to consider time windows to communicate synchronously or

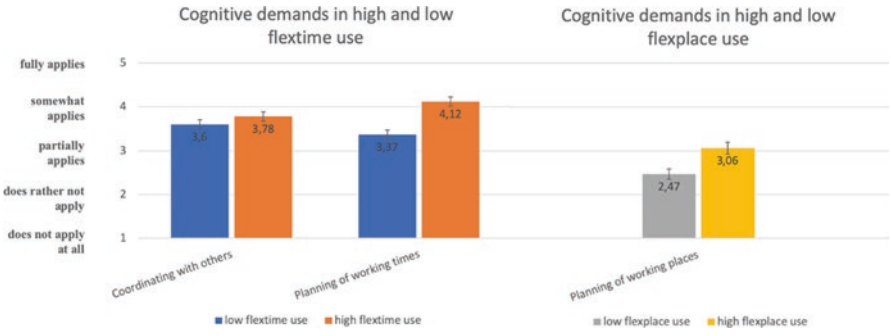


Fig. 1 Graphical representation of cognitive demands of flexible work in high and low flextime/flexplace use
Notes: The error bars show the 95% confidence interval of the respective mean value
Items were administered on a 5-point scale (1 = does not apply at all, 5 = fully applies)

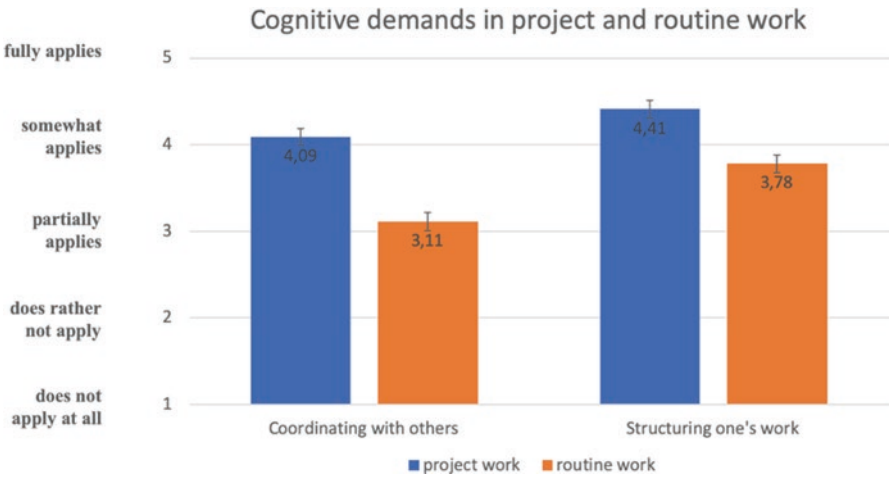


Fig. 2 Graphical representation of cognitive demands of flexible work in project and routine work
Notes: The error bars show the 95% confidence interval of the respective mean value
Items were administered on a 5-point scale (1 = does not apply at all, 5 = fully applies)

without long delays with other colleagues or her supervisor who might work later during the day. These considerations have to be balanced with breaks and sufficient time for her recovery between working, for seeing her partner or friends, and for taking care of her children. As most of the involved people act and plan their week independently, planning of working times requires careful time management and scheduling with only few possibilities to build routines (Schulze & Krumm, 2017).

2.2 Planning of Working Places

Nowadays, many organizations are characterized by a high spatial dispersion of work (Cascio & Montealegre, 2016). Information and communication technologies have led to widespread adoption of flexible workplace practices, according to which employees do not work solely at a fixed location but instead work remotely from various places, including from home, on the road, or while visiting clients (Eurofound, 2017). Spatial dispersion has also increased inside office buildings with the introduction of activity-based flexible offices. In these offices, employees no longer have a fixed desk but instead choose a different desk each day or even at various times within a day (Wohlers & Hertel, 2017), depending on the task on which they are working. With such flexibility, employees have to choose regularly between various workplaces that are likely to differ in their functionality regarding certain work tasks, their available resources, and their ergonomic design. Important aspects of a workplace can be the level of distractions, the possibilities for communication and collaboration, the available technological equipment, or the

commuting time to the workplace. According to their obligations at work and in their private life, employees have to consider these aspects and plan their workplaces. As can be seen in a sample of 551 employees of a logistics company (see Fig. 1), these demands rise under high flexplace use (M = 3.06, SD = 1.12), such as home-office or remote work compared to low flexplace use (M = 2.47, SD = 1.04; 95%-CI [−0.773, −0.405]), $t_{549} = -6.295$, $p < 0.001$).

For example, the IT specialist has to plan on which days she commutes to the office for work and on which days she works from home. She must schedule time at the office because certain tasks require special software that is only available on the computers in the office. However, in order to write a report, she schedules some time to work from home, where she can concentrate better due to fewer distractions and greater physical distance from her colleagues.

2.3 Structuring of Work Tasks

In a dynamic environment, high levels of complexity are hard to manage in a centralized and hierarchical organization, which is why many organizations have flattened their hierarchies and rely on employees to take responsibility (Grant & Parker, 2009; Wegman et al., 2018). Instead of having specified job descriptions with predefined tasks, employees are given goals, which can often be rather vague and abstract, and are required to choose their course of action on their own (Bäcklander et al., 2018; Hellgren et al., 2008). The demands to define necessary work steps, plan the execution of tasks, and monitor progress comprise cognitive demands to structure work tasks (Prem et al., 2020).

For example, an IT specialist can be assigned to program a certain module for an app and also be responsible for continuous improvement of the performance of a server. Being given only these abstract goals by her supervisor, she has to identify the necessary work steps to program the module herself, execute them, and monitor her progress. While programming the module, she also has to make sure not to lose sight of her other tasks. This could mean she has to build additional time into her planning in case she faces unexpected maintenance work, and she needs to decide continuously which tasks at a certain moment are important and/or urgent.

Cognitive demands to structure work tasks should be higher in temporal work organizations, such as project work. Project work is usually a temporary collaboration of a diverse and skilled team working on novel tasks (Hanisch & Wald, 2014). Compared to routine work, project work is thus characterized by less specified and more complex tasks and a higher degree of self-organization in the team (Hanisch & Wald, 2014; Spanuth & Wald, 2017). In a group of 320 employees of a logistics company, we found higher demands for structuring work tasks among employees working mostly on projects (M = 4.41, SD = 0.59) than among employees doing mostly routine work (M = 3.78, SD = 0.86; 95%-CI [0.4663, 0.7849]), $t_{318} = 7.73$, $p < 0.001$).

2.4 Coordinating with Others

Besides being more decentralized, contemporaneous organizations have also become more intertwined (Grant & Parker, 2009). By this we mean that there is increasing interdependence of work. Employees today can work in various projects spread across different divisions and organizations. Such projects usually consist of experts who sometimes work from different geographical locations and have diverse occupational and cultural backgrounds. The coordination within and across these projects tends to rely less on a central management or formal structures and procedures and more on self-reliant organization by the project members. Hence, employees are facing cognitive demands to coordinate with others, as they have to manage collaboration and communication, exchange information, and find a common approach with colleagues, supervisors, and clients (Prem et al., 2020).

Such demands are especially common in project work. Accordingly, we found in a sample of 319 employees from an organization in the logistics sector that employees working mostly in projects (M = 4.10, SD = 0.74) had significantly more demands to coordinate with others than employees working mostly in routine work (M = 3.11, SD = 0.83; 95%-CI [0.7981, 1.1504]), $t_{317} = 10.89$, $p < 0.001$). Cognitive demands to coordinate with others should also be higher when employees work flexibly, because employees are then less likely to be present at the same time and in the same place and spontaneous communications become less likely and more difficult (Hinds & Mortenson, 2005). Using the same sample ($N = 551$), we found that employees with high flextime use (M = 3.78, SD = 0.85) had significantly higher demands to coordinate with others than employees with low flextime use (M = 3.60, SD = 0.85; 95%-CI [−0.319, −0.035]), $t_{549} = -2.45$, $p < 0.05$). In conclusion, flexible work organization comes with demands to coordinate with others (see Fig. 1).

2.5 Cognitive Demands of Flexible Work in Different Sectors

To take a closer look at the prevalence of these demands in current work settings, we surveyed workers in different sectors, namely, elderly care ($N = 88$), logistics ($N = 551$), IT services ($N = 91$), and freelancers ($N = 222$). Organizations in the logistics sector have recently introduced an activity-based office concept. As can be seen in Fig. 3, workers on average reported medium to high levels of the cognitive demands of planning working times and places, structuring work tasks, and coordinating with others. Regarding the demands of planning working times ($F_{2,850} = 94.295$, $p < 0.001$) and places ($F_{2,845} = 24.913$, $p < 0.001$), all four groups differed significantly from each other. Freelancers showed the highest values in the demand to plan working time (M = 4.68, SD = 0.60) compared to logistics (M = 3.70, SD = 0.98) and IT (M = 3.66, SD = 1.16), as well as in the demand to plan the working place (M = 3.12, SD = 1.20). Freelancers have no company affiliation with a given work

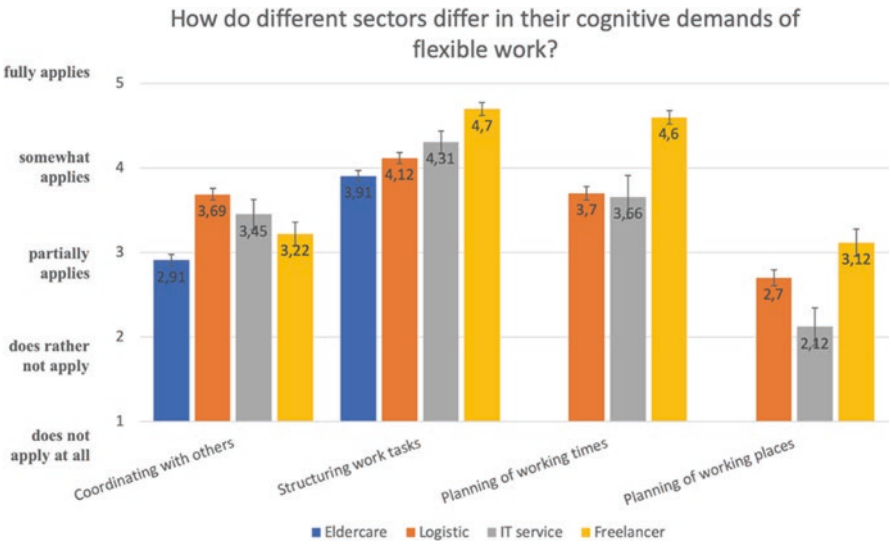


Fig. 3 Graphical representation of cognitive demands of flexible work in different sectors
Notes: The error bars show the 95% confidence interval of the respective mean value
Items were administered on a 5-point scale (1 = does not apply at all, 5 = fully applies)
Item examples can be found in the appendix

location, so they can choose when and where to work. A comparison between logistics (M = 2.70, SD = 1.11) and IT services (M = 2.12, SD = 1.02) shows that demands to plan the workplace were substantially higher in employees of the logistics company, which had implemented activity-based offices in which the employees had no fixed desk but chose a workstation each day depending on their tasks. Regarding the demand to structure one's work, significant differences between the four sectors can again be observed ($F_{3,933} = 21.328$, $p < 0.001$). Freelancers reported the highest levels (M = 4.7, SD = 0.56) and differed significantly from elderly care (M = 3.91, SD = 0.94), logistics (M = 3.57, SD = 0.91), and IT services (M = 4.33, SD = 0.61). Freelancers usually accept assignments from different clients, and they must organize and structure these assignments independently. The demand to coordinate with others also differed significantly in the four sectors ($F_{3,939} = 27.693$, $p < 0.001$). Significant differences were shown between elderly care (M = 2.91, SD = 0.83), logistics (M = 3.69, SD = 0.85), and IT services (M = 3.45, SD = 0.81), as well as between freelancers (M = 3.22, SD = 1.06) and logistics. One possible reason is that within a company, workers depend more strongly on their colleagues and have to coordinate their work more with others than, for example, freelancers who are assigned independent tasks. In conclusion, the cognitive demands of

flexible work are highly dependent on the characteristics of the organization and the task, but they can be found in a variety of sectors.[1]

3 The Consequences of Cognitive Demands of Flexible Work: A Proposed Model

Flexible work organization demands that employees plan, structure, and coordinate their work. This puts additional pressure on employees, but it also provides challenges and opportunities to learn new skills. This means that cognitive demands of flexible work are potentially both detrimental and beneficial. On the one hand, dealing with the cognitive demands of flexible work will be effortful and lead to strain in employees. On the other hand, the challenge of these demands should help employees learn new skills, which could benefit them in their work and beyond. A model with such a dual process is presented in Fig. 4. We propose that the cognitive demands of flexible work are linked to a strain process, in which the cognitive effort associated with these demands is responsible for several detrimental effects relating to psychological detachment, fatigue, and work–home conflict. In addition, cognitive demands of flexible work can also initiate a learning process in employees, in which learning of new skills and competencies fosters employees' cognitive flexibility, their motivation, and work–home enrichment.

this figure will be printed in b/w

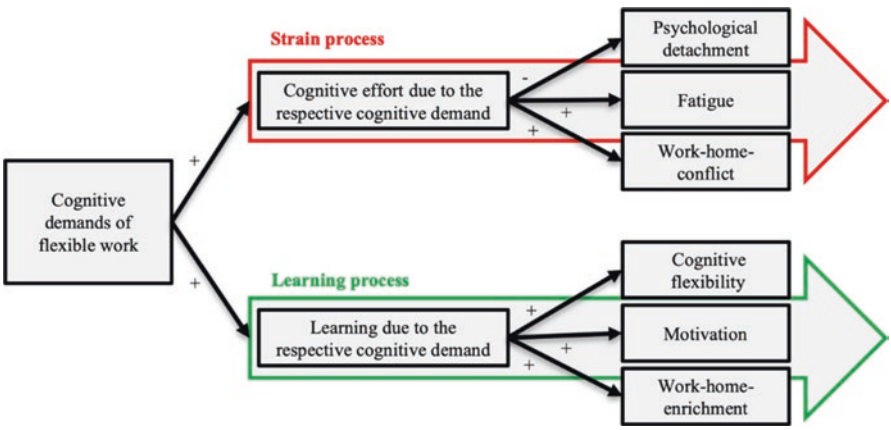


Fig. 4 Graphical representation of the proposed model

[1] The demands planning of working times and planning of working places were not asked of workers in the elderly care sector.

3.1 The Strain Process

Cognitive demands of flexible work are characterized by a high dynamic that makes it difficult for employees to build routines or establish practices to deal with those demands (Grant & Parker, 2009; Jett & George, 2003). As the circumstances can change rapidly and often in a flexible work organization, employees are required to re-analyze the situation regularly and to adapt their plans, decisions, and actions accordingly (Bäcklander et al., 2018; Parke et al., 2018). Constant analysis and adaptation to a changing environment can put pressure on employees and requires the expenditure of cognitive effort (Frese & Zapf, 1994; Hockey, 2013; Schmitt et al., 2012). Such effects have been reported by various scholars in the context of flexible work (Bäcklander et al., 2018; Höge & Hornung, 2015; Pérez-Zapata et al., 2016; Väänänen et al., 2020). Hence, cognitive demands of flexible work should lead to cognitive effort. This could subsequently foster strain in employees. In the following, we describe the potential effects of cognitive effort resulting from cognitive demands on three strain outcomes: psychological detachment, fatigue, and work–home conflict.

Psychological Detachment The cognitive effort associated with the cognitive demands of flexible work could hamper psychological detachment from work. Psychological detachment refers to a state of being mentally disengaged from work during nonwork hours (Sonnentag & Fritz, 2014). According to Sonnentag and Fritz (2014), high activation due to the expenditure of effort can persist after work hours and thus trigger work-related thoughts. Because flexible work blurs the boundaries between work and private life, the activation associated with cognitive demands of flexible work is even more likely to affect employees' thoughts and behaviors outside work. As hours and places for work or leisure become less clearly delineated, intruding thoughts about work may become more likely during nonwork time (Dettmers, 2017; Mache et al., 2020).

Fatigue Fatigue refers to a mental state characterized by feelings of tiredness or exhaustion and an aversion to investing effort (Hockey, 1997, 2013). It usually follows from prolonged cognitive activity (Randles et al., 2017; van der Linden et al., 2003a, b; van Hoof et al., 2007). Accordingly, the cognitive effort associated with cognitive demands of flexible work could cause fatigue in employees. Such an effect should happen immediately or within a short time frame, meaning that cognitive effort should lead to fatigue within the same day, such as in the evening. In addition to such short-term effects, there could also be long-term effects. If high effort is expended over a prolonged period of time, fatigue may accumulate and lead to an increase in general fatigue levels (Geurts & Sonnentag, 2006; McEwan, 1998). This would mean that continuously high cognitive effort due to cognitive demands of flexible work is associated with higher levels of fatigue in the long run.

Work–Home Conflict Work–home conflict is defined as "a form of inter-role conflict in which the role pressures from the work and family domains are mutually

incompatible in some respect" (Greenhaus & Beutell, 1985, p. 77). When employees need to bring in more resources to work than are available, their resources to contribute to family life are reduced (ten Brummelhuis & Bakker, 2012). It can be assumed that cognitive demands of flexible work are cognitively effortful, as employees need to bring in additional resources to independently organize their work tasks or organize their work and private lives. Thus, they lack resources to contribute to family obligations. The reduced resources in the home domain result in more work–home conflict (Michel et al., 2011).

3.2 The Learning Process

Cognitively demanding and complex work is known for its stimulating effects on learning at work (de Jonge et al., 2012; Frese & Zapf, 1994; Zacher & Frese, 2018). Such beneficial effects should also apply to cognitive demands of flexible work, which requires employees to organize themselves and build skills in planning, self-management, and decision-making (Hertel et al., 2006; Schulze & Krumm, 2017). Employees have to approach and solve new problems independently, but they also must consider and integrate other perspectives when coordinating in a team with other flexible workers. By using and practicing such skills, employees are likely to improve them (Frese & Zapf, 1994; Zacher & Frese, 2018). Thus, cognitive demands of flexible work should lead to employees learning new skills and competencies. In the following, we argue that such learning can subsequently improve employees' cognitive flexibility, motivation, and work–home enrichment.

Cognitive Flexibility As employees learn new skills and competencies, they may be motivated to transfer them to other areas of their life, benefitting their cognitive flexibility (Kohn & Schooler, 1983). Cognitive flexibility refers to the abilities of individuals to adapt to changing environments, to consider and integrate the perspectives of others, and to solve problems flexibly (Dennis & Vander Wal, 2010). The cognitive demands of flexible work give employees many opportunities to practice these skills and competencies. The more employees learn and consolidate these skills, the more likely it becomes that they use them in other areas of life. Empirical evidence for such a generalization of learned skills at work can be found in various longitudinal studies that indicate the positive effects of cognitively demanding work on cognitive functions (Kobayashi & Feldman, 2019; Lane et al., 2017; Marquié et al., 2010; Schooler et al., 1999; Smart et al., 2014).

Motivation Learning new skills and competencies at work should also have strong motivational effects. New skills and competencies could satisfy the need for competence in employees and so strengthen intrinsic motivation (Ryan & Deci, 2017). Various studies have shown that cognitively demanding work and learning can contribute to motivation (Chung-Yan, 2010; Daniels et al., 2009), thriving (Prem et al.,

2017), and engagement (Sarti, 2014). Therefore, we argue that learning new skills through cognitive demands of flexible work contributes to motivation in employees.

Work–Home Enrichment The benefits of learning new skills might not be limited to the work context. Rather, these newly acquired skills may also be used in the home domain, contributing to work–home enrichment. Work–home enrichment is defined "as the extent to which experiences in one role improve the quality of life in the other role" (Greenhaus & Powell, 2006, p. 72). As Crain and Hammer (2013) showed in their review, cognitive demands are positively associated with work–home enrichment. This result lends support to the assumption that cognitive demands of flexible work may also have the potential to enrich employees' private lives. As cognitive demands of flexible work give employees plenty of opportunities to learn new skills and competencies (Hertel et al., 2006; Schulze & Krumm, 2017), they help employees to gain personal resources that can also be used in private life. If, for example, someone needs to structure, plan, and monitor the progress of his/her work independently, the learned skills can also be used to achieve a personal goal.

4 Preliminary Empirical Evidence

Over the course of a research project funded by the Austrian Science Fund (FWF; grant P29408-G29), our research group conducted several studies to test the propositions of the model presented here, including two diary studies (Diary Study 1, Kubicek et al., 2020; Diary Study 2, Baumgartner et al., 2020) and one longitudinal study (Uhlig et al., 2020). A description of the studies can be found in Table 1. In the following, we present preliminary results from these studies and discuss the findings with regard to the proposed model.

4.1 The Strain Process

The demands of planning of working times and planning of working places showed very similar results across the two studies. Both demands were positively associated with cognitive effort in Diary Study 1 and the longitudinal study. In both studies, cognitive effort mediated the relationship of planning of working times and planning of working places with strain outcomes. Therefore, there were indirect effects of both demands on psychological detachment in Diary Study 1 and on fatigue in the longitudinal study.

Structuring of work tasks was positively related with cognitive effort in Diary Study 2, but not in Diary Study 1 or the longitudinal study. In Diary Study 2, the cognitive effort mediated an indirect relationship of structuring of work tasks on work–home conflict.

Table 1 Description of studies

	Design	Sample	Independent variables	Mediating variables	Dependent variables
Diary study 1	Daily questionnaires twice a day for 10 days	IT sector, N = 54; number of observations = 334	Planning of working times Planning of working places Structuring work task Coordinating with others	Cognitive effort Learning	Psychological detachment Cognitive flexibility
Diary study 2	Daily questionnaires twice a day for 5 days	Elder care workers, N = 88; number of observations = 407	Structuring work task Coordinating with others	Cognitive effort Learning	Work–home conflict Work–home enrichment
Longitudinal Study	Questionnaires at two time points with time lag of 4 months	Logistics sector, N = 257	Planning of working times Planning of working places Structuring work tasks Coordinating with others	Cognitive effort Learning	Fatigue Cognitive flexibility

Note. Cognitive demands of flexible work were measured in all three studies using the scale by Prem et al. (2020). Cognitive effort and learning were asked separately with regard to each of the demands (e.g., "coordinating with others was cognitively effortful for me")

Coordinating with others showed a positive relationship with cognitive effort in both diary studies and in the longitudinal study. In Diary Study 1, cognitive effort mediated an indirect relationship of coordinating with others on psychological detachment. In Diary Study 2, we found an indirect relationship of coordinating with others via cognitive effort on work–home conflict. In the longitudinal study, coordinating with others showed an indirect positive relationship with fatigue mediated via cognitive effort. Contrary to our expectations, coordinating with others showed a negative direct relationship with fatigue in the longitudinal study.

To summarize, across all three studies we found evidence for positive relationships between the cognitive demands of flexible work and cognitive effort. The results also lend support to a strain process linked to the cognitive demands of flexible work: for planning of working times, planning of working places, and coordinating with others, the cognitive effort related to these demands mediated relationships with strain outcomes in employees both on a daily basis and over a time lag of 4 months. For structuring of work tasks, the results were less consistent, and an indirect relationship with a strain outcome was found only in Diary Study 2.

Structuring of work tasks could be a rewarding activity that needs cognitive effort: as it is closely linked to the task itself, it also allows employees to feel more responsible for their work. These positive feelings linked to the demand could buffer the negative long-term effects. In comparison, high demands of planning of working times, planning of working places, and coordinating with others could feel more tedious, as these demands are more related to the organization of work and less to the content of the task. Thus, high levels of these demands could feel more like a burden. As a result, their effects could be more harmful.

In the longitudinal study, we also found an unexpected direct negative path from coordinating with others to fatigue. One possible explanation for this path could be social support. With higher demands to coordinate with others, there could also be more possibilities to receive social support (Grant & Parker, 2009). Over time, this resource could pay off and help to reduce strain in employees.

4.2 The Learning Process

Again, planning of working times and planning of working places showed similar results. Both demands were positively related to learning in Diary Study 1 and the longitudinal study, but we found no evidence for subsequent relationships of learning with cognitive flexibility. In the longitudinal study, however, both demands revealed positive direct relationships of cognitive demands of working time and working place planning with cognitive flexibility.

Structuring of work tasks was positively related with learning in both diary studies but not in the longitudinal study. In Diary Study 1, learning subsequently mediated a relationship between structuring of work tasks and cognitive flexibility. In Diary Study 2, we found an indirect relationship of structuring of work tasks with work–home enrichment via learning.

Coordinating with others was positively related with learning in all three studies. However, no subsequent relationships with learning outcomes were found.

The results across all three studies show consistent relationships between the cognitive demands of flexible work and learning. For organizing work and family obligations and for structuring of work tasks, we also found evidence that this learning can subsequently benefit employees' work–home enrichment and cognitive flexibility. For planning of working times and planning of working places, we also found positive direct relationships with cognitive flexibility.

To summarize, the preliminary evidence shows a complex pattern of results regarding the relationships between the different cognitive demands of flexible work and the proposed strain and learning processes. For the demands planning of working times and planning of working places, we found empirical evidence for both processes, suggesting that these demands can have ambivalent effects on employees, as proposed in our model. Structuring of work tasks seems to hold less potential for strain effects on employees. This could be because it involves fewer other people, giving employees more control over it. In contrast, coordinating with

others was consistently related with strain outcomes, but with none of the distal learning outcomes. This suggests that the skills learned through coordinating with others at work are not well suited to transfer to other areas.

We highlight two important avenues for future research. First, studies should examine engagement as a possible outcome of learning related to the cognitive demands of flexible work. Engagement is an important indicator of the quality of work life, which can benefit both employees and employers. Therefore, it is important to understand how it is affected by the cognitive demands of flexible work. Second, future research should also consider potential moderator variables such as individual and organizational boundary creation. Boundary creation refers to the permeability or flexibility with which boundaries between the work and home domains are drawn (Ashforth et al., 2000). If boundaries are permeable and both domains are integrated, spillover effects between both domains become more likely. This could mean that cognitive effort and learning resulting from the cognitive demands of flexible work have a stronger effect on strain and learning outcomes in employees. As boundary creation can be influenced by both the individual and the organization, it could be examined as a moderator on an individual or organizational level (Kreiner, 2006).

We want to emphasize that the results presented here are preliminary and should be interpreted with caution. Moreover, it is important to note that in all three studies cognitive effort and learning were measured at the same time points as the demands. This means that no definite statements about the direction of the effects can be made. An alternative explanation could be that employees who experience the demands as very cognitively effortful or useful for learning also tend to rate the demands more highly. Such an effect would be similar to the well-documented halo effect, which is a cognitive bias according to which the experience people have in a situation can influence their assessments of other objective characteristics of the situation (Greenwald & Banaji, 1995). Future research should clarify these causal relationships.

5 Practical Implications

Cognitive demands were found in many different sectors. Therefore, it seems all the more important that these demands are given additional attention in the design of workplaces. As has been shown in preliminary results, the cognitive demands of flexible work have both positive and negative effects on employees and trigger both a learning and a strain process. Therefore, it is essential to look at them in more detail. In order to strengthen positive effects and mitigate negative effects, a successful interaction between the employee, the organization, and the job is important (Allen et al., 2013). In the following, we list some examples of how cognitive demands can be met at different levels with targeted actions.

Since coordinating with others was linked only with the strain process, we can assume that this will be even more pronounced when it comes to teamwork. An

important challenge of flexible work is the interdependency of the team (Greer & Payne, 2014). Team members have to coordinate their tasks and to be reachable for each other. In flexible work arrangements, the coordination between team members tends to become more difficult; for example, working hours and location can be adapted to private needs, with the result that employees no longer work at the same time or in the same place. Preliminary results indicate that demands for coordinating with others and planning working times and places trigger a strain process. To keep coordination demands in the team as low as possible, it can be helpful to visualize the availability of the team (e.g., by sharing calendars). The role of informal communication in successful team coordination should not be overlooked (Kraut et al., 1993). Since informal communication is reduced in flexible work environments (Greer & Payne, 2014), it seems all the more important that managers pay attention to building a good team climate and to encouraging informal and personal communication to reduce coordination demands. Furthermore, the organization needs to ensure that employees who work flexibly have access to appropriate technologies that allow them to communicate formally and informally with colleagues. The planning of working times and working places can be supported by transparent rules for availability or additional rules regarding work organization (e.g., core hours).

With the use of flexible work arrangements, employees can plan their work independently. They face demands for structuring their work because they have to maintain an overview of their work tasks and monitor their work progress to accomplish goals. To achieve work goals, self-regulation skills are necessary (Vancouver et al., 2014). Preliminary results from our studies show that cognitive demands to structure work lead to a learning process. In line with these findings, Parke et al. (2018) found that individuals who work in flexible work environments increased their daily performance if they used time management planning and contingent planning as a form of self-regulation at work. Therefore, we suggest that organizations offer training to support the development of self-regulation skills in order to help employees and managers better deal with the demands for structuring their work independently and to foster the learning process.

6 Conclusion

Higher organizational flexibility brings not only more autonomy but also additional cognitive demands to plan, structure, and coordinate. In this chapter, we have described the nature of these cognitive demands of flexible work and have shown that the level of these demands depends heavily on flexible work organization, such as flextime, flexplace, or project work. Moreover, we have provided the first empirical evidence that these demands are related to two different processes: a strain process and a learning process. The relationships with both processes seemed to differ between the cognitive demands of flexible work: while planning of working times and planning of working places were related to both processes, structuring of work

tasks showed more consistent relationships with learning, and coordinating with others related only to strain. Targeted actions, such as team calendars to make the availability of the team visible or training to support the development of self-regulation skills, can help companies and managers reduce the detrimental effects and enhance the beneficial effects of the cognitive demands of flexible work. With regard to future research, moderators like organizational or individual boundary creation should be considered as well, as they might influence the impact of the cognitive demands of flexible work.

References

Allen, T. D., Johnson, R. C., Kiburz, K. M., & Shockely, K. M. (2013). Work-family conflict and flexible work arrangements: Deconstructing flexibility. *Personnel Psychology, 66*(2), 345–376. https://doi.org/10.1111/peps.12012

Allvin, M., Aronsson, G., Hagström, T., Johansson, G., & Lundberg, U. (2011). Work without boundaries. Psychological perspectives on the new working life. Wiley-Blackwell. https://doi.org/10.1002/9781119991236

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*(3), 472–491.

Bäcklander, G., Rosengren, C., & Kaulio, M. (2018). Managing intensity in knowledge work: Self-leadership practices among Danish management consultants. *Journal of Management & Organization*, 1–19. https://doi.org/10.1017/jmo.2018.64

Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology, 22*(3), 309–328.

Baumgartner, V. C., Prem, R., Kubicek, B., Uhlig, L., & Korunka, C. (2020). *Cognitive demands of flexible work and their relationship to work-home-outcomes: A daily diary study*. Manuscript in preparation.

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

Chung-Yan, G. A. (2010). The nonlinear effects of job complexity and autonomy on job satisfaction, turnover, and psychological well-being. *Journal of Occupational Health Psychology, 15*(3), 237–251. https://doi.org/10.1037/a0019823

Crain, T. L., & Hammer, L. B. (2013). Work–family enrichment: A systematic review of antecedents, outcomes, and mechanisms. In B. B. Arnold (Ed.), *Advances in positive organizational psychology* (Vol. 1, pp. 303–328). Emerald Group Publishing Limited. https://doi.org/10.1108/S2046-410X(2013)0000001016

Daniels, K., Boocock, G., Glover, J., Hartley, R., & Holland, J. (2009). An experience sampling study of learning, affect, and the demands control support model. *Journal of Applied Psychology, 94*(4), 1003–1017. https://doi.org/10.1037/a0015517

de Jonge, J., Spoor, E., Sonnentag, S., Dormann, C., & van den Tooren, M. (2012). "Take a break?!" Off-job recovery, job demands, and job resources as predictors of health, active learning, and creativity. *European Journal of Work and Organizational Psychology, 21*, 321–348. https://doi.org/10.1080/1359432X.2011.576009

Dennis, J. P., & Vander Wal, J. S. (2010). The cognitive flexibility inventory: Instrument development and estimates of reliability and validity. *Cognitive Therapy and Research, 34*, 241–253. https://doi.org/10.1007/s10608-009-9276-4

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. https://doi.org/10.1080/02678373.2017.1298164

Eurofound & 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://doi.org/10.2806/425484

Frese, M., & Zapf, D. (1994). Action as the core of work psychology: A German approach. In H. C. Triandis, M. D. Dunnette, & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (Vol. 4, 2nd ed., pp. 271–340). Consulting Psychologists Press.

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 and Health, 32*(6), 482–492.

Grant, A. M., & Parker, S. K. (2009). Redesigning work design theories: The rise of relational and proactive perspectives. *Academy of Management Annals, 3*(1), 317–375. https://doi.org/10.5465/19416520903047327

Greenhaus, J. H., & Beutell, N. J. (1985). Sources and conflict between work and family roles. *Academy of Management Review, 10*(1), 76–88. 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

Greenwald, A. G., & Banaji, M. R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review, 102*(1), 4–27. https://doi.org/10.1037/0033-295X.102.1.4

Greer, T. W., & Payne, S. C. (2014). Overcoming telework challenges: Outcomes of successful telework strategies. *The Psychologist-Manager Journal, 17*(2), 87–111. https://doi.org/10.1037/mgr0000014

Hanisch, B., & Wald, A. (2014). Effects of complexity on the success of temporary organizations: Relationship quality and transparency as substitutes for formal coordination mechanisms. *Scandinavian Journal of Management, 30*(2), 197–213. https://doi.org/10.1016/j.scaman.2013.08.005

Hellgren, J., Sverke, M., & Näswall, K. (2008). Changing work roles: New demands and challenges. In K. Näswall, J. Hellgren, & M. Sverke (Eds.), *The individual in the changing working life* (pp. 46–66). Cambridge University Press. https://doi.org/10.1017/CBO9780511490064.003

Hertel, G., Konradt, U., & Voss, K. (2006). Competencies for virtual teamwork: Development and validation of a web-based selection tool for members of distributed teams. *European Journal of Work and Organizational Psychology, 15*(4), 477–504. https://doi.org/10.1080/13594320600908187

Hinds, P. J., & Mortensen, M. (2005). Understanding conflict in geographically distributed teams: The moderating effects of shared identity, shared context, and spontaneous communication. *Organization Science, 16*, 290–324.

Hockey, G. R. J. (1997). Compensatory control in the regulation of human performance under stress and high workload: A cognitive-energetical framework. *Biological Psychology, 45*(1–3), 73–93. https://doi.org/10.1016/S0301-0511(96)05223-4

Hockey, R. (2013). *The psychology of fatigue: Work, effort and control*. Cambridge University Press.

Höge, T., & Hornung, S. (2015). Perceived flexibility requirements: Exploring mediating mechanisms in positive and negative effects on worker well-being. *Economic and Industrial Democracy, 36*(3), 407–430. https://doi.org/10.1177/0143831X13511274

Jett, Q. R., & George, J. M. (2003). Work interrupted: A closer look at the role of interruptions in organizational life. *Academy of Management Review, 28*(3), 494–507.

Kobayashi, L. C., & Feldman, J. M. (2019). Employment trajectories in midlife and cognitive performance in later life: Longitudinal study of older American men and women. *Journal of Epidemiology & Community Health, 73*, 232–238. https://doi.org/10.1136/jech-2018-211153

Kohn, M. L., & Schooler, C. (1983). *Work and personality: An inquiry into the impact of social stratification*. Ablex Publishing.

Kraut, R., Fish, R. S., Root, R., & Chalfonte, B. (1993). Informal communication in organizations: Form, function and technology. In R. M. Backer (Ed.), *Readings in groupware and computer supported cooperative work*. Morgen Kaufman.

Kreiner, G. E. (2006). Consequences of work-home segmentation or integration: A person-environment fit perspective. *Journal of Organizational Behavior, 27*(4), 485–507.

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*(6), 898–913. https://doi.org/10.1080/1359432X.2014.979160

Kubicek, B., Baumgartner, V. C., Prem, R., Sonnentag, S., & Korunka, C. (2020). *Less detachment but more cognitive flexibility? A diary study on outcomes of cognitive demands of flexible work*. Manuscript submitted for publication.

Lane, A. P., Windsor, T. D., Andel, R., & Luszcz, M. A. (2017). Is occupational complexity associated with cognitive performance or decline? Results from the Australian longitudinal study of ageing. *Gerontology, 63*(6). https://doi.org/10.1159/000475559

LePine, J. A., Podsakoff, N. P., & LePine, M. A. (2005). A meta-analytic test of the challenge stressor–hindrance stressor framework: An explanation for inconsistent relationships among stressors and performance. *Academy of Management Journal, 48*(5), 764–775. https://doi.org/10.5465/amj.2005.18803921

Mache, S., Servaty, R., & Harth, V. (2020). Flexible work arrangements in open workspaces and relations to occupational stress, need for recovery and psychological detachment from work. *Journal of Occupational Medicine and Toxicology, 15*, 5. https://doi.org/10.1186/s12995-020-00258-z

Marquié, J. C., Duarte, R. L., Bessières, P., Dalm, C., Gentil, C., & Ruidavets, J. B. (2010). Higher mental stimulation at work is associated with improved cognitive functioning in both young and older workers. *Ergonomics, 53*(11), 1287–1301. https://doi.org/10.1080/00140139.2010.519125

McEwen, B. S. (1998). Protective and damaging effects of stress mediators. *New England Journal of Medicine, 338*, 171–179. https://doi.org/10.7551/mitpress/3077.003.0079

Michel, J. S., Kotrba, L. M., Mitchelson, J. K., Clark, M. A., & Baltes, B. B. (2011). Antecedents of work–family conflict: A meta-analytic review. *Journal of Organizational Behavior, 32*(5), 689–725. https://doi.org/10.1037/e518632013-410

Parke, M. R., Weinhardt, J. M., Brodsky, A., Tangirala, S., & DeVoe, S. E. (2018). When daily planning improves employee performance: The importance of planning type, engagement, and interruptions. *Journal of Applied Psychology, 103*(3), 300–312.

Pérez-Zapata, O., Pascual, A. S., Álvarez-Hernández, G., & Collado, C. C. (2016). Knowledge work intensification and self-management: The autonomy paradox. *Work Organisation, Labour & Globalisation, 10*(2), 27–49. https://doi.org/10.13169/workorgalaboglob.10.2.0027

Prem, R., Ohly, S., Kubicek, B., & Korunka, C. (2017). Thriving on challenge stressors? Exploring time pressure and learning demands as antecedents of thriving at work. *Journal of Organizational Behavior, 38*, 108–123. https://doi.org/10.1002/job.2115

Prem, R., Kubicek, B., Uhlig, L., Baumgartner, V., & Korunka, C. (2020, May 26). Development and validation of a scale to measure cognitive demands of flexible work. *PsyArXiv*. https://doi.org/10.31234/osf.io/mxh75

Randles, D., Harlow, I., & Inzlicht, M. (2017). A pre-registered naturalistic observation of within domain mental fatigue and domain-general depletion of self-control. *PLoS One, 12*(9). https://doi.org/10.1371/journal.pone.0182980

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Publications.

Sarti, D. (2014). Job resources as antecedents of engagement at work: Evidence from a long-term care setting. *Human Resource Development Quarterly, 25*(2), 213–237. https://doi.org/10.1002/hrdq.21189

Schmitt, A., Zacher, H., & Frese, M. (2012). The buffering effect of selection, optimization, and compensation strategy use on the relationship between problem solving demands and occupational well-being: A daily diary study. *Journal of Occupational Health Psychology, 17*(2), 139–149. https://doi.org/10.1037/a0027054

Schooler, C., Mesfin, S. M., & Oates, G. (1999). The continuing effects of substantively complex work on the intellectual functioning of older workers. *Psychology and Aging, 14*(3), 483–506. https://doi.org/10.1037/0882-7974.14.3.483

Schulze, J., & Krumm, S. (2017). The "virtual team player": A review and initial model of knowledge, skills, abilities, and other characteristics for virtual collaboration. *Organizational Psychology Review, 7*(1), 66–95. https://doi.org/10.1177/2041386616675522

Smart, E. L., Gow, A. J., & Deary, I. J. (2014). Occupational complexity and lifetime cognitive abilities. *Neurology, 83*, 2285–2291. https://doi.org/10.1212/WNL.0000000000001075

Sonnentag, S., & Fritz, C. (2014). 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

Spanuth, T., & Wald, A. (2017). Understanding the antecedents of organizational commitment in the context of temporary organizations: An empirical study. *Scandinavian Journal of Management, 33*(3), 129–138. https://doi.org/10.1016/j.scaman.2017.06.002

ten Brummelhuis, L. L., & Bakker, A. B. (2012). A resource perspective on the work-home interface: The work-home resources model. *The American Psychologist, 67*(7), 545–556. https://doi.org/10.1037/a0027974

Uhlig, L., Korunka, C., Prem, R., & Kubicek, B. (2020). *Longitudinal effects of cognitive demands of flexible work on strain and personal development*. Manuscript in preparation.

Väänänen, A., Toivanen, M., & Lallukka, T. (2020). Lost in autonomy – Temporal structures and their implications for employees' autonomy and well-being among knowledge workers. *Occupational Health Science, 4*, 83–101. https://doi.org/10.1007/s41542-020-00058-1

van der Linden, D., Frese, M., & Meijman, T. F. (2003a). Mental fatigue and the control of cognitive processes: Effects on perseveration and planning. *Acta Psychologica, 113*(1), 45–65. https://doi.org/10.1016/S0001-6918(02)00150-6

van der Linden, D., Frese, M., & Sonnentag, S. (2003b). The impact of mental fatigue on exploration in a complex computer task: Rigidity and loss of systematic strategies. *Human Factors, 45*(3), 483–493. https://doi.org/10.1518/hfes.45.3.483.27256

van Hooff, M. L. M., Geurts, S. A. E., Kompier, M. A. J., & Taris, T. W. (2007). Workdays, in-between workdays and the weekend: A diary study on effort and recovery. *International Archives of Occupational and Environmental Health, 80*(7), 599–613. https://doi.org/10.1007/s00420-007-0172-5

Vancouver, J. B., Gullekson, N. L., Morse, B. J., & Warren, M. A. (2014). Finding a between-person negative effect of self-efficacy on performance: Not just a within-person effect anymore. *Human Performance, 27*, 243–261.

Wegman, L. A., Hoffman, B. J., Carter, N. T., Twenge, J. M., & Guenole, N. (2018). Placing job characteristics in context: Cross-temporal meta-analysis of changes in job characteristics since 1975. *Journal of Management, 44*(1), 352–386. https://doi.org/10.1177/0149206316654545

Wilkinson, A. (1998). Empowerment: Theory and practice. *Personnel Review, 27*(1). https://doi.org/10.1108/00483489810368549

Wohlers, C., & Hertel, G. (2017). Choosing where to work at work – Towards a theoretical model of benefits and risks of activity-based flexible offices. *Ergonomics, 60*(4), 467–486. https://doi.org/10.1080/00140139.2016.1188220

Zacher, H., & Frese, M. (2018). Action regulation theory: Foundations, current knowledge, and future directions. In N. Anderson, D. S. Ones, C. Viswesvaran, & H. K. Sinangil (Eds.), *Handbook of industrial, work & organizational psychology* (Vol. 2, pp. 80–102). SAGE Publications Ltd. https://doi.org/10.4135/9781473914957.n7

Managing the Work-Nonwork Interface: Personal Social Media Use as a Tool to Craft Boundaries?

Christine J. Syrek, Jana Kühnel, Inga J. Nägel, and Tim Vahle-Hinz

1 Introduction

Increased flexibility of work and particularly the developments regarding digital work (e.g., information and communications technology, ICT) have changed ways of working and made home-office and mobile work a common practice. Additionally, the developments in ICT, such as social media platforms, have also transformed our everyday lives (Klimmt et al., 2018; Stawarz et al., 2013). In the work context, ICT has promoted opportunities for certain occupations (e.g., knowledge-based work) to work anytime and anywhere. These developments have opened up new opportunities for employees to reconcile their nonwork and professional lives while also, paradoxically, posing risks to the successful balance of work and nonwork domains (Arlinghaus & Nachreiner, 2013; Stawarz et al., 2013). Owing to these technological developments, the boundaries between professional life and nonwork life are becoming increasingly permeable (Chesley, 2005; Dettmers & Biemelt, 2018; Dettmers, Vahle-Hinz, Bamberg, Friedrich, & Keller, 2016; Schlachter et al., 2018), bringing into focus the debate of how employees can deal with blurring boundaries in order to balance work and nonwork lives. How well employees can reconcile the

C. J. Syrek (✉)
University of Applied Sciences Bonn-Rhein-Sieg, Sankt Augustin, Germany
e-mail: christine.syrek@h-brs.de

J. Kühnel
University of Vienna, Vienna, Austria
e-mail: jana.kuehnel@univie.ac.at

I. J. Nägel
Macromedia University of Applied Sciences, Freiburg, Germany

T. Vahle-Hinz
Psychologische Hochschule Berlin, Berlin, Germany
e-mail: t.vahle-hinz@phb.de

C. Korunka (ed.), *Flexible Working Practices and Approaches*,
https://doi.org/10.1007/978-3-030-74128-0_3

needs of work and nonwork domains in light of a flexibilization of work is important for organizations, because conflicts between work and family are associated with poorer well-being and poorer performance of employees (e.g., Amstad et al., 2011). Especially in today's world of work, with mostly two working partners, work-nonwork balance is a challenge for employees (Kubicek & Tement, 2016; Major & Germano, 2006).

In the present chapter, our aim is to describe challenges of the flexibilization of work for work-nonwork balance and to illustrate theories that provide background information on the construction of boundaries between work and nonwork domains in terms of flexibility and permeability. Further, we describe interindividual differences regarding the preference for boundaries between work and nonwork life (segmentations vs. integration). Additionally, we explain recent developments of ways in which employees actively manage or craft their boundaries (boundary management crafting). We use the term work-nonwork balance throughout this chapter, because the term "nonwork" encompasses several life domains and because it is a neutral expression that does not evaluate the different life domains (see also Casper et al., 2018). However, we make exceptions to this rule when we describe specific theories that explicitly use other specific terms (e.g., work-family border theory). After the introduction of these fundamental theoretical concepts, our aim is to develop this field further by providing a discussion of how ICT use might not be seen only as a threat to the balance between work and nonwork domains (e.g., extended availability) but also as tool to manage the balance between work and nonwork domains. Specifically, we focus on personal social media use at work as an opportunity for employees to address demands from the nonwork domain while being at work.

2 Increased Flexibility at Work and Boundaries Between Work and Nonwork Domains

Industrialization changed the method of working considerably. Employers (those with the capital to provide the structure of industrialized production processes) and employees (those who possess the manpower to make industrialized production possible) found an arrangement that divided the typical structure of the day into times of working and times of nonworking or leisure time. Social developments led, at least in most western societies, to restrictions in maximum working hours and mandatory off-work times (e.g., holidays, weekends). However, since the mid-1990s, the concept of the flexibilization of work has repeatedly found resonance in the scientific debate of industrial and organizational psychology (e.g., Sauer, 2012). Within these changes of the way we work, technologies such as laptops, smartphones, and applications including Internet connectivity or e-mails provided a work environment that allowed for work that is, at least for high-skilled knowledge workers, increasingly independent of time and place (Schlachter et al., 2018), thus

challenging the historically developed separation between work and nonwork time. These developments present a double-edged sword: while on the one hand ICT has offered new opportunities to individualize work to the need of the employees (Kattenbach et al., 2010), on the other hand new demands such as an extended availability for work have arisen (Dettmers et al., 2016).

Regarding working time, flexibilization has led to the formation of new time structures and a general acceleration of everyday working life as well as to a destandardization of working time (Pauls et al., 2019). Thus, flexibilization has the risk of leading to atypical working hours with tacit extended availability in employees' leisure time or even on holidays (Lindecke, 2015; Waltersbacher et al., 2019). Regarding the location of work, telework is on the rise. Employees often report that working remotely helps them to better balance work and nonwork domains (Sullivan & Lewis, 2001). However, when working from home, some evidence suggests that employees might spend *less* time on personal and family activities (Middleton, 2007). In addition, when employees work from home, less physical or time-bound boundaries (e.g., the commute) exist between the experiences in one area of life and the experiences in the other area of life. When workplace experiences are made at home, they might even be shared instantaneously with the partner or spouse, which might increase the chance for crossover effects (the relationship between an actor's negative work experience and the partner's well-being). Taken together, telework offers both an opportunity and a threat to employees' work-nonwork balance.

Moreover, content and organization of work change with the increasing flexibilization due, at least in part, to ICT (Rau & Göllner, 2019). In particular, there is an increase in time pressure and workload, as well as an intensification, acceleration, and densification of work (Strobel, 2019). The latter occurs, for example, due to information overload and the large number of e-mails to be processed per day (Schulz-Dadaczynski et al., 2019). In addition, employees in today's working world have more autonomy and can determine many aspects of their working day themselves. Autonomy can be defined as "[…] the ability to exercise a degree of control over the content, timing, location, and performance of activities" (Hackman & Oldham, 1976; Mazmanian et al., 2013, p. 1). Employees must increasingly decide for themselves how they can contribute to meeting the demands of their work performance by using various resources. Higher autonomy, however, can result in overtime and long work hours (Glißmann & Peters, 2001), which is possibly due to a high degree of freedom of employees to perform activities that is accompanied by a loss of control, since employees' own interests and criteria for shaping their lives are often not sufficiently taken into account and requirements from work are given priority (Rau & Göllner, 2019; Mazmanian et al., 2013). Mazmanian et al. (2013) describe this phenomenon as a paradox of autonomy.

With "always online" technologies, a groundbreaking change in awareness has already taken place among many employees (Hager & Kern, 2017; Klimmt et al., 2018). The so-called permanently online and permanently connected (POPC) mindset describes a mentality in people of staying constantly online and connected to other people or networks, and it is characterized by various habitual perceptions (Klimmt et al., 2018). These developments dissolve the boundaries between work

and nonwork life. More specifically, differences between work and nonwork time become blurred, and traditional boundaries of both the working day and the working week, such as the end of the work day or the weekend, lose their significance (Dettmers et al., 2012; Lindecke, 2015; Strobel, 2019).

3 Theoretical Background: Boundary Management

The described developments of increased flexibility at work highlight the importance of the management of boundaries between work and nonwork domains in today's working world. Two major theories relevant to managing the boundaries between work and nonwork domains are the work-family border theory of Clark (2000) and the work-home boundary theory of Ashforth, Kreiner, and Fugate (2000).

The *work-family border theory* suggests that people physically and psychologically cross borders as they move between different areas of live such as work and family. Border theory describes physical, temporal, and psychological boundaries between different areas of life. Borders can be described by their flexibility and permeability. The flexibility of borders describes the extent to which a border can be narrowed or widened depending on the requirements of one or the other area of life. Permeability, on the other hand, describes the extent to which elements of one area of life can penetrate into another area of life. In general, each boundary can be differently flexible and permeable (Clark, 2000; Pangert et al., 2016).

Flexibility is often associated with a high permeability of the borders between work and nonwork life. Elements of working life can penetrate nonwork life to a high degree, e.g., through contact with supervisors and colleagues and/or taking up work outside regular working hours. Permeability of borders is increased by the use of ICT, since ICT usage enables individuals to be accessible to members of one domain while they are currently involved in another domain (Boswell & Olson-Buchanan, 2007; Dettmers & Biemelt, 2018). Whether permeable and/or flexible borders due to work-related ICT use lead to conflicts depends on the control employees have over boundary crossings, boundary management competences, and individual preferences regarding segmentation and integration of different life domains (see below) (Pangert et al., 2016).

The work-family border theory also states that individuals are likely to differ systematically in how they draw and maintain their boundaries between work and family (Dettmers et al., 2016; Kossek et al., 2012; Kreiner et al., 2009). This view is also shared by Olson-Buchanan and Boswell (2006), who see cross-border availability as an essential aspect of each individual's boundary management. Last but not least, the permeability of the boundaries between different areas of life is often understood as a negotiation process, e.g., between employer and employee, in which individuals make clear the weighing of their individual interests in relation to strict or less strict boundaries (Kreiner, 2006). Some studies also indicate that people who do not consider rigid boundaries between work and nonwork life to be important are more likely to work in their leisure time (Kossek et al., 2012; Strobel, 2019).

The *work-home boundary theory* by Ashforth et al. (2000) describes role transitions as boundary-crossing activities. Boundaries refer to physical, psychological, or temporal delimitations for separating one domain from another. Role boundaries refer to the rules, norms, and expectations associated with one specific role in contrast to another role. Ashforth et al. (2000) delineate macro- and micro-role transitions that occur between different roles. While macro-role transitions are infrequent and often involve permanent change, micro-role transitions between roles occur frequently and repetitively. For instance, an executive director changes her roles during home office frequently to accomplish both job demands in the role of being a director and nonwork demands in the role of being a mother. Flexibility and permeability are the two key concepts of a given role boundary (Ashforth et al., 2000). Flexible boundaries allow individuals to fulfill their roles regardless of time and location. In contrast, inflexible boundaries determine when and where a role may be fulfilled. Permeability refers to the degree to which a person is physically present in the domain of one role and while psychologically fulfilling demands of another role. From the perspective of work-home boundary theory, permeability of the boundaries between the work and nonwork domain is associated with blurred roles and has the potential to cause conflicts between work and nonwork domains and, consequently, to cause strain (Dettmers & Biemelt, 2018; Dettmers, et al., 2016; Hecht & Allen, 2009). A specific role is associated with specific values, norms, and communication styles creating the role identity. Further, a specific role is associated with a specific social domain, creating role boundaries. Role identity and role boundary are two concepts that can vary on a continuum from high segmentation to high integration. Thus, we now turn to the role of integration or segmentation preferences for employees' boundary management.

4 Theoretical Background: Integration and Segmentation

Integration and segmentation are terms used to describe the degree to which individuals keep aspects of their work role(s) separate from aspects of their nonwork role(s) (Kreiner, 2006). The degree of separation can range from high segmentation (inflexible role boundaries) to high integration (flexible role boundaries) (Nippert-Eng, 1996). Most individuals reside somewhere between these two extremes. Both extremes are associated with certain costs and benefits. Integration can make transitions between roles easier, but it can also increase role blurring (Ashforth et al., 2000). Segmentation creates role boundaries and decreases role blurring, but it can make transitions between roles more difficult (Ashforth et al., 2000).

Integration/segmentation preferences refer to the degree to which an individual prefers to merge nonwork and work roles (integration) versus the preference to separate those roles (segmentation) (Kreiner, 2006). A *preference for segmenting work from family* (PSWF) was associated with less psychological work-to-family conflict, while a *preference for segmenting family from work* (PSFW) was associated with less psychological family-to-work conflict (Park & Jex, 2011). Psychological

work-family conflict refers to internal preoccupation with one role while being in the other role (Park & Jex, 2011). Taken together, work-family interference is less likely for individuals with a segmentation strategy. A segmentation preference has been found to be positively related to psychological detachment from work and recovery from work (Park, Fritz, & Jex, 2011). A segmentation preference has also been found to be negatively associated with organizational commitment (Rothbard et al., 2005). However, the negative association between a segmentation preference and organizational commitment is moderated by access to organizational segmentation policies (such as access to flextime). Rothbard et al. (2005) have found that employees with a greater preference for segmentation perceived more job satisfaction and organizational commitment when they had access to segmentation policies. Likewise, Kreiner (2006) has shown that preference for segmentation and workplace supplies jointly predicted work-home conflict, stress, and job satisfaction. Thus, the *congruence* between an individual's work-nonwork segmentation preference and the perceived segmentation supplies granted to the employee by the organization is important; as workplace segmentation supplies more closely matched preferences, an employee is better able to negotiate the work-nonwork boundary to his or her preferences, reducing work-home conflict and stress and increasing job satisfaction. The findings of these studies point to the importance of perceived congruence between individuals' preferences for separating work-nonwork life and the available organizational policies.

5 Theoretical Background: Work-Nonwork Balance Crafting

Job crafting is a concept that highlights employees' ability to actively shape their status quo within the workplace (Tims & Bakker, 2010). This concept can also be applied to employees' ability to actively shape their work-nonwork balance. Specifically, work-nonwork balance crafting behavior refers to activities that individuals use to shape their own work-nonwork balance (Sturges, 2012). Employees shape this balance through the use of standard, formal organizational policies like part-time working (Gregory & Milner, 2009), flexible work hours (Anderson et al., 2002), and teleworking (Kossek et al., 2006). Employees may also negotiate idiosyncratic deals (Hornung et al., 2008). In addition to these formal or individually negotiated organizational arrangements, employees use unofficial techniques to supplement official organizational policies or to compensate for unavailable official policies (e.g., due to a workplace culture that discourages such policies [Blair-Loy & Wharton, 2004] or managers who are unwilling to grant access to work-nonwork policies [Breaugh & Frye, 2008]). Unofficial techniques employees use in order to shape their work-nonwork balance encompass time management techniques to avoid overtime hours (Golden & Geisler, 2007), trying to limit workload (Roberts, 2008), occasionally working at home (Tietze, 2002), and using mobile technology for working remotely (Wacjman et al., 2008).

Using a qualitative approach to data gathering and analysis, Sturges (2012) has classified work-nonwork balance crafting into different categories, namely, (a) physical, (b) cognitive, and (c) relational crafting.

(a) *Physical crafting* involves the management of time spent at work, the location where work time is spent, the type of job, and the length of commuting time (Sturges, 2012). Physical crafting can be split into temporal crafting, locational crafting, choosing a job that will ensure a satisfactory work-nonwork balance (e.g., making choices based on the location of the working place or expected working hours), and reducing commuting time by moving nearer to the working place, thus reducing travelling time. Temporal crafting involves the management of the length and timing of the working day (e.g., restricting the working day to contracted working hours; managing when the working day begins) and the management of the pace and intensity (temporal experience) of the working day (e.g., minimizing breaks, meetings, or social interactions at work to finish on time). Locational crafting involves deliberate activities such as occasionally working at home instead of in the office (e.g., to enable employees to deal with home-related business; to avoid a lengthy commute) and occasionally working at home in addition to working in the office (e.g., working in the evening or on weekends).
(b) *Cognitive crafting* involves defining and framing perceptions of what work-nonwork balance means and entails (Sturges, 2012). It can be split into three specific forms: first, individually defining work-nonwork balance (e.g., defining balance as having the weekends free); second, prioritizing work at the expense of nonwork life (to justify working longer than the work contract requires); and third, making compromises, that is, making short-term sacrifices regarding one's work-nonwork balance for long-term rewards (e.g., working longer at a young age to have more time for the family later in life).
(c) *Relational crafting* involves managing and using relationships at work and at home to secure and reinforce the kind of work-nonwork balance that an individual wants to achieve (Sturges, 2012). The two forms of relational crafting are the management of work relationships (in order to reduce workload and unnecessary interactions at work) and the management of out-of-work relationships, that is, socializing with people who work similar hours and have a similar conceptualization of work-nonwork balance (to help maintain the belief that one's own notion of work-nonwork balance is common).

Taken together, results of this qualitative study show that employees may engage in a range of techniques to actively shape their work-nonwork balance and that different approaches exist for employees engaging in a different mix of physical, cognitive, and relational crafting techniques. Next, we turn to a specific behavior that is crucial for the management of boundaries between work and nonwork domains, namely, the use of ICT.

6 Restricting ICT Use in Order to Facilitate Boundary Management and Work-Nonwork Balance?

The use of ICT for work-related purposes after office hours makes boundaries between work and nonwork permeable (see above). Therefore, an attempt to achieve better work and nonwork balance is to restrict the work-related ICT use after office hours in order to achieve a better work-nonwork balance in the face of technology-related flexibility of work. Indeed, previous research has focused on boundaries for ICT use after work in order to facilitate work-nonwork balance. For example, boundary creation (meaning the establishment of impermeable boundaries) using work-related ICT in the nonwork domain has been investigated by Olson-Buchanan and Boswell (2006). The study suggests that employees with higher preference for integration create fewer boundaries for using ICT during nonwork time and report higher work-nonwork conflict. In an intervention study, Curtaz, Hoppe, and Nachtwei (2015) have shown that an app designed to monitor and restrict smartphone use at home was effective in facilitating employees' work engagement, relaxation, and psychological detachment. In general, crafting boundaries by restricting ICT use according to individuals' segmentation preferences could be a useful technique for achieving work-nonwork balance. The technical tools themselves can be used to create these boundaries by monitoring one's behavior and suggesting times offline.

Dettmers et al. (2016) have highlighted that it is not only remotely attending to work tasks after work that is detrimental for employee's detachment but also the cognitive threat of having to be available for work after office hours. In a similar manner, Ohly and Latour (2014) have shown that the motivation behind work-related ICT use in the evening is important and that an autonomous and controlled motivation can indeed relate to positive effects of after-work work-related ICT use. Thus, a simple restriction of work-related ICT use in the evening without considering individual preferences (e.g., the wish to put one's mind at ease regarding a work-related problem) and organizational politics (informal expectations about availability during nonwork time) might hamper the intended positive effects of the ICT ban.

Previous research has primarily focused on extended availability for work during periods of leisure and recreation, whereas the opposite direction—extended availability for family and nonwork demands during work—has been largely neglected. ICT can be used both at work and at home, which means that the border between these two domains is becoming increasingly permeable. Therefore, in the next section, we explore whether the use of social media in the work context for personal, that is, nonwork-related, issues may be a tool to manage one's boundaries between work and nonwork domains.

7 Personal Use of Social Media in the Context of Work: A Tool to Manage Work-Nonwork Balance?

With regard to ICT use for personal matters at work, the use of social media may be particularly relevant. The use of social media can be defined as the use of Internet-based applications that build on the technological foundations of Web 2.0 and enable the creation and exchange of user-generated content (Kaplan & Haenlein, 2010, p. 61), or simply as "[…] social interactions using technology […]" (Smith, 2012, p. 1). Thus, social media use includes the use of social networking sites and apps such as Facebook Messenger, WhatsApp, Threema, Signal, and many other applications, but it also may include "traditional" communication channels such as personal e-mail, as these are now used in a similar way to short messages (e.g., Towers et al., 2006). These social media applications make it easier for employees to stay in contact with family and friends while at work.

The use of social media has increased dramatically over the last decade. A study by Markowetz et al. (2014) has shown that there is an interaction via smartphone on average every 16 minutes of the day. According to recent surveys, 65% of American adults regularly use at least one social media platform for nonwork purposes during working hours (Pew Research Center, 2015). In the work context, estimates show that employees spend up to 2 hours of their work time on personal activities on the Internet (e.g., reading, instant messaging, writing personal e-mails; Henle et al., 2009; Vitak et al., 2011).

Many employees have developed strong habits of regularly checking their mobile devices for relevant messages throughout the day (Klimmt et al., 2018). Following these habits can create a feeling of security, while not reading or not answering messages can create a feeling of fear that some communication takes place without them. This fear of missing something can in turn increase the motivation to stay active on certain networks. Now it already seems to be the norm for many people to be available most of the day. The concept of online vigilance includes the three processes: salience (meaning), reactability, and monitoring (Klimmt et al., 2018). The former describes people being continuously occupied with smartphone functions and online communication. Employees devote a part of their thought processes to the activities that are important to them in the online environment while they are not actively or physically connected to that environment. The smartphone serves as a portal to an online sphere that one can always open (Klimmt et al., 2018). The second process, reactability, involves the preparation and readiness of users to respond to incoming automated activities. Many users feel a social obligation or social pressure to respond to incoming online communication with friends or family. The process of monitoring describes the continuous observation of one's own digital communication environment, in which push messages and audio signals encourage the employee to inform herself or himself regularly, keeping an eye on new developments (Klimmt et al., 2018).

Nonwork-related use of social media during working time is typically seen as misuse of working time and company resources (Mills et al., 2001; Yu et al., 2018).

The terms used in the literature, such as cyberloafing (e.g., Lim & Chen, 2012) or cyberslacking (e.g., Lavoie & Pychyl, 2001), confirm this view. These terms make it clear that the nonwork use of social media in the workplace can be considered deviant behavior from the perspective of the organization, i.e., behavior which "violates essential organizational norms and thereby endangers the well-being of an organization, its members or both" (Robinson & Bennett 1995, p. 556). Reasons for such deviant behavior in the workplace can be based—as with other types of deviant behavior in the workplace—on an imbalance between effort and reward (e.g., reward for overtime), the compensation for perceived organizational injustice (e.g., dissatisfaction with pay), and the response to breaches of psychological contracts (e.g., revenge on the organization for perceived injustice) (e.g., Berry, Ones, & Sackett, 2007). It is therefore not surprising that empirical research has reported negative effects of personal use of social media at work. For example, a cross-sectional study has found that the use of social media was associated with poorer self-reported work performance (Andreassen et al., 2014). In a study on excessive use of social media at work, Yu et al. (2018) have shown that consequences ranged from information overload to communication overload and social overload, which in turn lead to exhaustion and a decrease in performance.

The debate in management circles about the potentially negative effects of nonwork use of social media during working hours, and the consequence of this concern has led many companies to ban the personal use of platforms such as Facebook, YouTube, Instagram, and Twitter at work (Microsoft, 2013). How timely and effective a ban or technical restriction of platforms or applications on corporate devices is can be questioned against the background of the distribution of smartphones. An additional reason against the ban on nonwork-related use of social media is that young employees reject and do not accept a restriction of their activities in social media (Ali-Hassan et al., 2015). Accordingly, almost three out of four "millennial" employees agree with the statement that they will not follow guidelines to restrict their personal use of social media (Fister Gale, 2013). The same study reports that two-thirds also consider it illegitimate for the employer to monitor online behavior, even when social media is used for nonwork purposes on corporate devices within the corporate network.

Additionally, just as ICT use for work-related purposes after work does not have to be detrimental for employees per se (see, e.g., Ohly & Latour, 2014), personal ICT use at work through social media can have positive effects. Studies have shown that cyberloafing can be regarded as a coping mechanism when employees are faced with work-related stress, particularly with workplace aggression (Andel et al., 2019). Moreover, another study shows that cyberloafing can be seen as a coping mechanism to deal with boredom at work (Pindek et al., 2018).

Remarkably, positive effects of personal social media use at work can be shown, for example, in a study by Luo, Guo, Lu, and Chen (2018) that finds that personal social media use at work is related to an increase in affective commitment. In addition, Van Zoonen and Treem have shown that organizational identification and desire to succeed is related to employees' use of their personal Twitter accounts for work-related information.

In a comprehensive study by the Pew Research Center (2016), the most frequently cited answer to the question of why employees use social media at work reveals a new and, above all, positive perspective: according to the study, the most frequently cited reason for personal use of social media at work is "to take a mental break (from work)" (Pew Research Center 2016). The question about the extent to which personal use of social media at work can be expected to have a positive effect on well-being and performance has largely fallen outside the focus of research to date. Syrek, Kühnel, Vahle-Hinz, and de Bloom (2018) have argued and demonstrated that the nonwork use of social media can be seen as a micro-break that is used to build up energy and personal resources (see also Vahle-Hinz et al., 2019).

The personal use of social media in the workplace can help to improve the work-nonwork balance by actively crafting boundaries in the work domain. For example, couples can quickly exchange information via social media to coordinate household chores (e.g., who does the shopping after work, what needs to be taken care of). Personal use of social media at work can also make it easier to keep in touch with family members at work without being physically present. For example, employees and their friends and relatives can provide emotional support by sending encouraging messages, or the well-being of children can be inquired about. In summary, it can be assumed that the nonwork use of social media in the workplace makes it easier for employees to perform unfinished tasks outside of work and to fulfill different roles simultaneously (D'Abate, 2005). Next, we describe recent empirical findings that tentatively support the view that personal social media use at work can be beneficial for employees in terms of their work-nonwork balance.

8 Relevant Empirical Findings on the Personal Use of Social Media at Work

In the following, we present results of research investigating the connections between personal use of social media at the workplace and work engagement (Syrek et al., 2018) as well as work-nonwork balance (Kühnel et al., 2020). We conducted a study with 334 employees from various industries (largest share: engineering services, IT, financial sector). The average age of the participants was 34 years (people aged 18 to 64 years were represented). Half of the sample were male, the other half female. Eighty percent of the participants were employed full-time, working an average of 40 hours a week and having an average of 6 years work experience. The majority of participants were married and/or living with a partner, and 24% lived with one or more children in the household.

Participants in the study were asked to answer hourly short questionnaires over the course of a working day. In each of these hourly short questionnaires, the personal use of social media at work (in minutes) within the last hour was asked for. In this study, personal use of social media included nonwork use of social networks (e.g., Facebook, MySpace), of short message services and programs (e.g.,

WhatsApp, Threema), of voice-over-IP services (e.g., Skype, FaceTime), as well as reading and writing personal e-mails and playing online multiplayer games (e.g., Farmville, Words with Friends). Participants were also asked to assess their perceived work-nonwork balance and work engagement in relation to the last hour. The survey method used by the authors has the great advantage of minimizing the risk of bias in the assessment of past or general behavior and experiences (e.g., the potential under- or overestimation of the actual personal use of social media at work, if asked retrospectively in relation to the whole working day, the last working week, or "in general"). In addition, this method can be used to record and evaluate differences within a person over time.

The majority of the sample investigated (97%) stated that they had used social media for personal purposes during the working day. The average time spent using social media was 4.9 minutes per hour, i.e., about 39 minutes during the whole working day. As expected, employees belonging to Generation Y (birth cohorts from 1981 to 2000) used social media 5.4 minutes per hour, more frequently than employees belonging to Generation X (birth cohorts from 1966 to 1980; 3.7 minutes per hour) or the generation of baby boomers (birth cohorts up to 1965; 2.7 minutes per hour).

The results showed that employees who reported a longer nonwork use of social media during the day also generally reported less work engagement than people who reported a generally lower use of social media (Syrek et al., 2018). Similarly, during the hours in which an employee used social media more often compared to hours in which he or she used social media less often, the employee experienced less work engagement during the same hour.

However, the results underline that there was a positive relationship between personal use of social media and work engagement in the *following* hour. Employees who used more social media for nonwork-related purposes reported higher work engagement in the subsequent hour. This finding contributes significantly to research focusing on positive effects as it may suggest that the use of social media represented a micro-break during which resources were restored. This could subsequently have enabled the focus on work activity and the experience of engagement at work. These results are supported by the study from Kühnel et al. (2020) which has found similar results for creativity at work.

In addition to considering work engagement, we also examined the perceived work-nonwork balance of the participants (Kühnel et al., 2020). Here, consistently positive relationships between nonwork use of social media and work-nonwork balance were found: employees who stated a longer personal use of social media during the day reported a better work-nonwork balance than people who stated that they generally used social media less for personal reasons. Similarly, an employee experienced a better work-nonwork balance during those hours in which they used social media more often compared to hours during which they used social media less often. Interestingly, this pattern of findings applied to both women and men, while it was different for younger vs. older people: the positive relationship between nonwork use of social media and work-nonwork balance was stronger for older people than for younger people. In addition, the positive relationship between

nonwork use of social media and work-nonwork balance was stronger for employees who were in a relationship compared to employees who lived alone. In contrast, whether a person lived with or without children in the household was not relevant for the association between personal use of social media and work-nonwork balance.

Interestingly, Kühnel et al. (2020) have found that being the initiator of the contact was significantly related to work-nonwork balance insofar as that the social media user under study experienced more work-nonwork balance during the hours in which the contact was self-initiated compared to those hours during which the contact was initiated by others. This indicates that it is essential to perceive autonomy regarding the use of social media for nonwork-related purposes during work. This finding relates to the process of responsiveness (Klimmt et al., 2018) described above, which involves the social obligation or pressure to respond to incoming online communication with friends or family. The benefit of social media use as a boundary management strategy thus depends on employees not feeling pressured but self-initiating the contact.

9 Discussion

In this chapter, we have highlighted that increased flexibility and the use of ICT at the workplace provide a challenge for employees to manage the boundaries between work and nonwork domains. Against the background of implications from the work-home boundary theory (Ashforth et al., 2000), the work-family border theory (Clark, 2000), integration and segmentation preferences, and work-nonwork balance crafting, we can show that on the one hand ICT can help to combine work and nonwork life; however, it also poses a threat in the way that boundaries between these domains are permeated. Thus, setting boundaries and adapting them according to individual needs and using ICT to accustom one's boundary needs are challenges for employees. In addition, employers need to support and accept employees' boundary setting (e.g., refraining from contacting employees during nonwork time and/or eliminating expectations regarding availability during nonwork time). In this discussion, we wish to summarize the previous sections in order to provide an answer to the important question on how employees and employers can deal with the challenges for work-nonwork balance emerging from technological developments such as ICT and how they can craft boundaries that facilitate a successful work-nonwork balance.

The sections above have highlighted that ICT makes boundaries between work and nonwork domains increasingly permeable. In order to manage work and nonwork balance, employees have the possibility to establish strict boundaries by restricting the use of ICT after work (for work-related purposes) and at work (for nonwork-related purposes). However, the use of ICT at and after work can also have beneficial effects, depending on the extent of use, whether it is self-initiated or initiated by others and whether it is in accordance with individual preferences for segmentation or integration. Accordingly, a strict ban of ICT use can be a good step to

help employees manage their work-nonwork balance, especially for work-related ICT use after office hours. However, individual preferences and organizational expectations need to be in balance with this ban. With regard to ICT use for personal reasons at work, a ban does not seem to be the best possible solution. Employee resistance and the suppression of possible positive effects (e.g., recovery through micro-breaks, higher work-nonwork balance) are likely.

According to the work-home boundary theory (Ashforth et al., 2000), an increase in micro-transitions between work and nonwork roles can be expected through the use of personal social media use at work. These micro-transitions can be a welcomed micro-break at work, which might enhance work engagement and creativity of employees (Kühnel et al., 2020; Syrek et al., 2018). However, the empirical results on the personal use of social media in the workplace show that this behavior is associated with ambiguous effects. In general, employees who use social media for personal purposes more frequently at work show less work engagement throughout the day. However, there is evidence that sporadic nonwork-related use of social media at work may even be conducive to work engagement in the following hour. This finding was also largely confirmed for creativity. The assessment is clearer with regard to work-nonwork balance. Here it is shown that the personal use of social media in the workplace, both as a stable difference between employees and as a sporadic behavior, enables a better work-nonwork balance. In the course of these diverging effects of personal use of social media in the workplace, the question arises of how organizations should deal with this behavior of their employees and how the positive effects of personal social media use could be reinforced.

10 Practical Implications and Suggestions for Future Research

Companies and especially managers should sensitize and inform their employees about what kind of personal use of social media is accepted, in what framework it can take place, and what risks and negative consequences for employees and the company could result from inadequate use. Especially when employees use social media to take a short mental break or to communicate with family or friends in order to be able to then concentrate fully on their work again, a ban should be unnecessary and, furthermore, could have detrimental effects on work-nonwork balance and job satisfaction. More accepted and more adequate than a ban would be the training and education of employees as to how social media can be used for nonwork purposes (e.g., for micro-breaks) in order to help them benefit in terms of their work potential. The importance of the context of use is underlined by a study by Ali-Hassan et al. (2015), who recommend that managers should have a clear idea of what kind of work performance is important to them and regulate the nonwork use of social media accordingly. If the focus is on promoting innovative and creative thinking, the personal use of social media can be beneficial from the point of view of satisfying social and cognitive-informational, as well as hedonistic, needs.

Building on research indicating the importance of individual ideas regarding segmentation and integration of different life domains, organizations should take into account employees' segmentation preferences when implementing work-nonwork balance programs by allowing employees to individually set and manage their boundaries and chose how much work and nonwork life can overlap. Irrespective of the availability of organizational programs and policies that address segmentation preferences, employees are challenged to craft their boundaries between work and nonwork domains in line with their individual integration-segmentation preferences in order to achieve work-nonwork balance.

Based on the work-family border theory (Clark, 2000), it should be helpful for employees to have the possibility to flexibly widen or narrow borders according to personal needs. The result that self-initiated (vs. other-initiated) contact to others via personal social media use at work is positively related to the experience of work-nonwork balance underlines the importance of autonomous decisions about how and when the technology is used. It should be noted, however, that a self-initiated contact by one partner is an other-initiated contact for the recipient. Thus, flexible boundary crafting by one employee in terms of using social media as a tool for work-nonwork boundary management may result in an involuntary permeable boundary between nonwork and work for the partner of this employee. Negotiations at home and agreements on integration vs. segmentation preferences between partners, together with knowledge about the partner's location (at work or at home), seem to be crucial in order to use personal social media use as an effective tool to craft work-nonwork boundaries that are beneficial for all members of the family.

Future research should address the question of whether the recovery potential of a short "social media break" is linked to certain boundary conditions, for example, that personal use of social media should be deliberate and self-initiated (in contrast to merely reactive use, which can disrupt/interrupt the workflow). Furthermore, we believe that research is needed in which, in addition to the frequency or duration of personal use, the personal use of social media is investigated with a more qualitative focus. For example, the motives for personal use and the content of personal use of social media could be included, as it is conceivable that these can modulate the direction of effects of nonwork-related use of social media.

11 Conclusion

In this chapter we described how an increased flexibility of work and the use of ICT in the workplace provide a challenge for employees to manage their boundaries between work and nonwork. Empirical results on the personal use of social media at the workplace show ambiguous effects—such as lower concurrent work engagement and higher subsequent work engagement and overall higher work-nonwork balance. Yet, the benefits in terms of work-nonwork balance can only be achieved if boundaries between the different life domains are set in accordance with individual segmentation preferences and needs. For employers, it seems essential to support

employees' boundary settings. Thus, better than banning personal ICT use at work, employers and employees can learn how social media may be used for micro-breaks to benefit from them in terms of their work potential.

References

Ali-Hassan, H., Nevo, D., & Wade, M. (2015). Linking dimensions of social media use to job performance: The role of social capital. *The Journal of Strategic Information Systems, 24*, 65–89. https://doi.org/10.1016/j.jsis.2015.03.001

Amstad, F., Meier, L., Fasel, U., Elfering, A., & Semmer, N. (2011). A meta-analysis of work-family conflict and various outcomes with a special emphasis on cross-domain versus matching-domain relations. *Journal of Occupational Health Psychology, 16*, 151–169. https://doi.org/10.1037/a0022170

Andel, S. A., Kessler, S. R., Pindek, S., Kleinman, G., & Spector, P. E. (2019). Is cyberloafing more complex than we originally thought? Cyberloafing as a coping response to workplace aggression exposure. *Computers in Human Behavior, 101*, 124–130. https://doi.org/10.1016/j.chb.2019.07.013

Anderson, S., Coffey, B., & Byerly, R. (2002). Formal organizational initiatives and informal workplace practices: Links to work–family conflict and job-related outcomes. *Journal of Management, 28*, 787–810. https://doi.org/10.1177/014920630202800605

Andreassen, C. S., Torsheim, T., & Pallesen, S. (2014). Use of online social network sites for personal purposes at work: Does it impair self-reported performance? *Comprehensive Psychology, 3*. https://doi.org/10.2466/01.21.cp.3.18.

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

Ashforth, B. E., Kreiner, G., & Fugate, M. (2000). All in a day's work: Boundaries and micro role transitions. *Academy of Management Review, 25*, 472–491. https://doi.org/10.2307/259305

Berry, C. M., Ones, D. S., & Sackett, P. R. (2007). Interpersonal deviance, organizational deviance, and their common correlates: A review and meta-analysis. *Journal of Applied Psychology, 92*, 410–424. https://doi.org/10.1037/0021-9010.92.2.410

Blair-Loy, M. S., & Wharton, A. (2004). Organizational commitment and constraints on work-family policy use: Corporate flexibility policies in a global firm. *Sociological Perspectives, 47*, 243–267. https://doi.org/10.1525/sop.2004.47.3.243

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. https://doi.org/10.1177/0149206307302552

Breaugh, J., & Frye, N. (2008). Work–family conflict: The importance of family-friendly employment practices and family-supportive supervisors. *Journal of Business and Psychology, 22*, 345–353. https://doi.org/10.1007/s10869-008-9081-1

Casper, W. J., Vaziri, H., Wayne, J. H., DeHauw, S., & Greenhaus, J. (2018). The jingle-jangle of work–nonwork balance: A comprehensive and meta-analytic review of its meaning and measurement. *Journal of Applied Psychology, 103*(2), 182–214. https://doi.org/10.1037/apl0000259

Chesley, N. (2005). Blurring boundaries? Linking technology use, spillover, individual distress, and family satisfaction. *Journal of Marriage and Family, 67*, 1237–1248. https://doi.org/10.1111/j.1741-3737.2005.00213.x

Clark, S. C. (2000). Work/family border theory: A new theory of work/family balance. *Human Relations, 53*, 747–770. https://doi.org/10.1177/0018726700536001

Curtaz, K., Hoppe, A., & Nachtwei, J. (2015). Bewusste Auszeiten vom Smartphone tun gut! *HR Performance*, *1*(January), 112–114.

D'Abate, C. P. (2005). Working hard or hardly working: A study of individuals engaging in personal business on the job. *Human Relations, 58*, 1009–1032. https://doi.org/10.1177/0018726705058501

Dettmers, J., & Biemelt, J. (2018). Always available – The role of perceived advantages and legitimacy. *Journal of Managerial Psychology, 33*, 497–510. https://doi.org/10.1108/JMP-02-2018-0095

Dettmers, J., Vahle-Hinz, T., Bamberg, E., Friedrich, N., & Keller, M. (2016). Extended work availability and its relation with start-of-day mood and cortisol. *Journal of Occupational Health Psychology, 21*, 105–118. https://doi.org/10.1037/a0039602

Dettmers, J., Vahle-Hinz, T., Friedrich, N., Keller, M., Schulz, A., & Bamberg, E. (2012). Entgrenzung der täglichen Arbeitszeit – Beeinträchtigungen durch ständige Erreichbarkeit bei Rufbereitschaft. In B. Badura, A. Ducki, H. Schröder, J. Klose, & M. Meyer (Eds.), *Fehlzeitenreport 2012. Gesundheit in der flexiblen Arbeitswelt: Chancen nutzen – Risiken minimieren* (pp. 53–60). Springer.

Fister Gale, S. (2013). Companies that don't embrace social media might be treading water. Workforce. https://www.workforce.com/uk/news/companies-that-dont-embrace-social-media-might-be-treading-water-experts-say. Accessed 19 Jan 2019.

Glißmann, W., & Peters, K. (2001). *Mehr Druck durch mehr Freiheit. Die neue Autonomie in der Arbeit und ihre paradoxen Folgen*. VSA-Verlag.

Golden, A., & Geisler, C. (2007). Work-life boundary management and the personal digital assistant. *Human Relations, 60*, 519–551. https://doi.org/10.1177/0018726707076698

Gregory, A., & Milner, S. (2009). Work-life balance: A matter of choice? *Gender, Work and Organization, 16*, 1–13. https://doi.org/10.1111/j.1468-0432.2008.00429.x

Hackman, R. J., & Oldham, G. (1976). Motivation through the design of work: Test of a theory. *Organizational Behavior and Human Performance, 16*(2), 250–279.

Hager, S., & Kern, S. (2017). Always online – Permanente Erreichbarkeit und die psychische Gesundheit. In M. Seidel (Ed.), *Banking & Innovation 2017* (pp. 137–157). Springer Gabler. https://doi.org/10.1007/978-3-658-15785-2_9

Hecht, T., & Allen, N. (2009). A longitudinal examination of the work–nonwork boundary strength construct. *Journal of Organizational Behavior, 30*, 839–862. https://doi.org/10.1002/job.579

Henle, C. A., Kohut, G., & Booth, R. (2009). Designing electronic use policies to enhance employee perceptions of fairness and to reduce cyberloafing: An empirical test of justice theory. *Computers in Human Behavior, 25*, 902–910. https://doi.org/10.1016/j.chb.2009.03.005

Hornung, S., Rousseau, D., & Glaser, J. (2008). Creating flexible work arrangements through idiosyncratic deals. *Journal of Applied Psychology, 93*, 655–664. https://doi.org/10.1037/0021-9010.93.3.655

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of Social Media. *Business Horizons, 53*, 59–68. https://doi.org/10.1016/j.bushor.2009.09.003

Kattenbach, R., Demerouti, E., & Nachreiner, F. (2010). Flexible working times: Effects on employees' exhaustion, work-nonwork conflict and job performance. *Career Development International, 15*, 279–295. https://doi.org/10.1108/13620431011053749

Klimmt, C., Hefner, D., Reinecke, L., Rieger, D., & Vorderer, P. (2018). The permanently online and permanently connected mind. Mapping the cognitive structures behind mobile Internet use. In P. Vorderer, D. Hefner, L. Reinecke, & C. Klimmt (Eds.), *Permanently online, permanently connected. Living and communication in a POPC world* (pp. 18–28). Routledge.

Kossek, E., Lautsch, B., & Eaton, S. (2006). Telecommuting, control, and boundary management: Correlates of policy use and practice, job control, and work-family effectiveness. *Journal of Vocational Behavior, 68*, 347–367. https://doi.org/10.1016/j.jvb.2005.07.002

Kossek, E., Ruderman, M., Braddy, P., & Hannum, K. (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

Kreiner, G. (2006). Consequences of work-home segmentation or integration: A person-environment fit perspective. *Journal of Organizational Behavior, 27*, 485–507. https://doi.org/10.1002/job.386

Kreiner, G. E., Hollensbe, E. C., & Sheep, B. L. (2009). Balancing borders and bridges: Negotiating the work-home interface via boundary work tactics. *Academy of Management Journal, 52*, 704–730. https://doi.org/10.5465/AMJ.2009.43669916

Kubicek, B., & Tement, S. (2016). Work intensification and the work-home interface. *Journal of Personnel Psychology, 15*, 76–89. https://doi.org/10.1027/1866-5888/a000158.

Kühnel, J., Vahle-Hinz, T., de Bloom, J., & Syrek, C. J. (2020). Staying in touch while at work: Relationships between personal social media use at work and work-nonwork balance and creativity. *The International Journal of Human Resource Management, 31*, 1235–1261. https://doi.org/10.1080/09585192.2017.1396551

Lavoie, J. A. A., & Pychyl, T. A. (2001). Cyberslacking and the procrastination superhighway. *Social Science Computer Review, 19*, 431–444. https://doi.org/10.1177/089443930101900403

Lim, V. K. G., & Chen, D. J. Q. (2012). Cyberloafing at the workplace: Gain or drain on work? *Behaviour & Information Technology, 31*, 343–353. https://doi.org/10.1080/01449290903353054

Lindecke, C. (2015). Wem gehört die Zeit? Flexible Arbeitszeiten: grenzenlose Freiheit oder grenzenlose Erreichbarkeit? *Zeitschrift für Arbeitswissenschaft, 69*, 31–38. https://doi.org/10.1007/BF03373934

Luo, N., Guo, X., Lu, B., & Chen, G. (2018). Can non-work-related social media use benefit the company? A study on corporate blogging and affective organizational commitment. *Computers in Human Behavior, 81*, 84–92. https://doi.org/10.1016/j.chb.2017.12.004

Major, D. A., & Germano, L. M. (2006). The changing nature of work and its impact on the work-home interface. In F. Jones, R. J. Burke, & M. Westman (Eds.), *Work-life balance: A psychological perspective* (pp. 13–38). Psychology Press.

Markowetz, A., Błaszkiewicz, K., Montag, C., Switala, C., & Schlaepfer, T. E. (2014). Psycho-informatics: Big data shaping modern psychometrics. *Medical Hypotheses, 82*, 405–411. https://doi.org/10.1016/j.mehy.2013.11.030

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

Microsoft News Center (2013, May 28). Bring your own service: employees want social tools at work, despite company restrictions and hesitations, reports new Microsoft survey. https://news.microsoft.com/2013/05/28/bring-your-own-service-employees-want-social-tools-at-work-despite-company-restrictions-and-hesitation-reports-new-microsoft-survey/. Accessed 20 Jan 2019.

Middleton, C. A., (2007). Illusions of balance and control in an always-on environment: A case study of BlackBerry users. *Ted Rogers School of Information Technology Management Publications and Research*. Paper 4. http://digitalcommons.ryerson.ca/trsitm/4

Mills, J. E., Hu, B., Beldona, S., & Clay, J. (2001). Cyberslacking! A liability issue for wired workplaces. *Cornell Hotel and Restaurant Administration Quarterly, 42*, 34–47. https://doi.org/10.1177/0010880401425004

Nippert-Eng, C. (1996). *Home and work: Negotiating boundaries through everyday life*. University of Chicago Press.

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

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. https://doi.org/10.1016/j.jvb.2005.10.006

Pangert, B., Pauls, N., & Schüpbach, H. (2016). Die Auswirkungen arbeitsbezogener erweiterter Erreichbarkeit auf Life-Domain-Balance und Gesundheit (2. Aufl). Dortmund: Bundesanstalt für Arbeitsschutz und Arbeitsmedizin.

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. https://doi.org/10.1037/a0023594

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

Pauls, N., Schlett, C., Pangert, B., & Menz, W. (2019). Den Umgang mit arbeitsbezogener erweiterter Erreichbarkeit gesund gestalten. In J. Rump & S. Eilers (Eds.), *Arbeitszeitpolitik. Zielkonflikte in der betrieblichen Arbeitszeitgestaltung lösen* (pp. 197–211). Springer.

Pew Research Center. (2015). Social media usage: 2005–2015. http://www.pewinternet.org/2015/10/08/social-networking-usage-2005-2015/. Accessed 20 Jan 2019.

Pew Research Center. (2016). Social media and the workplace. *Report*. http://www.pewinternet.org/2016/06/22/social-media-and-the-workplace/. Accessed 20 Jan 2019.

Pindek, S., Krajcevska, A., & Spector, P. E. (2018). Cyberloafing as a coping mechanism: Dealing with workplace boredom. *Computers in Human Behavior, 86*, 147–152. https://doi.org/10.1016/j.chb.2018.04.040

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

Roberts, E. (2008). Time and work-life balance: The roles of 'temporal customisation' and 'life temporality'. *Gender, Work and Organization, 15*, 430–453. https://doi.org/10.1111/j.1468-0432.2008.00412.x

Robinson, S., & Bennett, R. (1995). A typology of deviant workplace behaviors: A multidimensional scaling study. *The Academy of Management Journal, 38*, 555–572. https://doi.org/10.2307/256693

Rothbard, N., Phillips, K., & Dumas, T. (2005). Managing multiple roles: Work-family policies and individuals' desires for segmentation. *Organization Science, 16*, 243–258. https://doi.org/10.1287/orsc.1050.0124

Sauer, D. (2012). Entgrenzung – Chiffre einer flexiblen Arbeitswelt – ein Blick auf den historischen Wandel von Arbeit. In B. Badura, A. Ducki, H. Schröder, J. Klose, & M. Meyer (Eds.), *Fehlzeiten-Report 2012: Gesundheit in der flexiblen Arbeitswelt: Chancen nutzen - Risiken minimieren* (pp. 3–14). Springer.

Schlachter, S., Mcdowall, A., Cropley, M., & Ilke, 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

Schulz-Dadaczynski, A., Junghanns, G., & Lohmann-Haislah, A. (2019). Extensives und intensiviertes Arbeiten in der digitalisierten Arbeitswelt – Verbreitung, gesundheitliche Risiken und mögliche Gegenstrategien. In B. Badura, A. Ducki, H. Schröder, J. Klose, & M. Meyer (Eds.), *Fehlzeiten-Report 2019* (pp. 268–283). Springer.

Smith, M. C. (2012). Social media update. *The Advocate, 58*, 1–12.

Stawarz, K., Cox, A. L., Bird, J., & Benedyk, R. (2013). "I'd sit at home and do work emails": How tablets affect the Work-Life Balance of office workers. *Proceedings of the 2013 Conference on Human Factors in Computing Systems (CHI-2013),* 1383–1388. https://doi.org/10.1145/2468356.2468603.

Strobel, H. (2019). *Erreichbarkeit im Arbeitsleben Aushandlungsprozesse in der Automobilindustrie*. VS Verlag für Sozialwissenschaften.

Sturges, J. (2012). Crafting a balance between work and home. *Human Relations, 65*, 1539–1559. https://doi.org/10.1177/0018726712457435

Sullivan, C., & Lewis, S. (2001). Home-based telework, gender, and the synchronization of work and family: Perspectives of teleworkers and their co-residents. *Gender, Work and Organization, 8*(2), 123–145. https://doi.org/10.1111/1468-0432.00125

Syrek, C. J., Kühnel, J., Vahle-Hinz, T., & De Bloom, J. (2018). Share, like, twitter, and connect: Ecological momentary assessment to examine the relationship between non-work social media use at work and work engagement. *Work and Stress, 32*, 209–227. https://doi.org/10.1080/02678373.2017.1367736

Tietze, S. (2002). When 'work' comes 'home': coping strategies of teleworkers and their families. *Journal of Business Ethics, 41*, 385–396. https://doi.org/10.1023/A:1021236426657

Tims, M., & Bakker, A. B. (2010). Job crafting: Towards a new model of individual job redesign. *South African Journal of Industrial Psychology, 36*(2), 1–9. https://doi.org/10.4102/sajip.v36i2.841

Towers, I., Duxbury, L., Higgins, C., & Thomas, J. (2006). Time thieves and space invaders: Technology, work and the organization. *Journal of Organizational Change Management, 19*, 593–618. https://doi.org/10.1108/09534810610686076

Vahle-Hinz, T., Syrek, C., Kühnel, J., & Feuerhahn, N. (2019). Private soziale Mediennutzung am Arbeitsplatz. In B. Badura, A. Ducki, H. Schröder, J. Klose, & M. Meyer (Eds.), *Fehlzeitenreport 2019. Digitalisierung - gesundes Arbeiten ermöglichen* (pp. 237–248). Springer.

Vitak, J., Crouse, J., & LaRose, R. (2011). Personal internet use at work: Understanding cyberslacking. *Computers in Human Behavior, 27*, 1751–1759. https://doi.org/10.1016/j.chb.2011.03.002

Wacjman, J., Bittman, M., & Brown, J. (2008). Families without borders: Mobile phones connectedness and work-home division. *Sociology, 42*, 635–652. https://doi.org/10.1177/0038038508091620

Waltersbacher, A., Maisuradze, M., & Schröder, H. (2019). Arbeitszeit und Arbeitsort – (wie viel) Flexibilität ist gesund? In B. Badura, A. Ducki, H. Schröder, J. Klose, & M. Meyer (Eds.), *Fehlzeiten-Report 2019* (pp. 77–107). Springer.

Yu, L., Cao, X., Liu, Z., & Wang, J. (2018). Excessive social media use at work: Exploring the effects of social media overload on job performance. *Information Technology & People, 31*, 1091–1112. https://doi.org/10.1108/ITP-10-2016-0237

The Importance of Recovery from Work in Intensified Working Life

Saija Mauno and Ulla Kinnunen

1 Introduction

1.1 Background and Aims

Societies today are characterized by acceleration and intensity in actions and processes occurring in everyday life (Rosa, 2003, 2013). The phenomenon known as the "fast-speed society" is also evident in working life and in this context is often referred to as *work intensification/intensity* (e.g., Chesley, 2014; Franke, 2015; Granter et al., 2019; Green, 2004; Menon et al., 2020). Traditionally, work intensification has referred to an accelerated pace of work where employees feel pressured to intensify their work effort by working harder and/or faster, and such working conditions deplete more employees' resources, e.g., energy (Granter et al., 2019; Green, 2004; Green & McIntosh, 2001; Korunka et al., 2015; Mauno et al., 2019a; Menon et al., 2020). However, in this chapter, we aim to show that work intensification can also manifest in other ways in modern societies, where acceleration has been predicted to continue because technological development via robotization, machine learning, and artificial intelligence causes processes and production to be constantly accelerated (Alasoini, 2018; Autor, 2015; Rosa, 2003, 2013; Mauno et al., 2019a, b, c; Menon et al., 2020). Moreover, technological acceleration will probably gain further momentum given the great benefit of technology to societies

S. Mauno (✉)
Tampere University, Tampere, Finland

University of Jyväskylä, Jyväskylä, Finland
e-mail: saija.mauno@tuni.fi

U. Kinnunen
Tampere University, Tampere, Finland
e-mail: ulla.kinnunen@tuni.fi

C. Korunka (ed.), *Flexible Working Practices and Approaches*,
https://doi.org/10.1007/978-3-030-74128-0_4

in the Covid-19 pandemic. Altogether, these prospects are challenging because technological acceleration is often seen as one major antecedent of work intensification (Chesley, 2014; Mauno et al., 2019a, b, c; Menon et al., 2020; Rosa, 2003, 2013).

These facts and scenarios would suggest that work intensification is undeniably a topical issue likely to affect employees in several ways. One negative implication of work intensification is its detrimental effects on employees' well-being, health, and role performance (see Chesley, 2014; Chowhan et al., 2019; Franke, 2015; Korunka et al., 2015; Kubicek et al., 2015; Mauno et al., 2020). However, we reasoned that work intensification may also affect employees' opportunities to recover from work (defined in Sect. 1.3) during off-job time, a viewpoint which has not yet been paid much attention while the costs of work intensification for employees are assessed. Furthermore, successful recovery may also buffer the relationships between work intensification and employee outcomes.

Accordingly, this chapter focuses on work intensification from the perspective of recovery from work by paying particular attention to the potentially mediating and mitigating (buffering) role of recovery in the linkages between work intensification and its consequences. We start by defining the concepts of multifaceted work intensification and recovery from work, and then we introduce a conceptual model that might be useful in connecting work intensification and recovery to employee outcomes. After this conceptual introduction, we present some relevant empirical findings based on the ongoing research project "Managing new intensified job demands through self-regulative resources" where we are able to prospectively investigate the relationships between work intensification, recovery, and employee outcomes. We end this chapter with theoretical and practical conclusions and recommendations.

1.2 Defining Work Intensification: Toward a Multifaceted Model

Research on work intensification originated in sociology and management sciences, inspired particularly by two theoretical models, that is, social acceleration (Rosa, 2003, 2013) and high performance work systems theories (HPWS, see Boxall & Macky, 2014; Oppenauer & Van De Voorde, 2018). In brief, social acceleration theory proposes (see more Sect. 2) that three inter-related cycles of acceleration characterize modern societies, that is, technological acceleration, acceleration of social changes, and accelerated pace of living (see Korunka et al., 2015; Kubicek et al., 2015; Mauno et al., 2020; Ulferts et al., 2013). The HPWS theory, in turn, perceives employees' empowerment as the main route to high performance and productive organizations. Empowerment is best achieved by fostering employees' involvement, autonomy, and responsibility and encouraging them to apply their skills and abilities at work as fully as possible (Boxall & Macky, 2014; Oppenauer & Van De Voorde, 2018). In these theories, it is also proposed that such changes in societies and management systems do indeed have implications for working life, for

example, by fueling work intensification, on which we focus. Because both these models are broad and content-rich, this signifies that work intensification may actually be a broader phenomenon than merely accelerated pace of work, which has been the prevailing view in early definitions of work intensification (e.g., Green, 2004; Green & McIntosh, 2001).

In response to these broad societal and managerial changes, work and organizational psychologists have recently suggested that work intensification is actually a multifaceted phenomenon, consisting of five specific facets/dimensions, which are included in the *intensified job demands* model (*IJDs model*; see Kubicek et al., 2015) utilized in this chapter. Specifically, the IJDs model, inspired by social acceleration theory (Kubicek et al., 2015; Rosa, 2003, 2013; Ulferts et al., 2013), seeks to capture the dynamic nature of certain mental job demands, which here refers to an *employee's appraisals* concerning increases in particular job demands, which are seen to be implications of social acceleration in working life (Kubicek et al., 2015; Paškvan et al., 2016). The five facets of IJDs describe such acceleration by focusing on how the work effort required of an employee has become qualitatively more intense (greater mental effort at work is increasingly expected of employees) and/or quantitatively more demanding (employees are expected to work faster or otherwise more effectively). This dynamic nature of the IJDs model based on acceleration theory (Kubicek et al., 2015; Mauno et al., 2019a, 2020; Ulferts et al., 2013) distinguishes the IJDs model from more traditional job demands/stress theories (e.g., Job-Demands-Control model; Karasek & Theorell, 1990), which do not initially perceive job demands as dynamic. Next we introduce each facet of the IJDs model in more detail.

The first facet of work intensification is called *work intensification* and illustrates best the traditional nature of work intensification, that is, increased pace of work (see, e.g., Franke, 2015; Green, 2004; Green & McIntosh, 2001). Specifically, Kubicek et al. (2015) have defined work intensification as a need to work faster, reduce downtime, and perform different work tasks simultaneously, that is, to deal with multitasking demands. This last-mentioned aspect is new; multitasking has not so far been included in traditional definitions of work intensification (e.g., Chesley, 2014; Franke, 2015; Green, 2004; Menon et al., 2020). However, technological acceleration in working life may indeed increase multitasking demands as technology is conducive to multitasking.

The second facet of the IJDs model is *intensified job-related planning and decision-making demands*, which refers to increases in decision-making authority, putting more pressures on employees to decide which tasks they need to perform (planning) and how to perform them (doing). The third facet, *career-related planning and decision-making demands*, means that employees are increasingly required to maintain their employability with the current employer but simultaneously to be increasingly aware of and receptive to other (external) career opportunities. As traditional (stable) career lines seem to be changing, there are more demands for employees to manage and pursue their careers on their own (Pongratz & Voß, 2003; Van der Hejden & De Vos, 2015). Indeed, both job- and career-related planning and decision-making demands highlight that employees need to display increasing initiative and be proactive not only in their current work but also in the long run,

throughout the career span. Also, today's HR management practices (e.g., HPWS model), which empower employees via improved agency, self-management, and autonomy, may paradoxically increase the job- and career-related planning and decision-making demands made of employees (Boxall & Macky, 2014; Oppenauer & Van De Voorde, 2018), and these may then turn into harmful stressors.

Finally, *intensified learning demands* means that the demands to improve one's work-related knowledge, skills, and competencies have also intensified. Learning demands originally consisted of two types: those in relation to *knowledge* (e.g., new expertise) and *skills* (e.g., new devices), but these facets were found to be highly intercorrelated in empirical data and are therefore described unidimensionally (e.g., Kubicek et al., 2015; Mauno et al., 2020; Mauno & Minkkinen, 2020). Due to the rapid technological development and frequent organizational changes, employees are increasingly required to constantly update their job-relevant knowledge and competencies and adjust their skills in order to be able to accomplish their work (see Glaser et al., 2015; Kubicek et al., 2015; Mauno et al., 2019a, b, c, 2020). Demands for life-long learning may prove to be a new, and also stressful, paradigm in working life.

To sum up, the IJDs model describes different aspects of accelerated working life as perceived by employees, that is, whether employees perceive certain job demands (the five dimensions in the model) to have increased over time. The IJDs model has its origins in the social acceleration of modern societies and in modern management practices, e.g., high performance work systems (HPWS). Now we turn to the recovery perspective, aiming to explain the role of recovery in relation to IJDs and their proposed outcomes.

1.3 Defining Recovery from Work

Recovery refers to the process that restores employees' energy and mental resources (Zijlstra & Sonnentag, 2006). Theoretically, according to the *effort-recovery model* (Meijman & Mulder, 1998), recovery from work occurs when an individual is no longer confronted with job demands. Effort expenditure at work causes psychophysiological load reactions, and recovery occurs when the psychophysiological systems activated at work stabilize at their pre-stressor level. This occurs when the exposure to job demands ceases. If the recovery process is somehow impeded, load reactions may accumulate, leading in the long term to chronic health and well-being problems (Cropley & Zijlstra, 2011; Geurts & Sonnentag, 2006; Sonnentag et al., 2017). In other words, in the case of incomplete recovery from work, employees will start a new working day in suboptimal condition (e.g., tired) and will therefore need to expend compensatory work effort to maintain adequate job performance. This extra effort can initiate a negative process of accumulation of load reactions, resulting in health problems.

Thus, the effort-recovery model (Meijman & Mulder, 1998) suggests that the investment of mental and physical resources to respond to job-related demands

results in a depletion of resources (e.g., energy) and "a need to recover" (van Veldhoven, 2008). As recovery will only occur when the depleted systems are no longer taxed during off-job time, two experiences indispensable to the facilitation of successful recovery are *psychological detachment from work* and *relaxation* during off-job time (Sonnentag & Fritz, 2007). Psychological detachment refers to refraining from job-related activities and not thinking about one's job during off-job time. Relaxation is a state characterized by low (sympathetic) activation and increased positive affect.

However, recovery may also occur via a more active process proposed in the *conservation of resources (COR) theory* (Hobfoll, 1989). The core assumption of the COR theory is that people are motivated to conserve existing resources and gain new ones, which are defined broadly. Internal resources, such as energy and positive mood, are the most important resources in the context of recovery from work (Sonnentag & Fritz, 2007). According to the COR theory, stress is caused by depletion of resources, experienced threat of losing resources, or failure to regain resources after investing effort. To recover from job stress, employees must engage actively in activities that help to replenish the resources depleted at work. Accordingly, the favorable effects of two experiences presented by Sonnentag and Fritz (2007) – *mastery* and *control* – can be attributed to regaining internal resources depleted at work, which according to the COR theory advances recovery. Mastery refers to the experience of competence or proficiency arising from challenging experiences or learning opportunities outside the work domain. Engaging in activities that create mastery experiences typically requires some effort. Nevertheless, mastery experiences are believed to promote recovery as they help to create new resources, such as self-efficacy, and potentially increase positive affect. Control can be described as the degree to which people can decide for themselves how to spend their free time.

There is evidence to show that all four recovery experiences during off-job time (detachment, relaxation, mastery, and control) promote recovery from work and employee well-being (see Bennett et al., 2018; Steed et al., 2019; Wendsche & Lohmann-Haislah, 2017, for meta-analyses). However, of these experiences, psychological detachment from work has been shown to be the most powerful recovery experience promoting recovery (Sonnentag & Fritz, 2015; Sonnentag et al., 2017; Wendsche & Lohmann-Haislah, 2017).

The need to recover well is particularly high in the face of high job demands (Sonnentag, 2018). Nevertheless, recovery-enhancing processes (like detachment from work) tend to be impaired when job demands are high. Under high IJDs, an employee's work effort – either qualitatively or quantitatively – is more intense and therefore likely to deplete her/his resources (e.g., energy). This depletion, in turn, means that recovery-enhancing processes may be threatened. Such a process concerns especially detachment from work, which requires self-regulatory resources in order to control one's thought processes (Sonnentag & Fritz, 2015). Earlier longitudinal studies (see Sonnentag, 2018) suggest that high quantitative job demands in particular, such as the facet of work intensification, may over longer periods of time undermine recovery. Considering this reasoning, we deemed it important to

examine recovery in the context of the IJDs model, which includes different facets of intensified job demands. Because detachment is essentially cognitive, it should match well with IJDs, which, again, are also predominantly cognitive. Such a good match between demands and resources should be effective in a stress management process (e.g., de Jonge et al., 2012).

2 A Conceptual Model of the Role of Recovery Between IJDs and Employee Outcomes

The conceptual model for exploring the role of recovery between intensified job demands (IJDs) and their consequences is presented in Fig. 1. It is noteworthy that there may naturally also exist other relevant macro- and micro-level factors that affect this process, but here we focus on factors with theoretical foundations and relevance from the viewpoint of an individual/employee.

The main societal context factor behind IJDs is the abovementioned *social acceleration* (see left box, Fig. 1). Technological acceleration in particular has been seen as the prime cause of intensification occurring in working life because its various forms (e.g., digitalization, robotization, machine learning, artificial intelligence) are transforming the content of jobs, occupations, and even entire industries (Autor, 2015; Menon et al., 2020). Technological acceleration will speed up all work processes and information transfer, thereby creating a need for more effective and intensive work effort on the part of employees (Rosa, 2003, 2013). Indeed, the use of technology has been found to predict higher IJDs (across facets) in a recent longitudinal study (Mauno et al., 2019a), lending support to Rosa's (2003, 2013) acceleration theory behind the IJDs. Moreover, technological acceleration has also been claimed to fuel acceleration in social structures and pace of life (Rosa, 2003, 2013).

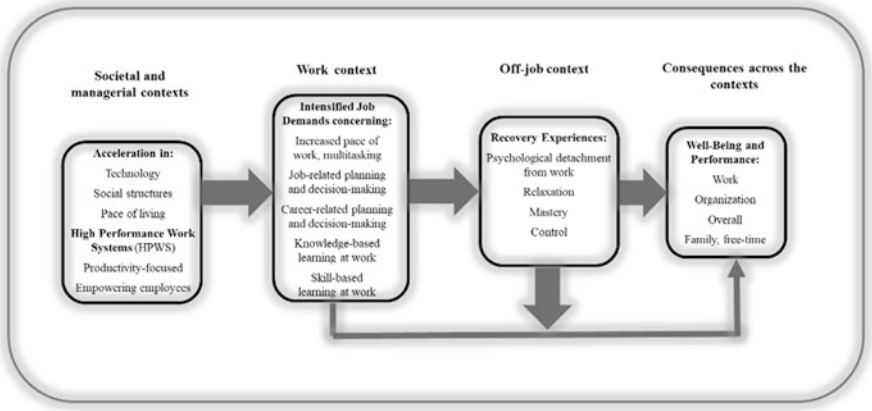


Fig. 1 A conceptual model on the linkages between the phenomena across different contexts

Manifestations of the former include faster and unpredictable changes in social structures that challenge traditional institutions and habits and of the latter short-lived trends and lifestyles. One concrete example of technological acceleration in society is social media use in our daily lives, where new updates are a "must," and very easy to do, encouraging fast-speed lifestyles and overall "life intensification." As a consequence of the encroachment of work on private life, due to new technology, work and nonwork spheres can no longer be separated in individuals' lives, and thus acceleration occurring in different life domains may easily accumulate and be reinforced. Hence, acceleration-prompting changes in social structures and pace of living may increase acceleration in working life and vice versa. Moreover, from the viewpoint of management, the high performance work systems (HPWS) paradigm can be seen to accentuate these acceleration processes by stressing high performance and high-productivity expectations for organizations and employees (Boxall & Macky, 2014; Oppenauer & Van De Voorde, 2018).

Consequently, three forms of social acceleration together with HPWS can be hypothesized to increase the likelihood of IJDs (see second box, Fig. 1), which characterize not only the elements of fast-speed work (intensifying working pace and multitasking) but also illustrate the intensified mental effort needed at work (intensifying planning, decision-making, and learning demands). Thus, acceleration and high-performance expectations in the context of work are experienced by the employees as IJDs, which, as job stressors (Korunka et al., 2015; Kubicek et al., 2015; Mauno et al., 2019b, c, 2020), are expected and indeed have also been shown to have *negative outcomes* for employees' well-being, health, and role performance across the contexts (see right box, Fig. 1). For instance, there is empirical evidence that IJDs are related to job burnout, impaired job performance, and job dissatisfaction (e.g., Korunka et al., 2015; Kubicek et al., 2015; Mauno et al., 2019b, c, 2020). Moreover, the most compelling evidence in this regard concerns increased working pace, which has been studied most widely as a hallmark of stressful work intensification (Chesley, 2014; Franke, 2015; Green, 2004).

However, our model also proposes that *recovery* and particularly four specific recovery experiences (see third box, Fig. 1) play an important role in the relationships between IJDs and employee outcomes. Specifically, we suggest that recovery operates in this stress process via two routes, that is, either as a mediator or as a moderator (a stress buffer). Both these mechanisms are involved in the *stressor-detachment model* introduced by Sonnentag and Fritz (2015). The model identifies detachment as a key variable influencing strain in addition to job stressors, and it also suggests that detachment attenuates the stressor-strain relationship and functions as a mediator in the stressor-strain process. In fact, there is empirical evidence to show that all recovery experiences may assume these two roles.

First, concerning mediation, it has been shown in a meta-analysis (Bennett et al., 2018) that recovery experiences, as a partial mediator, explained 26% more variance in fatigue and 62% more variance in vigor beyond work characteristics models. Detachment, relaxation, and mastery functioned as partial mediators between job demands and fatigue, whereas all experiences partially mediated the effects of job demands on vigor. Second, the moderating role of detachment and relaxation

has gained most research attention in earlier studies. Detachment has been reported to buffer against increased job exhaustion under high workload consisting of stringent time pressures at work (e.g., Korunka et al., 2012; Sianoja et al., 2018). Psychological detachment has also been identified as a moderator of the stressor–strain relationship, for example, between workplace bullying and psychological strain (Moreno-Jiménez et al., 2009), emotional conflicts at work and poor well-being (Sonnentag et al., 2013), as well as self-control demands and exhaustion (Rivkin et al., 2015). Relaxation has been shown to buffer against high need for recovery under high job insecurity (Kinnunen et al., 2010) and under high time demands (Siltaloppi et al., 2009). In addition, work–home conflict among preschool teachers predicted a decrease in vigor over time only when subjects were unable to achieve higher levels of relaxation experiences during off-job time (Gu et al., 2020). Also, in the presence of high levels of emotional dissonance, preschool teachers with higher levels of relaxation experiences during off-job time tended to report fewer insomnia symptoms over time. Mastery and control have been paid less attention, but in one study the relationship between workload and work-family conflict was particularly strong in the presence of low psychological detachment, low relaxation, and low control (Molino et al., 2015). Mastery has been shown to protect against increased need for recovery in the presence of lack of control at work (Siltaloppi et al., 2009).

To sum up, our conceptual model presented in Fig. 1 suggests that social acceleration and HPWS increase work intensification/intensity, manifested in IJDs, as experienced by employees. IJDs, as job stressors, are then expected to lead to negative consequences for employees' health, well-being, and role performance. However, successful off-job recovery (via four recovery experiences) may hinder this detrimental stress-strain process by buffering against IJDs, thus mitigating their negative outcomes. Furthermore, a different negative pathway is also possible, where IJDs first impair employees' off-job recovery and this impairment, in turn, mediates the relationship between IJDs and outcomes.

Next we turn to an empirical test of this conceptual model. We shall present preliminary evidence recently obtained in the ongoing IJDFIN project (e.g., Mauno et al., 2019b, 2020; Mauno & Minkkinen, 2020), where we explore the relationships between IJDs and employee outcomes, also paying attention to the role of recovery. The conceptual model (Fig. 1) will be partially tested because we focus only on the moderator role of recovery via psychological detachment. As it is unlikely that we could prevent work intensification, it is important to find ways to mitigate its negative consequences for employees. Here we suggest that, of recovery experiences, psychological detachment from work would be most promising in this respect.

3 Empirical Findings of the IJDFIN Study on the Role of Psychological Detachment

3.1 IJDs as Predictors of Impaired Psychological Detachment from Work

To explore the role of psychological detachment in relation to IJDs and their outcomes for employees, we analyze two-wave data collected on the IJDFIN project in 2018 (Time 1) and 2019 (Time 2) with a time lag of 1 year. This time lag was selected mainly due to practical reasons related to the time-frame of the research project and negotiations with the representatives of the industries studied. Furthermore, a 1-year time lag is quite commonly used in recovery studies (e.g., Kinnunen & Feldt, 2013; Sianoja et al., 2018). This follow-up data consists of Finnish employees working in teaching (n = 507), services (n = 234), and industry (n = 279). Specifically, we test two assumptions of the conceptual model (Fig. 1), that is, (1) whether IJDs impair detachment and (2) whether detachment buffers against IJDs in relation to certain employee outcomes. The mediator hypothesis presented in Fig. 1 (i.e., off-job recovery mediates the relationship between IJDs and outcomes) is not tested here because we use only two measurement points. Three measurement points would be needed to reliably test a mediation (MacKinnon, 2008). Furthermore, we presumed that focusing on a buffering role of psychological detachment would have more practical valence in stress management; if detachment mitigates the negative effects of IJDs on employee outcomes, such experiences should be promoted.

Regarding the consequences of IJDs, we selected self-rated *job performance* (Koopmans et al., 2016) and *meaning of work* (Steger et al., 2012) as the outcomes because these phenomena have not yet gained much attention in studies focusing on the consequences of IJDs. All the relationships are to be examined prospectively (i.e., independent and moderator variables at Time 1 and dependent variables at Time 2) by separately analyzing two occupational groups (teachers vs. others). We noticed that the correlations were quite different for the samples of teachers (n = 507) vs. others (n = 513), and for this reason we created these two groups (henceforth teachers and other employees). The groups were also of about the same size, helping us to interpret the findings across the subsamples.

First, we analyzed, using hierarchical regression analysis, whether IJDs (entered in Step 2) predict poorer detachment over time while accounting for control variables (sex, age, and education entered in Step 1). In the first model, where the baseline of detachment (Time 1) was not controlled for, the facet of *work intensification* (i.e., increased pace of work and multitasking demands) predicted impairment in detachment among teachers ($\beta = -0.15$, $p < 0.01$) and others ($\beta = -0.19$, $p < 0.001$). Moreover, in other employees (but not in teachers), *intensified learning demands* predicted poorer detachment over time ($\beta = -0.19$, $p < 0.001$). However, the other facets of IJDs were not significant contributors. Altogether, IJDs explained 3%

($p < 0.01$) of the variance of detachment in teachers and 13% ($p < 0.001$) in other employees.

In order to test the robustness of these prospective effects, we next ran new regression models where the baseline of detachment was controlled for in the first step of the analysis (other steps were similar to those reported above). In these revised models, none of the facets of IJDs significantly predicted detachment among teachers, whose detachment was explained only by their level of detachment of the previous year ($\beta = 0.61$, $p < 0.001$) and age ($\beta = -0.09$, $p < 0.05$); teachers who detached mentally well at Time 1 were likely to continue to do so 1 year later at Time 2. Thus, psychological detachment was relatively stable over time over a 1-year time period. Furthermore, younger teachers reported better detachment from work during off-job time than older ones. However, in the group of other employees, *higher learning demands* predicted poorer detachment over time ($\beta = -0.11$, $p < 0.01$), even when the baseline detachment was controlled for. Also, in the group of other employees, detachment was decidedly stable over a 1-year period ($\beta = 0.64$, $p < 0.001$).

To sum up the above results, IJDs played only a minor role in predicting a change in psychological detachment from work over a 1-year time period. A change was observed only in the group of other employees among whom high learning demands at work predicted a decrease in detachment over time.

3.2 *Psychological Detachment as a Buffering Factor Between IJDs and Employee Outcomes*

Next we tested, based on the same longitudinal data as reported above (see Sect. 3.1), the second proposition of the conceptual model (Fig. 1), that is, whether psychological detachment prospectively buffers against IJDs in relation to job performance and meaning of work. Specifically, we performed hierarchical moderated regression analyses with interaction terms based on the standardized variables of IJDs and detachment derived from Time 1. Thus, altogether eight interactions were analyzed. Control variables included sex, age, and education derived from Time 1, whereas the dependent variables (job performance, meaning of work) were based on the Time 2 measurement. We ran the regression models again in two subsamples (teachers vs. other employees). Significant interaction effects were also graphically inspected based on the key parameter values (β-coefficients and confidence intervals). Again, we analyzed two types of models: first, without controlling for the baseline effect of the dependent variable (i.e., job performance/meaning of work at Time 1) and second, entering this baseline effect into the model in the first step.

These regression analyses indicated two significant (prospective) moderator effects, which were similar in both models (without and with baseline control). Here, we report only the effects of a more robust testing (i.e., including the baseline control of the dependent variable at T1). The facet of *work intensification* interacted

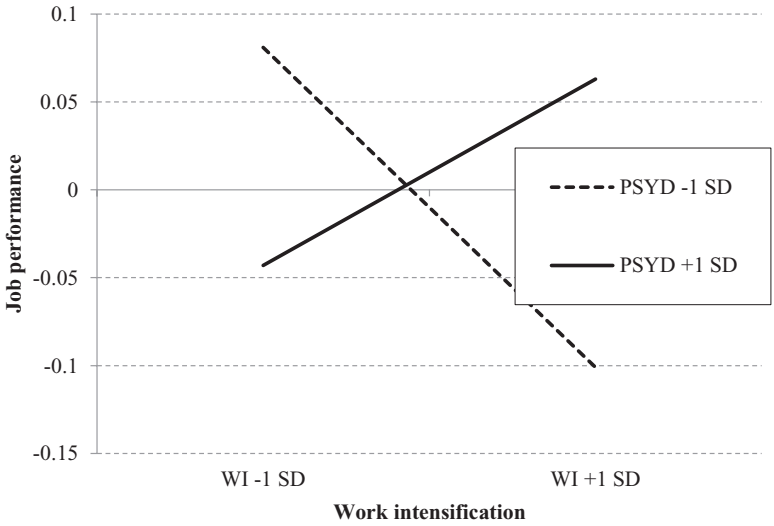


Fig. 2 Interaction effect of work intensification (WI at Time 1) and psychological detachment (PSYD, at T1) on job performance (at Time 2) among teachers; job performance at T1 is controlled for

Fig. 3 Interaction effect of work intensification (WI at Time 1) and psychological detachment (PSYD, at T1) on meaning of work (at Time 2) among teachers; meaning of work at T1 is controlled for

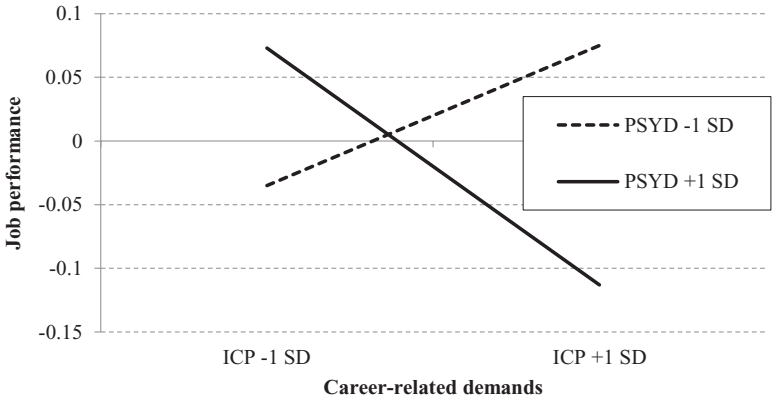


Fig. 4 Interaction effect of intensified career-related planning and decision-making demands (ICP at Time 1) and psychological detachment (PSYD, at Time 1) on job performance (at Time 2) among service and industry workers; job performance at T1 is controlled for

with psychological detachment among teachers in predicting job performance ($\beta = 0.11$, $p < 0.05$; see Fig. 2) and meaning of work ($\beta = 0.12$, $p < 0.05$, see Fig. 3). Figure 2 indicates that, among teachers, high psychological detachment (PSYD + 1 SD) buffered against work intensification over time in relation to job performance. In high work intensification, good psychological detachment from work during off-job time helped to maintain higher job performance over time. Figure 3 reveals a rather similar prospective buffering effect regarding meaning of work; those teachers' meaning of work was less negatively impacted whose psychological detachment was high (compared to poorly detached teachers) in the presence of high work intensification.

However, only one marginally significant interaction effect was found among other employees (industry and service workers): *intensified career-related planning and decision-making demands interacted* with psychological detachment ($\beta = .-0.09$, $p < 0.06$) in relation to job performance. Because this effect was statistically significant in the model without the baseline control ($\beta = -0.14$, $p < 0.05$), we inspected it graphically. Figure 4 shows that under high career-related demands, high psychological detachment (PSYD +1 SD) did not protect against poor job performance, conversely; however, low psychological detachment (PSYD – 1 SD) seemed to improve job performance over time. Thus, in a situation of high career-related demands, low detachment was beneficial in terms of job performance. Maybe those who perceive high career-related planning and decision-making demands do not even feel any need to detach mentally from work because they are so utterly committed to their careers.

In addition to the above-reported interaction effects, longitudinal regression analyses also revealed whether IJDs and psychological detachment directly predicted job performance and meaning of work over time. After controlling for the baseline effect of the dependent variables (robust testing), only intensified career-related planning and decision-making demands predicted a decrease in meaning of

work among teachers ($\beta = -0.11$, $p < 0.05$). Interestingly, psychological detachment predicted neither performance nor meaning of work over time in either subsample, and the respective correlation coefficients were also nonsignificant.

To sum up, the moderating role of psychological detachment turned out to be modest in the present longitudinal analysis: detachment functioned as expected (a stress-buffering moderator) only among teachers and concerning the relationship between work intensification (a stressor) and job performance and meaning of work (employee outcomes). Accordingly, good detachment during off-job time mitigated the association between work intensification and job performance and meaning of work over time.

3.3 Conclusions Regarding Empirical Findings in Relation to the Conceptual Model

Altogether, the prospective analyses reported above suggest that work intensification was the most predictive facet of IJDs regarding impairment in psychological detachment from work. Work intensification has previously been related to other harmful employee outcomes (e.g., Boxall & Macky, 2014; Chesley, 2014; Franke, 2015; Kubicek et al., 2015; Mauno et al., 2020), and here we documented, for the first time, that work intensification may also impair employees' psychological detachment from work. However, the facet of work intensification comes close to work pressure, and there are earlier studies showing that especially work pressure renders psychological detachment from working hard (see Sonnentag, 2018).

Moreover, intensified learning demands also impaired detachment over time among service and industry workers but not among teachers. Less highly educated workers may not be so well adapted to increasing work-related learning demands, and workers may experience these as stressful, with negative implications for their psychological detachment from work during off-job time. Overall intensified learning demands have been researched less frequently than work intensification, and some studies have shown that learning demands, if moderate (not high or low), may even be associated with positive rather than negative outcomes (e.g., Glaser et al., 2015; Mauno et al., 2019c). Thus, the level of learning demands (besides occupation) may partly determine their outcomes.

Altogether, these results are in line with the effort-recovery model (Meijman & Mulder, 1998) and the stressor-detachment model (Sonnentag & Fritz, 2015), suggesting that when the depleted systems are no longer taxed during off-job time (detachment from work fulfills this criterion), recovery is possible. Thus, high work effort, due to intensified job demands, depletes self-regulatory resources, which would be crucial to stop thinking about work during off-job time. Such resources would be required especially under high quantitative job demands, e.g., in the presence of work intensification (increased working pace combined with multitasking).

Altogether, our longitudinal findings lent only partial support to our conceptual model (Fig. 1), which proposed that all dimensions of IJDs harm off-job recovery experiences (here psychological detachment). What we found here was that two out of four facets of IJDs were related (over time) negatively to psychological detachment from work. However, these findings have implications. First, intensified pace of work and increased demands to multitask require more attention in organizations in fostering employees' psychological detachment from work. This may occur by keeping quantitative job demands at a moderate level and by also allowing employees to recover during work (e.g., breaks). Second, contemporary working life, and even more so in the future, seems to require lifelong learning, and it is essential to bear in mind that continuous learning demands may be risky for off-job recovery, particularly among less highly educated/blue-collar workers. It is also important to realize that the level of learning demands may determine their outcomes and there are variations in personal preferences regarding job-related learning demands (see Mauno et al., 2019c).

Longitudinal moderator analyses revealed that psychological detachment was not a strong or very consistent buffering resource against negative outcomes related to IJDs in a prospective design. We found prospective buffering effects only among teachers and regarding only one facet of the IJDs, namely, work intensification. Although similar moderator effects have not been studied earlier, there is evidence that good detachment from work has buffered against increased exhaustion under high workload consisting of tough time demands at work (Korunka et al., 2012; Sianoja et al., 2018). It should be borne in mind that high workload comes close to the concept of work intensification. In addition, somewhat similar buffering effects have already been found in our cross-sectional data based on these same subsamples (Minkkinen et al., 2019). In this earlier study, a few buffering effects were found in relation to job exhaustion, but they were relatively weak and varied across the subsamples, as also here. Generally, our moderator findings indicate modest support for our conceptual model (Fig. 1), which suggested that recovery experiences buffer against negative effects of IJDs on employee outcomes. Indeed, only two out of eight buffering effects tested were significant and concerned only the dimension of work intensification in one occupational group (teachers).

It is possible that psychological detachment and other recovery experiences would rather mediate (see Fig. 1) than moderate the effects between IJDs and employee outcomes, a proposition which needs to be tested in the future using multi-wave data. This would be in line with the results based on the job demands-resources-recovery model (see Kinnunen et al., 2011; Bennett et al., 2018, for a meta-analysis). Mediator effects were not tested here because we used only two-wave data. Therefore our conceptual model should be tested more fully in the future. Furthermore, it is important to realize that the conceptual model proposed here is admittedly limited regarding other potential factors that may affect employees' well-being and motivational outcomes in contemporary and especially in future working life. Consequently, we encourage scholars to develop alternative,

preferably empirically testable models including different macro- and micro-level factors that might be relevant in future working life, which will bring possibly totally new job demands into the spotlight.

4 General Outlook

4.1 Some Future Scenarios

In spite of evidence that IJDs entail harmful costs for employees' well-being and motivation (e.g., Boxall & Macky, 2014; Chesley, 2014; Franke, 2015; Korunka et al., 2015; Kubicek et al., 2015; Mauno et al., 2019b, c, 2020), this evidence is not consistent or strong regarding all dimensions of IJDs. Thus, more studies, also longitudinal, would be needed to explore the various outcomes of IJDs. More importantly, it is important to note that job demands do not occur in a vacuum but often co-emerge. Thus, it is possible that IJDs become more stressful (also leading to more negative outcomes) if they co-emerge with other job stressors, e.g., job insecurity and work-family conflict. We have actually already found some cross-sectional evidence that IJDs may co-occur with other mental job demands, e.g., interruptions at work and extra-role work tasks (Mauno & Minkkinen, 2020).

It has been predicted that working life will change permanently after the Covid-19 pandemic, and therefore an interesting question is what happens to intensified working life: Will work intensity and its various forms decrease or increase, and what may be the accumulated costs of increased job insecurity and work intensity for employees and organizations? One future scenario is that societies will move to a less intensified mode of living and working, in contrast to social acceleration theory (Rosa, 2003, 2013), meaning the beginning of a new era. However, it is also very likely that technological acceleration, one key phenomenon of acceleration in Rosa's theory, will actually speed up in the future, as technology has widely benefited societies and economies during Covid-19. Another theory that has inspired work intensification research is the high performance work systems (HPWS) model, which highlights employees' empowerment, that is, fostering employees' involvement, autonomy, responsibility, and skill utilization as key drives for successful performance and productivity (Boxall & Macky, 2014; Oppenauer & Van De Voorde, 2018). It is hard to imagine that such expectations and management practices would disappear in the future; quite the opposite, many organizations are continuously seeking for better productivity and profits. In such effort-demanding circumstances, it is vital to consider how high-performance work systems will intensify job demands in the future and what their consequences may be for employees. Altogether, future scenarios imply that researchers and other working life specialists need to be vigilant in observing visible changes but also weak signals of societies and organizations to find out what the most relevant and topical job demands are in this new era. Multidisciplinary research is definitely needed considering the complexity and dynamic nature of future working life.

4.2 Stress Management Recommendations

Psychological detachment has been indicated to be one of the most powerful experiences of off-job recovery in earlier studies (see Sonnentag et al., 2017) and was therefore also focused on here as a potential buffer. Despite its theoretically plausible role as a buffer against IJDs (see Fig. 1), we found only weak empirical evidence for this in this prospective study (only concerning the dimension of work intensification in teachers). Nevertheless, two facets of IJDs, i.e., work intensification and intensified learning demands, were directly related to poor detachment, making detachment from work more difficult during off-job time. Our modest findings should not, however, undermine the crucial role of psychological detachment for employees' well-being and motivation established earlier, as our (weak) findings may relate, e.g., to the occupational groups studied, country context, less optimal time-frame, or the selected outcomes (performance, meaning of work). It has been suggested that psychological detachment requires self-regulative capacity on the part of an employee (Sonnentag & Fritz, 2015), further suggesting that under high IJDs, it is difficult to refrain from thinking about work-related issues due to depleted energy resources and reduced self-control. In addition, blurring boundaries between work and nonwork time and spheres can render detachment from work difficult during off-job time (Kinnunen et al., 2016). Therefore, the other more active and concrete recovery experiences outlined in Fig. 1 (relaxation, mastery, control; see also Sonnentag & Fritz, 2007) would need more attention both in future studies and in best practices on IJDs and their outcomes.

Nevertheless, although the experience of high job demands calls for effective recovery processes, empirical research shows, including our study, that recovery processes are actually impaired when job demands are high (Bennett et al., 2018; Sonnentag, 2018). Sonnentag (2018) calls this observation the "recovery paradox." Given the strong empirical evidence that recovery-enhancing processes (like detachment from work) are impaired when job demands are high, it is crucial to keep job demands within certain limits and to support employees to adequately cope with these job demands. A key question is what organizations and individuals can do to sidestep the recovery paradox and to promote recovery processes even when job demands are high. According to Sonnentag (2018), being mindful at work would likely help to reduce negative activation in reaction to job demands and therefore aid recovery. In addition, the development of new recovery habits (e.g., physical exercise) may help in starting recovery processes even under unfavorable affective and energetic circumstances, although this is not always easy and may require goal-driven efforts.

Funding The study was supported by Academy of Finland, grant number 308 334.

References

Alasoini, T. (2018). *Digitalisaatiolla työn uudelleenajatteluun* [Digitalization and transformations at work]. Finnish Institute of Occupational Health.

Autor, D. H. (2015). Why are there still so many jobs? The history and future of workplace automation. *Journal of Economic Perspectives, 29*(3), 3–30. https://doi.org/10.1257/jep.29.3.3

Bennett, A. A., Bakker, A. B., & Field, J. G. (2018). Recovery from work-related effort: A meta-analysis. *Journal of Organizational Behavior, 39*, 262–275. https://doi.org/10.1002/job.2217

Boxall, P., & Macky, K. (2014). High-involvement work processes, work intensification and employee well-being. *Work, Employment, and Society, 28*(6), 963–984. https://doi.org/10.1177/0950017013512714

Chesley, N. (2014). Information and communication technology use, work intensification and employee strain and stress. *Work, Employment and Society, 28*(4), 589–610. https://doi.org/10.1177/0950017013500112

Chowhan, J., Denton, M., Brookman, C., Davis, S., Sayin, F., & Zeytinoglu, I. (2019). Work intensification and health outcomes of health sector workers. *Personnel Review, 48*(2), 342–359. https://doi.org/10.1108/PR-10-2017-0287

Cropley, M., & Zijlstra, F. R. H. (2011). Work and rumination. In J. Langan-Fox & C. L. Cooper (Eds.), *Handbook of stress in the occupations* (pp. 487–502). Elgar.

de Jonge, J., Spoor, E., Sonnentag, D., Dormann, C., & van den Tooren, M. (2012). "Take a break?!" Off job recovery, job demands and job resources as predictors of health, active learning, and creativity. *European Journal of Work and Organizational Psychology, 21*, 321–348. https://doi.org/10.1080/1359432X.2011.576009

Franke, F. (2015). Is work intensification extra stress? *Journal of Personnel Psychology, 14*(1), 17–27. https://doi.org/10.1027/1866-5888/a000120

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*(6), 482–492. https://doi.org/10.5271/sjweh.1053

Glaser, J., Seubert, C., Hornung, S., & Herbig, B. (2015). The impact of learning demands, work-related resources, and job stressors on creative performance and health. *Journal of Personnel Psychology, 14*(1), 1–32. https://doi.org/10.1027/1866-5888/a000127

Granter, E., Wankhade, P., McCann, L., Hassard, J., & Hyde, P. (2019). Multiple dimensions of work intensity: Ambulance work as edgework. *Work, Employment, & Society, 33*(2), 280–297. https://doi.org/10.1177/0950017018759207

Green, F. (2004). Why has work effort become more intense? *Industrial Relations, 43*, 709–741. https://doi.org/10.1111/j.0019-8676.2004.00359.x

Green, F., & McIntosh, S. (2001). The intensification of work in Europe. *Labor Economics, 8*, 291–308. https://doi.org/10.1016/S0927-5371(01)00027-6

Gu, Y., Wang, R., & You, X. (2020). Recovery experiences moderate the impact of work stressors on well-being: A two-wave study of preschool teachers. *Early Childhood Education Journal, 48*, 189–202. https://doi.org/10.1007/s10643-019-00994-w

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist, 44*(3), 513. https://doi.org/10.1037/0003-066x.44.3.513

Karasek, R., & Theorell, T. (1990). *Healthy work: Stress, productivity, and the reconstruction of working life*. Basic Books.

Kinnunen, U., & Feldt, T. (2013). Job characteristics, recovery experiences and occupational Well-being: Testing cross-lagged relationships across 1 year. *Stress and Health, 29*(5), 369–382. https://doi.org/10.1002/smi.2483

Kinnunen, U., Feldt, T., Siltaloppi, M., & Sonnentag, S. (2011). Job demands–resources model in the context of recovery: Testing recovery experiences as mediators. *European Journal of Work and Organizational Psychology, 20*(6), 805–832. https://doi.org/10.1080/1359432X.2010.524411

Kinnunen, U., Mauno, S., & Siltaloppi, M. (2010). Job insecurity, recovery and well-being at work: Recovery experiences as moderators. *Economic and Industrial Democracy, 31*, 179–194. https://doi.org/10.1177/0143831X09358366

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

Koopmans, L., Bernaards, C., Hildebrandt, V., Lerner, D., de Vet, H., & van der Beek, A. (2016). Cross-cultural adaptation of the individual work performance questionnaire. *Work, 53*(3), 609–619. https://doi.org/10.3233/WOR-15223

Korunka, C., Kubicek, B., Paškvan, M., & Ulferts, H. (2015). Changes in work intensification and intensified learning: Challenge or hindrance demands? *Journal of Managerial Psychology, 30*(7), 786–800. https://doi.org/10.1108/JMP-02-2013-0065/full/html

Korunka, C., Kubicek, B., Prem, R., & Cvitan, A. (2012). Recovery and detachment between shifts, and fatigue during a twelve-hour shift. *Work, 41*(Supplement 1), 3227–3233. https://doi.org/10.3233/WOR-2012-0587-3227

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*(6), 898–913. https://doi.org/10.1080/1359432X.2014.979160

MacKinnon, D. P. (2008). *Introduction to statistical mediation analysis*. Erlbaum.

Mauno, S., Kubicek, B., Feldt, T., & Minkkinen, J. (2020). Intensified job demands and job performance: Does SOC strategy use make a difference? *Industrial Health, 58*, 224–237. https://doi.org/10.2486/indhealth.2019-0067

Mauno, S., Kubicek, B., Minkkinen, J., & Korunka, C. (2019a). Antecedents of intensified job demands: Evidence from Austria. *Employee Relations: The International Journal, 41*(4), 694–707. https://doi.org/10.1108/ER-04-2018-0094

Mauno, S., & Minkkinen, J. (2020). Profiling a spectrum of mental job demands and their linkages to employee outcomes. *Journal of Person-Oriented Research, 6*(1), 56–72. https://doi.org/10.17505/jpor.2020.22046

Mauno, S., Minkkinen, J., & Auvinen, E. (2019b). Nakertaako työn intensiivisyyden lisääntyminen työssä suoriutumista ja työn merkityksellisyyttä? Vertaileva tutkimus eri ammattialoilla. *Hallinnon tutkimus, 38*, 271–289. [Intensified job demands and their associations with job performance and meaning of work: Comparative study across occupational groups. *Finnish Journal of Administrative Science, 38*, 271–289].

Mauno, S., Minkkinen, J., Tsupari, H., Huhtala, M., & Feldt, T. (2019c). Do older employees suffer more from work intensification and other intensified job demands? Evidence from upper white-collar workers. *Scandinavian Journal of Work and Organizational Psychology, 4*(1), 3. https://doi.org/10.16993/sjwop.60

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

Menon, S., Salvatori, A., & Zwysen, W. (2020). The effect of computer use on work discretion and work intensity. Evidence from Europe. *British Journal of Industrial Relations, 58*(4), 1004–1038. https://doi.org/10.1111/bjir.12504

Minkkinen, J., Kinnunen, U., & Mauno, S. (2019). *Does recovery from work strain protect employees from the effects of intensified job demands on job exhaustion?* Oral presentation in EAWOP-2019 conference (conference paper).

Molino, M., Cortese, C. G., Bakker, A. B., & Ghislieri, C. (2015). Do recovery experiences moderate the relationship between workload and work-family conflict? *Career Development International, 20*, 686–702. https://doi.org/10.1108/CDI-01-2015-0011

Moreno-Jiménez, B., Rodríguez-Muñoz, A., Pastor, J. C., Sanz-Vergel, A. I., & Garrosa, E. (2009). The moderating effects of psychological detachment and thoughts of revenge in workplace bullying. *Personality and Individual Differences, 46*, 359–364. https://doi.org/10.1016/j.paid.2008.10.031

Oppenauer, V., & Van De Voorde, K. (2018). Exploring the relationships between high involvement work system practices, work demands, and emotional exhaustion: A multilevel study. *The International Journal of Human Resource Management, 29*, 311–337. https://doi.org/10.1080/09585192.2016.1146321

Paškvan, M., Kubicek, B., Prem, R., & Korunka, C. (2016). Cognitive appraisal of work intensification. *International Journal of Stress Management, 23*(2), 124–146. https://doi.org/10.1037/a0039689

Pongratz, H. J., & Voß, G. (2003). From employee to 'entreployee': Towards a 'self-entrepreneurial' work force? *Concepts and Transformation, 8*, 239–254. https://doi.org/10.1075/cat.8.3.04pon

Rivkin, W., Diestel, S., & Schmidt, K.-H. (2015). Psychological detachment: A moderator in the relationship of self-control demands and job strain. *European Journal of Work and Organizational Psychology, 24*, 376–388. https://doi.org/10.1080/1359432X.2014.924926

Rosa, H. (2003). Social acceleration: Ethical and political consequences of a desynhcronized high-speed society. *Constellations, 10*, 3–33. https://doi.org/10.1111/1467-8675.00309

Rosa, H. (2013). *Social acceleration. A new theory of modernity*. California University Press.

Sianoja, M., Kinnunen, U., Mäkikangas, A., & Tolvanen, A. (2018). Testing the direct and moderator effects of the stressor-detachment model over one year: A latent change perspective. *Work & Stress, 32*(4), 357–378. https://doi.org/10.1080/02678373.2018.1437232

Siltaloppi, M., Kinnunen, U., & Feldt, T. (2009). Recovery experiences as moderators between psychosocial work characteristics and occupational well-being. *Work and Stress, 23*, 330–348. https://doi.org/10.1080/02678370903415572

Sonnentag, S. (2018). The recovery paradox: Portraying the complex interplay between job stressors, lack of recovery, and poor well-being. *Research in Organizational Behavior, 38*, 169–185. https://doi.org/10.1016/j.riob.2018.11.0020191-3085

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., Unger, D., & Nägel, I. J. (2013). Workplace conflict and employee well-being: The moderating role of detachment from work during off-job time. *International Journal of Conflict Management, 24*, 166–183. https://doi.org/10.1108/10444061311316780

Sonnentag, S., Venz, L., & Casper, A. (2017). Advances in recovery research: What have we learned? What should be done next? *Journal of Occupational Health Psychology, 22*(3), 365–380. https://doi.org/10.1037/ocp0000079

Steed, L. B., Swider, B. W., Keem, S., & Liu, J. T. (2019). Leaving work at work: A meta-analysis on employee recovery from work. *Journal of Management*. Advance online publication. https://doi.org/10.1177/0149206319864153

Steger, M. F., Dik, B. J., & Duffy, R. D. (2012). Measuring meaningful work: the Work and Meaning Inventory (WAMI). *Journal of Career Assessment, 20*(3), 322–337. https://doi.org/10.1177/1069072711436160

Ulferts, H., Korunka, C., & Kubicek, B. (2013). Acceleration in working life: An empirical test of a sociological framework. *Time & Society, 22*(2), 161–185. https://doi.org/10.1177/2F0961463X12471006

Van der Hejden, B., & De Vos, A. (2015). Sustainable careers: Introductory chapter. In A. De Vos & B. van der Heijden (Eds.), *Handbook of research on sustainable careers* (pp. 1–20). Edward Elgar Publishing.

van Veldhoven, M. (2008). Need for recovery after work. An overview of construct, measurement and research. In J. Houdmont & S. Leka (Eds.), *Occupational health psychology: European perspectives on research, education and practice* (pp. 1–25). Nottingham University Press.

Wendsche, J., & Lohmann-Haislah, A. (2017). A meta-analysis on antecedents and outcomes of detachment from work. *Frontiers in Psychology, 7*, 2072. https://doi.org/10.3389/fpsyg.2016.02072/full

Zijlstra, F. R., & Sonnentag, S. (2006). After work is done: Psychological perspectives on recovery from work. *European Journal of Work and Organizational Psychology, 15*, 129–138. https://doi.org/10.1080/13594320500513855

The Impact of Gender in Flexible Work: From Highlighting Gender Differences to Understanding Gender Roles in Use of Information and Communication Technology

Sandra Ohly and Claude Draude

1 Introduction

Flexible work involves the use of information and communication technology (ICT) such as laptops, tablets, and smartphones. Working individuals appreciate the flexibility that ICT affords (Matusik & Mickel, 2011; Mazmanian et al., 2013; Middleton & Cukier, 2006) despite the blurring boundaries between work and private life. From a gender research perspective, the private/public-private/work-life division is central. The gendered division of labor traditionally allocates women to the private/domestic sphere of reproductive work (care work, informal, unpaid) and men to the public sector. Even when both genders work, the majority of reproductive work is still done by women (Hochschild & Machung, 1989; Samtleben, 2019). Women are more likely than men to choose telework (see for a review (Allen et al., 2015), and telework has the potential to reinforce the gendered division of labor, posing the question if there is also a gendered way ICT is used to enable flexibility.

In Germany, where the data in focus of the present chapter was collected, the gender care share of women living with their partners is 66% (Samtleben et al., 2020). Hence, attention to differences in domestic work that still prevail in today's societies can help in assessing why flexible work is more beneficial to some while not to others and what other factors (job positions etc.) are important. It could also help formulate guidelines that factor in that the home is not just a place for leisure – but also work. This seems to be a particularly important issue in times of the pandemic with an increasing trend toward flexible working.

Empirical research with a gender focus is located in a field of tension between under- and overemphasizing the relevance gender holds for a specific research domain. Because gender is such a powerful structuring category on an individual as

S. Ohly (✉) · C. Draude
University of Kassel; Research Center for Information System Design, Kassel, Germany
e-mail: ohly@uni-kassel.de; claude.draude@uni-kassel.de

C. Korunka (ed.), *Flexible Working Practices and Approaches*,
https://doi.org/10.1007/978-3-030-74128-0_5

well as on a societal level (Harding, 1991, 2005), viewing topics, domains and research questions through the lens of gender is important. This "gender lens," however, might also lead to a reinscribing of gender stereotypes or to overestimating gender as an explanatory factor for a specific phenomenon. For example, prior research on ICT use has examined gender differences in attitudes toward ICT, ICT competence, and gendered usage pattern (Lee et al., 2014). This research has found a gendered perception of various ICTs, with mobile phones being perceived as more feminine (Selwyn, 2007). More recently, research has explored gender differences in smartphone usage (Crowe & Middleton, 2012; Dutta, 2020; Sowon et al., 2018), mostly using qualitative approaches. This previous research reveals that women encounter gendered expectations to be available for their families, even when at work. In our study, we will examine daily use and the positive and negative events occurring in relation to ICT, thereby contributing to previous research on gendered usage pattern.

In the project Always Online – Social Link (David et al., 2014), one of the authors of this chapter examined the relationships between ICT use, work-life balance, and well-being. In a series of diary studies, knowledge workers reported the length of their ICT use in the evening after leaving the workplace and indicated the kinds of positive and negative events they experienced each day in relation to ICT. In previous publications of this data, we analyzed the relationship of ICT use and ICT events on well-being outcomes (Braukmann et al., 2017) but neglected potential gender differences. In the study, data about gender was collected, meaning people were asked to check a box for their gender. Options given were along the gender binary of man or woman. Third gender options were not part of the form. Hence, the gender category in the study most likely amounts to the gender assigned to a person (either a man or a woman) at birth. Gender then means the way society views them. Additionally, gender is just one category in the social fabric. Other categories like age, economic background, race, or ethnicity intersect with gender (and each other) and might also be relevant. In the context of this study, we will need to examine how work-related factors might explain potential differences in ICT use.

2 Theoretical Background

The use of ICT might affect work-life balance, defined as satisfaction and good functioning at work and at home, because ICT use after working hours might create conflict with family members, take up time that could be spent on other activities (relaxing or socializing), and use up available energy. This has been the dominant perspective in research on ICT based on the following theories. Work-family border theory (Clark, 2000) focuses on explaining the work-family balance. It concerns the physical, temporal (e.g., working hours), and psychological (e.g., thinking patterns) borders associated with work and family roles, whereby borders are the "lines of demarcation between domains" (Clark, 2000, p. 751). Similarly to the border theory, the boundary theory (Ashforth et al., 2000) addresses daily role transitions

between life domains. According to the work-family border theory (Clark, 2000) and boundary theory (Ashforth et al., 2000), employees differ in the creation, maintenance, and modification of boundaries between work and home domains. These differences depend, for example, on the extent of identification with the domain roles (employee role vs. family member role). Employees who prefer segmenting are less likely, whereas those who prefer integrating of their work and family roles are more likely to use communication technologies for work purposes after hours (Ďuranová & Ohly, 2016).

On the other hand, ICT use after hours might contribute positively to work-life balance because it enables employees to flexibly react to multiple role demands. The flexibility afforded by ICT might benefit some individuals more than others. For example, individuals with care responsibility might benefit from the temporal flexibility. They might better be able to balance work and care responsibility with the help of ICT because they can schedule work at home in opportune moments (e.g., when children are occupied playing or asleep) or be available for urgent matters when taking care of others (e.g., being available via smartphone for colleague's questions). Because of the gendered division of labor, the question is if ICT usage patterns of men and women also differ and if women and men are equally affected by ICT use at home. In other words, does the flexibility afforded by ICT equally benefit all working individuals? By examining this research question, our chapter responds to calls for examining individual differences in the effect of flexible work (Demerouti et al., 2014).

In general, there is a gender-specific distribution of work. For example, men and women occupy different types of jobs and use ICT differently because of the tasks related to these jobs (e.g., Seyda & Flake, 2019). Gender is a powerful social structuring force (Harding, 1991, 2005) impacting (care) work distribution, the job market, societal roles and behaviors, and so forth. Different job sectors also might differ in ICT usage, provision of tools, and options for flexible work. For example, the KOFA study revealed that women, compared to men, are less likely to work with computer-operated systems, which might be due to the fact that women are less frequently employed in manufacturing. Or the more infrequent use of apps to take on work tasks in women, compared to men, might be due to the fact that women work more in direct service-contact roles, which renders the app use pointless (Seyda & Flake, 2019).

Thus, it is important to examine if potential gender differences in ICT usage pattern are due to underlying differences in terms of occupational role. For example, if the men in the samples were more often in leadership roles, does this explain gender differences in the frequency or extent of ICT use? Or do people working in specific industries report more ICT-related stress? To examine these questions, we reanalyzed diary data collected in the project "Always Online – Social Link" (David et al., 2014). Given that we do not have sufficient theoretical basis on the nature of gender differences in ICT use, we do not propose formal hypotheses and thus do not provide statistical test results. Rather, our analyses are exploratory.

3 Empirical Study

3.1 Sample of Diary Study 1

In Study 1, we surveyed 127 individuals aged between 22 and 62 years (M = 37.5, SD = 10.0). About half (55.4%) were female. Most were either married (41.5%) or cohabiting (23.1%). About 30% had children. Children were mostly under the age of 12. 3.1% of participants had (additional) care responsibilities. Participants were highly educated (58.5% college degree; 68.1% of women and 49.1% of men had a college degree). Most worked in either manufacturing (17.7%), consulting (13.1%), IT and media (18.5%), or other services (23.8%). Most were employees (90.8%) working between 6 and 12 hours daily (M = 8.9, SD = 1.3). 37.7% did not work from home on a regular basis. The remaining participants worked between 0.5 and 50 h a week from home (M = 6.0, SD = 7.4). Most had a leadership position (61.1%). Men in the sample more frequently held a leadership position (80%) than women (48.6%). Of all participants, most received a fixed payment (53.1%) or fixed payment combined with some form of performance-based pay (41.5%). Overtime was in most cases not compensated (50.8%). 26.2% of participants indicated that some level of overtime was included in their payment, and 12.3% received compensation via leisure time.

3.2 Sample of Diary Study 2

In Study 2, we surveyed 141 individuals aged between 19 and 61 (M = 36.6, SD = 11.0) working in different industries such as manufacturing (13.8%), chemical industry (23.0%), bank and insurances (10.5%), or other services (11.2). Participants were highly educated (58.9% college degree; similar levels for both men and women in the sample). About half (48.2%) were female. Most were cohabiting (25.5%) or married (36.2%), about a third was single (33.3%). 19.1% had children, and 8.5% cared for other family members, including the elderly. Most were employees (95.7%), working between 7 and 12 hours a day on a regular basis (M = 8.99, SD = 1.0). They had between 1 and 43 years of work experience (M = 15.20, SD = 11.1) and between 0.3 and 43 years of tenure with their current employer (M = 9.8, SD = 9.3). 58.2% had a leadership position (68.5% of men and 47.1% of women).

Most received a fixed payment (52.5%) or fixed payment combined with some form of performance-based pay (41.1%). Overtime was in most cases not compensated (37.6%), or 25.5% of participants indicated that some level of overtime was included in their payment. It was compensated by leisure time in 27.7% of participants.

3.3 Method

In both studies, participants were requested to fill in a general online questionnaire as well as daily questionnaires. In Study 1, they filled out three daily surveys (T1 in the morning, T2 after work, T3 before going to bed) over the course of 7 consecutive working days. In Study 2, they participated for 8 consecutive days (including weekends). During workdays, they filled in three questionnaires: in the morning, after work, and before going to bed. On the weekend, participants filled in only two questionnaires: one in the morning and one before going to bed.

We asked participants about their work-related ICT use (defined as laptops, smartphones, tablets) in general and assessed their daily usage in the evening (after leaving the workplace) in terms of length and positive and negative events experienced in relation to usage (Tables 1 and 2).

We also assessed a range of potential outcome variables such as work-home balance, positive and negative affect, recovery, and sleep quality (reported in Braukmann et al., 2017). The work situation of each individual is assessed using concepts such as work load, job autonomy, and perceived demands and expectations related to ICT (see Table 3 for more information).

4 Results

4.1 Gender-Specific Usage Pattern

Comparison in daily hours worked for the job, time spent using ICT in the evening, and daily satisfaction with ICT use indicate little if any differences between men and women. Although women indicate lower levels of ICT use in the evening

Table 1 Daily work-related ICT usage in the evening, aggregated

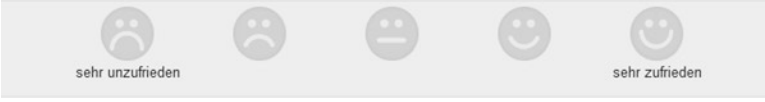
		n	*M*	*SD*
How long have you been using ICT (e.g., smartphones, tablets, laptops, computers) for work in the evening (in minutes)?				
Study 1	Male	48	33.34	50.25
	Female	64	19.89	29.50
Study 2	Male	58	18.67	30.96
	Female	61	13.90	28.52
Please indicate, using the pictures below, how satisfied you are today with the work-related ICT use in the evening 				
Study 1	Male	44	4.02	0.79
	Female	55	4.04	0.72

Table 2 Positive and negative events related to ICT use for work purposes

Event	Study 1			Study 2		
	Male	Female	All	Male	Female	All
Disruption during a meeting or phone call by incoming calls, messages, or memos	29.4	10.8	19.7	88.9	86.7	87.8
Disruption of workflow by incoming calls, messages, or memos	17.6	16.2	16.9	91.7	94.5	93.0
Overload due to high ICT-mediated workload and expectations of quick reaction times	8.8	29.7	19.7	86.7	86.7	86.7
Work impediment or delay caused by technical problems (hardware, software, connectivity issues, etc.)	32.4	29.7	31.0	72.6	69.4	71.0
Strain due to simultaneous use of multiple communication channels or devices	8.8	13.5	11.3	86.9	85.5	86.2
Strain due to pursuing or finishing work tasks outside of working hours (e.g., post-processing/ preparation of work day)	45.0	52.6	48.7	63.2	55.7	59.3
Disruption by incoming work calls during private time	25.0	31.6	28.2	35.1	32.8	33.9
Disruption by incoming work emails during private time	50.0	47.4	48.7	56.1	52.5	54.2
Quick and easy information access and updates via ICT	20.0	15.9	17.9	72.1	80.3	76.2
Productive exchange and interconnected work with other via ICT	17.9	9.1	13.3	87.5	96.6	92.2
ICT facilitating work, including quick problem-solving, work organization, or multi-channel availability	57.3	38.6	47.6	96.2	98.2	97.2
ICT-mediated correspondence or information research during a meeting or phone call	12.5	13.6	13.1	80.6	76.7	78.7
Perceived gain by being available via ICT while travelling, working from home, or during breaks	27.5	27.3	27.4	54.8	69.4	62.1
Using idle time (e.g., travelling, waiting) for work correspondence or other work tasks	17.5	20.5	19.0	52.5	71.0	61.8
Being able to work from home/outside of working hours (flexible working hours, being able to leave early and finish tasks later)	25.9	24.2	25.0	70.9	54.1	62.1
Being available for urgent work matters outside of working hours/being able to contact others outside of working hours	37.0	48.5	43.3	74.1	63.3	68.4
Handling private matters via ICT during working time	10.0	25.0	17.9	65.6	76.3	70.8
Handling private matters via ICT during private time	51.9	45.5	48.3	85.4	88.3	87.0

Table 3 Study concepts in Study 2

Concept	Source	Sample item
Work load	ISTA, 1-item (Semmer et al., 1999)	How often do you work under time pressure?
Job autonomy	WDQ (scheduling, method, and decision) (Stegmann et al., 2010)	The job allows me to make my own decisions about how to schedule my work
Organizational expectations	Organizational time demands (Thompson et al., 1999)	Employees are often expected to take work home at night and/or on weekends
ICT demand	ICT demands (Day et al., 2012)	As a result of technology, I work longer hours at and away from the office
ICT availability expectations	ICT demands (Day et al., 2012)	I am expected to be accessible at all times (e.g., through cell phone/smartphone)
ICT satisfaction	Self-developed, 1 item	see Table 1
ICT appraisal positive negative	Self-developed	The use of ICT is… enriching straining
ICT use in the evening	Self-developed, 1 item	see Table 1
Work-life balance	2 items based on Valcour (2007)	How satisfied are you, taking everything into account, with the balance between your work and private life?

compared to men in both studies, the variance within each group is greater than this difference. Women and men are also quite satisfied with their daily ICT use for work-purposes with a mean of about 4, which is equivalent to the smiling face.

For the assessment of daily affective ICT events, participants reported twice a day if they encountered positive or negative ICT-related events: at T2 (after work between 3 p.m. and 8 p.m.) and at T3 (before going to bed between 9 p.m. and 1 a.m.). "Were there any situations today [T2]/after work [T3] which were related to the use of ICT (PC, smartphone, tablet) and which you evaluate as being negative or stressful?" Responses to this open-ended question were qualitatively analyzed in Study 1, and the resulting categories are used as a checklist in Study 2. The frequency of encountering each type of event is shown in Table 2. In study 1, possibly because of the open-ended questions, each type of event was reported as occurring less frequently than in Study 2 when we used a checklist. Because responses to open-ended questions require more effort, and women might be more likely to feel obliged to collaborate with researchers, and thus invest more effort in responding (see Spitzmuller et al., 2006), we focus on differences in the frequency of occurrence when they are evident in Study 2.

Examining the frequency of experiencing negative and positive events related to ICT use in the evening reveals no consistent gender differences (>10%) across studies in most types of events. Women and men to an equal degree experience the most frequent (based on Study 2 frequencies) positive events: (1) ICT facilitating work, (2) productive exchange, and (3) quick and easy information access. Women and

men to an equal degree experience the most frequent negative events: (1) disruption of workflow, (2) disruption during meeting or phone call, (3) overload due to high ICT use, and (4) strain due to simultaneous use of multiple communication channels. These findings indicate that ICT use is similar for both men and women in their work role, indicating that the work role dominates and levels out any potential gender differences.

With regard to work events related to the work home interface, some interesting differences emerge in Study 2: Men seem to experience benefits in working from home and being available more frequently than women (difference >10%). Women, in contrast, seem to benefit more frequently from being available while travelling and using idle time than men (difference >10%). These findings are interesting in the light of previous considerations that men and women use the flexibility afforded through telework and ICT differently (Hilbrecht et al., 2008; Seyda & Flake, 2019). While men might be able to promote their careers by being flexible, women, because of their on average higher care responsibilities, might use the time gained in fulfilling the care responsibilities. This is why they seem to benefit from using idle time, but in being available at home to the same degree.

To explore if this explanation is true, we analyzed the occurrence of these three types of events depending on care responsibility and gender using data of Study 2. For this analysis, care responsibility is defined as having children living in the same household or taking care of a dependent. Results revealed that primarily women without care responsibilities experience the benefit to use idle time, and men without and women with care responsibility experience the benefit of flexibility in working from home.

Based on border theory, boundary management theory, and stress theories (for summary see Sonnentag and Frese (2003)), we analyzed the relationships between work and organizational characteristics (work load, job autonomy, organizational time demands), ICT-related concepts (ICT appraisal, ICT satisfaction, ICT demand, ICT availability demands, and ICT use in the evening), and work-life balance. Inspecting the correlations of all concepts with work-life balance (Table 4) indicates little differences between men, women, and the total sample. The only apparent difference concerns the role of perceived organizational time demands and work-life balance. Whereas the correlation is significant and negative in the total sample and among women, it is nonsignificant and small among men. This result indicates that work-life balance of men is less dependent on perceived demands by their employer, compared to women. In contrast, women seem to react more strongly to perceived demands by their employer, but it is currently unclear why this is the case. As women do not face higher care responsibilities than men in our sample, additional demands posed on them cannot explain this differing reaction.

It is of note that for both men and women, ICT use in the evening is unrelated to work-life balance, indicating that daily ICT use does not affect individuals' work-life balance negatively overall. This finding mirrors previous findings that only under specific circumstances (such as high norms or organizational expectations to be available for work (Gadeyne et al., 2018)) prolonged ICT use negatively affects employees. Comparisons of the correlation between ICT related concepts and

Table 4 Correlations of work characteristics and ICT characteristics with work-life balance

				Work characteristics			General ICT characteristics			ICT experience		
										Appraisal		
	N	M	SD	Work load	Job autonomy	Org. time expectation	ICT strain	ICT avail	ICT satisf	Pos	Neg	ICT use
Total	151	3.54	0.79	–.36**	.08	–.30**	–.30**	–.31**	.47**	.06	–.22*	–.09
Male	76	3.54	0.75	–.29*	.11	–.15	–.26*	–.29*	.38**	.07	–.20	.02
Female	74	3.55	0.83	–.42**	.05	–.45**	–.35**	–.33**	.57**	.05	–.23	–.21

Note. 120 for ICT use in the evening (58 men and 61 women for ICT use in the evening)
* $p < .05$
** $p < .01$

work-life balance with those of work and organizational characteristics give additional insights. Interestingly, work characteristics such as the organizational expectation to be available for work outside working hours is consistently linked to work-life balance although ICT use is not. It thus seems that the blurring boundary between work and private life is mainly driven by organizational expectations, not by ICT. This relationship is more pronounced among women, indicating that they might react more strongly to organizational expectations, but it is currently unclear why this is the case.

5 Discussion

Our results suggest little if any differences in the pattern of ICT usage between men and women in a sample of highly educated knowledge workers. Men and women did not differ significantly in the length of work-related ICT use in the evening or in their daily satisfaction with this behavior. Moreover, they mostly experienced the same kind of positive and negative events related to ICT, with the exception of experiencing the opportunity of using ICT to fill idle time. Men and women also showed similar patterns of relationship between work-related characteristics, ICT characteristics, and work-life balance. Because our samples consist of men and women in similar occupational roles, these findings indicate that gender differences are negligible when examining a homogeneous sample. This finding is in line with the conclusion that "gender roles…become a secondary, background influence in settings in which specific roles are of primary importance" (Eagly & Wood, 2012, p. 470).

Moreover our findings suggest that the flexibility afforded by ICT seems to benefit all working individuals equally, as they encounter positive events related to ICT to the same degree. The finding that work-life balance was not related to the extent of daily ICT use might indicate that positive and negative effects outweigh each other; this is why ICT use is termed a double-edge sword (for review see Ďuranová & Ohly, 2016). To promote work-life balance and well-being of working individuals, the occurrence of positive events should be fostered, and the occurrence of negative events should be minimized. This could be achieved by giving individuals autonomy to decide when and how they want to be available for work and changing the social and organizational norms concerning availability accordingly.

Because the studies were not designed to test gender differences in ICT use and its effect on work-life balance, some information which is critical in this domain (Powell & Greenhouse, 2010) is missing in our data. Powell and Greenhouse argued that gender roles and home demands are important to examine. For future work in this area, focusing more on gender roles instead of treating gender as a rather stable category could benefit the design of empirical studies. Gender roles demonstrate how social expectations regarding certain behaviors or traits are linked to one gender. Paying attention to gender roles allows researchers to focus more on activities, behaviors, other roles, occupations, domains, and how these are viewed as gendered. Although little gender differences were found in our highly educated sample,

this finding might not generalize to other occupational groups, e.g., low skilled workers. This calls for future intersectional analysis which would allow to integrate further social categories in empirical studies and also pay attention to the status of various categories and differences as well as interaction between them.

For future research in this area, it might also be interesting to examine if intersecting factors are more relevant than gender. For example, one could argue that individuals with leadership responsibilities show different ICT usage pattern (e.g., more pronounced use or more frequent positive and negative event occurrence) because they rely on ICT to fulfill their leadership role. For example, ICT is important for networking, which is a central activity of leaders. Because men are more likely to rise into higher-level leadership positions than women, the intersection of leadership roles and gender needs to be taken into account in future studies on ICT use.

Gender roles form a nodal point where society and individuals intersect. If, for example, a caring behavior is linked to a specific gender, it has an impact for the individual as well as it renders specific occupations and activities as gendered. Hence, a gender research perspective opens up a wider field of analysis and does not need to amount to differences between genders. It can, for example, serve to view the home also as a place of (usually unpaid) work, or caring for others as work, and so forth, or shed light on social expectations, work, and gender relations.

Although the majority of our findings indicate little gender differences, the study tentatively suggests that women respond more strongly to organizational expectations to be available for work and that these expectations are more relevant for well-being than blurred boundaries through ICT use. More research is needed to explore and replicate this effect in different types of work organizations and explain why this difference occurs. For example, individuals develop a shared frame around ICT and its appropriate use (Mazmanian, 2013), and this frame might differ for men and women, despite being in the same occupational role, which leads to the perception of higher organizational expectations.

When individuals experience greater demands for care work at home as well as high organizational demands for their time, the dual high demands create conflict. To explore this issue further, future research needs to directly assess the home demands of ICT users more precisely than in our studies. As explained above, assessing the home demands might shed light on why the difference in experiencing positive and negative ICT events occurred. As argued above, it might be that any person who is primarily responsible for child care (as one type of home demand) will use idle time on the way home, and experience ICT as helpful for meeting these demands, independent of their gender.

For future studies it might be interesting to explore the type of activities ICT is used for in the evening and differentiating the type of device that is used. Gadeyne et al. (2018) showed that the effects of using smartphones differed from those of using other devices, possibly because laptops, tablets, and computers are used to finish work tasks, whereas smartphones are used to quickly check messages. Whereas the former means a prolonged working time (similar to overtime), the latter is shorter but fragments the evening, deters detaching from work, and is more

likely to cause interruptions in ongoing activities, including family and private activities.

6 Conclusion

The re-analyses of data of two diary studies suggest little if any gender differences in ICT usage pattern, which indicates that the occupational role as knowledge workers is of primary importance. This analysis contributes to the emerging field of gendered ICT usage (Crowe & Middleton, 2012; Dutta, 2020; Sowon et al., 2018). By discussing how to further elaborate on gendered ICT use, we hope to promote knowledge in this field.

Acknowledgment This work has been funded by the Social Link Project within the Loewe Program of Excellence in Research, Hessen, Germany. We thank Julia Bertram who supported the writing of this chapter and participants of the workshop Total.Digital at the German Youth institute in December 2019 for the input which inspired the writing of this chapter.

References

Allen, T. D., Golden, T. D., & Shockley, K. M. (2015). How effective is telecommuting? Assessing the status of our scientific findings. *Psychological Science in the Public Interest, 16*(2), 40–68.

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.

Braukmann, J., Schmitt, A., Ďuranová, L., & Ohly, S. (2017). Identifying ICT-related affective events across life domains and examining their unique relationships with employee recovery. *Journal of Business and Psychology, 33*, 1–16.

Clark, S. C. (2000). Work/family border theory: A new theory of work/family balance. *Human Relations, 53*(6), 747–770.

Crowe, R., & Middleton, C. (2012). Women, smartphones and the workplace: Pragmatic realities and performative identities. *Feminist Media Studies, 12*(4), 560–569.

David, K., Bieling, G., Bohnstedt, D., Jandt, S., Ohly, S., Rossnagel, A., … Wacker, A. (2014). Balancing the online life: Mobile usage scenarios and strategies for a new communication paradigm. *IEEE Vehicular Technology Magazine, 9*(3), 72–79.

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*(4), 473.

Demerouti, E., Derks, D., Lieke, L., & Bakker, A. B. (2014). New ways of working: Impact on working conditions, work–family balance, and well-being. In C. Korunka & P. Hoonakker (Eds.), *The impact of ICT on quality of working life* (pp. 123–141). Springer.

Ďuranová, L., & Ohly, S. (2016). *Persistent work-related technology use, recovery and well-being processes*. Springer.

Dutta, D. (2020). Mobile phones as interactive technologies mediating gendered work-life conflict: A qualitative study on women in STEM. *Sex Roles, 82*(11), 659–672.

Eagly, A., & Wood, W. (2012). Social role theory. Handbook of theories in social psychology. In P. A. M. van Lange (Ed.), *Handbook of theories in social psychology* (Vol. 2, pp. 458–476). Sage.

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.

Harding, S. (1991). *Whose science? Whose knowledge?: Thinking from women's lives.* Cornell University Press.

Harding, S. (2005). Rethinking standpoint epistemology: What is "strong objectivity?". In A. E. Cudd & R. O. Andreasen (Eds.), *Feminist theory: A philosophical anthology* (pp. 218–236). Blackwell Publishing.

Hilbrecht, M., Shaw, S. M., Johnson, L. C., & Andrey, J. (2008). 'I'm home for the kids': contradictory implications for work–life balance of teleworking mothers. *Gender, Work & Organization, 15*(5), 454–476.

Hochschild, A., & Machung, A. (1989). *The second shift: Working parents and the revolution at home. 1989.* Viking.

Lee, Y.-K., Chang, C.-T., Lin, Y., & Cheng, Z.-H. (2014). The dark side of smartphone usage: Psychological traits, compulsive behavior and technostress. *Computers in Human Behavior, 31*, 373–383.

Matusik, S. F., & Mickel, A. E. (2011). Embracing or embattled by converged mobile devices? Users' experiences with a contemporary connectivity technology. *Human Relations, 64*(8), 1001–1030.

Mazmanian, M. (2013). Avoiding the trap of constant connectivity: When congruent frames allow for heterogeneous practices. *Academy of Management Journal, 56*(5), 1225–1250.

Mazmanian, M., Orlikowski, W. J., & Yates, J. (2013). The autonomy paradox: The implications of mobile email devices for knowledge professionals. *Organization Science, 24*(5), 1337–1357.

Middleton, C. A., & Cukier, W. (2006). Is mobile email functional or dysfunctional? Two perspectives on mobile email usage. *European Journal of Information Systems, 15*(3), 252–260.

Powell, G. N., & Greenhouse, J. H. (2010). Sex, gender, and the work-to-family interface: Exploring negative and positive interdependencies. *Academy of Management Journal, 53*, 513–534.

Samtleben, C. (2019). Auch an erwerbsfreien Tagen erledigen Frauen einen Großteil der Hausarbeit und Kinderbetreuung. *DIW-Wochenbericht, 86*(10), 139–144.

Samtleben, C., Lott, Y., & Müller, K.-U. (2020). Auswirkungen der Ort-Zeit-Flexibilisierung von Erwerbsarbeit auf informelle Sorgearbeit im Zuge der Digitalisierung. In *Expertise für den Dritten Gleichstellungsbericht der Bundesregierung*. Retrieved from https://www.dritter-gleichstellungsbericht.de/de/article/204.samtlebenlottmueller.html

Selwyn, N. (2007). Hi-tech= guy-tech? An exploration of undergraduate students' gendered perceptions of information and communication technologies. *Sex Roles, 56*(7–8), 525–536.

Semmer, N., Zapf, D., & Dunckel, H. (1999). Instrument zur Stressbezogenen Tätigkeitsanalyse. In H. Dunckel (Ed.), *Handbuch psychologischer Arbeitsanalyseverfahren* (pp. 179–204). vdf Hochschulverlag an der ETH.

Seyda, S., & Flake, R. (2019). Chancengleichheit und Digitalisierung: Frauen und Männer in der digitalen Arbeitswelt. In I. d. d. W. K. e.V. (Ed.), *KOFA Studie* (Vol. 4). Köln: Kompetenzzentrum Fachkräftesicherung.

Sonnentag, S., & Frese, M. (2003). Stress in organizations. In W. C. Borman & D. R. Ilgen (Eds.), *Handbook of psychology: Industrial and organizational psychology* (Vol. 12, pp. 453–491). Wiley.

Sowon, K., Sikhwari, O., Nyemba-Mudenda, M., & Chigona, W. (2018). *Smartphone paradoxes in working mothers' pursuit of work-life balance.* Paper presented at the International Development Informatics Association Conference.

Spitzmuller, C., Glenn, D. M., Barr, C. D., Rogelberg, S. G., & Daniel, P. (2006). "If you treat me right, I reciprocate": Examining the role of exchange in organizational survey response. *Journal of Organizational Behavior, 27*, 19–35.

Stegmann, S., van Dick, R., Ullrich, J., Charalambous, J., Menzel, B., Egold, N., & Wu, T. T.-C. (2010). Der Work Design Questionnaire. *Zeitschrift für Arbeits- und Organisationspsychologie A&O, 54*(1), 1–28. https://doi.org/10.1026/0932-4089/a000002

Thompson, C. A., Beauvais, L. L., & Lyness, K. S. (1999). When work–family benefits are not enough: The influence of work–family culture on benefit utilization, organizational attachment, and work–family conflict. *Journal of Vocational Behavior, 54*(3), 392–415.

Valcour, M. (2007). Work-based resources as moderators of the relationship between work hours and satisfaction with work-family balance. *Journal of Applied Psychology, 92*(6), 1512–1523.

Technology in the Workplace: Opportunities and Challenges

Yannick Griep, Ivana Vranjes, Madelon M. L. van Hooff, Debby G. J. Beckers, and Sabine A. E. Geurts

1 Introduction

In the current economic environment, organizations have shifted toward an increasing reliance on digital technologies—including telework, automation, artificial intelligence (AI), robotics, etc.—to promote efficiency, reduce physical human effort, and create more flexibility for both employees and clients in terms of the location and the timing at which services can be provided. Very recently, technology has played a crucial role in organizational efforts to deal with the negative effects of the global COVID-19 pandemic, likely forever altering the organizational landscape. The implementation of technology in the workplace can help improve working and living conditions (e.g., Acemoglu & Restrepo, 2019; Davenport & Bean, 2017) but can also cause a great deal of anxiety and stress among employees (Chen et al., 2009; McClure, 2018). As technology continues to change the world of work, organizations need to develop ways to promote optimal employee functioning and well-being in the era of automation. In order to move beyond perceiving digitalization as a looming threat, organizations need to find ways to effectively deal with the opportunities and challenges associated with the implementation of technology.

Y. Griep (✉)
Radboud University, Nijmegen, The Netherlands

Stockholm University, Stockholm, Sweden
e-mail: y.griep@psych.ru.nl

I. Vranjes
Tilburg University, Tilburg, The Netherlands
e-mail: I.Vranjes@tilburguniversity.edu

M. M. L. van Hooff · D. G. J. Beckers · S. A. E. Geurts
Radboud University, Nijmegen, The Netherlands
e-mail: m.vanhooff@psych.ru.nl; d.beckers@psych.ru.nl; s.geurts@psych.ru.nl

C. Korunka (ed.), *Flexible Working Practices and Approaches*,
https://doi.org/10.1007/978-3-030-74128-0_6

In this chapter, we focus on three different types of technology-related changes in the workplace: (1) telework, (2) automation, and (3) algorithmic management. In the first section, we discuss how the use of technology has enabled remote and virtual work and how this type of work has gained popularity during the COVID-19 pandemic. We devote special attention to the implications of telework for performance, work-life balance, and social aspects of work. In the second section, we focus on the positive and negative sides of automation and digitalization. Specifically, we focus on the development and application of technology to deliver goods and services with minimal human intervention. These developments have resulted in improved working and living conditions but also caused a great deal of anxiety and stress among workers. In this section, we provide organizations with advice on how to promote optimal worker functioning and well-being in the era of automation. In the third and final section, we discuss an even more far-reaching application of technology, namely, the application of AI-based algorithms. We discuss how these algorithms are used to control and manage workers. We pay special attention to how workers respond to how these algorithms direct, evaluate, and discipline them at work. Overall, we discuss the potential advantages and disadvantages of these technology-related changes in work, as well as (where possible) offer suggestions and advice to organizations as to how they can successfully implement these new technologies and technology-related work arrangements. In doing so, we hope that this chapter will stimulate interesting new avenues of research for understanding challenges and opportunities associated with new technology in the workplace.

2 Telework: Implications for Work Performance, Work-Life Balance, and Social Aspects of Work

Teleworking implies that one does not work at a central worksite (office or other workplace) in the presence of other workers of the same organization. Instead, it implies using information and communication technologies (ICT, e.g., Internet, e-mail, virtual meeting tools) to enable remote and virtual work. Among office and knowledge workers, the most common way of remote and virtual work is distance working or "telework" (Allen et al., 2015). The "level" of remote or telework can vary from a couple of hours a week to full-time telework. The increased popularity of telework goes hand in hand with advances in ICT. Early telework was facilitated by telephone contact, complemented with Internet and e-mail access in the 1990s. The introduction of smartphones and virtual meeting tools not only facilitated traditional forms of telework (working from home on individual tasks) but enabled the ability to work at any place and at any time (ICT-mobile work), including group tasks via online meetings. The most extreme example of full-time distance or teleworking happened during the COVID-19 pandemic. To reduce further spread of the virus, many office workers were abruptly required to work from home, and their working life became entirely virtual and remote. While workers with children faced

the challenge of combining home-education with working from home, resulting in an overly integrated work and family life (cf. Yerkes et al., 2020), workers without a partner or children were faced with the risk of developing feelings of loneliness due to social isolation. Many researchers and institutes initiated studies to examine the psychological and occupational health consequences of this pandemic (Eurofound, 2020). Notwithstanding the insightful knowledge obtained from these studies, we mainly focus on knowledge workers who—under normal non-pandemic circumstances—work partly at a worksite and partly remotely by means of ICT applications so as to keep the knowledge in this chapter widely applicable and sustainable also beyond the COVID-19 pandemic period.

International prevalence figures (Eurofound & ILO, 2017) reveal that telework is widespread and has been on the rise in modern work society. This rise will be catalyzed even more by (1) the continuous and rapid technological advancements in the years to come and (2) as a result of the COVID-19 pandemic, during which the world of work became a *living lab* on telework in which many employers and employees were abruptly confronted with high levels of telework. Hence, it is to be expected that telework prevalence and intensity (i.e., number of remote working days) will remain substantially higher in the future world of work compared to the pre-pandemic period.

In what follows, we discuss the potential advantages and disadvantages of telework from both the company and employee perspectives, with special attention for work performance, work-life balance, and social aspects of work.

2.1 Implications of Telework

From the perspective of both the employer and employee, scholars have proposed and discussed challenges, advantages, and opportunities of telework. In the next sections, we will provide an overview of the perspectives of different stakeholders (employers, employees) on the potential implications of telework for work performance, work-life balance, and social aspects of work. We will complement these theoretical accounts with a concise description of empirical evidence, with the aim of drawing conclusions about telework within the current and future work society.

2.1.1 Work Performance

From an employer perspective, the implementation of policy aimed at stimulating telework first of all implies less costs associated with paying employees for their travel expenses. Moreover, as telework happens on a more structural basis (e.g., at any given time, only 60% of all employees works from the office), less office space is required, and accommodation costs can be reduced significantly. Finally, if employers accommodate their employees' needs and desires to work from home, this may result in more positive employer-employee relations, as well as a more

sustainable and motivated workforce (cf. person-environment fit, Edwards, 1996; Nijp et al. 2015). However, up until recently, many employers traditionally emphasized potential disadvantages of teleworking and were reluctant to implement and facilitate telework. Some employers feared that the implementation of telework would result in reduced performance either because of home-to-work interference (e.g., children disturbing work efforts at home), due to assumed loafing behavior (e.g., doing the laundry instead of focusing on work), or due to less optimal remote collaboration opportunities among coworkers (Origo & Pagani, 2008; OECD, 2016). A notorious example of a gloomy outlook on telework concerns Yahoo CEO Marissa Mayerin who shut down the company's beloved working from home policy in 2013 by stating that presence at the workplace would benefit employees' collaboration and innovativeness. A logical question arising from this duality in perspectives on telework pertains to the following: "Which perspective is most substantiated by empirical literature?".

The meta-analyses of Gajendran and Harrison (2007) and Martin and MacDonnell (2012) found small positive associations between telework and positive organizational outcomes (e.g., productivity, retention, organizational commitment, and performance). It thus appears that under the right circumstances (e.g., well-defined performance targets, availability of proper ICT to support virtual meetings and collaboration, a proper and undisturbed work location at home), the fear of reduced performance is mostly incorrect (Eurofound & ILO, 2017). Moreover, it even appears that under these circumstances, workers would put in a higher number (but more distributed throughout the workweek) of working hours compared to their counterparts who were unable to engage in telework (Eurofound & ILO, 2017).

2.1.2 Work-Life Balance

In line with the abovementioned telework literature on work performance, other prominent reasons mentioned for working from home were "to be more productive" and "to reduce commuting time" (Eurofound & ILO, 2017). Telework has been theorized to stimulate proper work-life balance (and associated well-being indicators such as worker vitality) through two mechanisms which are related to the level of worktime control—defined as an employee's autonomy over working time (Beckers et al., 2012; Nijp et al., 2012). As a first mechanism, telework or working remotely may provide workers with higher degrees of freedom regarding their working times and, in doing so, may serve as a time-regulation mechanism. Telework empowers workers to adjust working times to responsibilities in their private life (Nijp et al., 2012) and may assist in preventing time-based work-home interference (Kecklund et al., 2017). The second mechanism implies recovery regulation; telework and the associated worktime autonomy enable workers to adapt work and rest times to momentary recovery needs. In doing so, a favorable balance between effort and recovery will be promoted (Beckers et al., 2012) and accumulation of work-related fatigue, stress, and strain-based work-home interference prevented (Kecklund et al., 2017).

Meta-analytical evidence on this topic found a statistically significant but relatively weak favorable relationship between telework and work-home balance (Gajendran & Harrison, 2007; Allen et al., 2013). It is important to note that such weak or absent overall effects may mask a dichotomy between positive and negative effects of telework which could be related to (1) individual differences in preferences for telework, (2) individual differences in the way employees manage telework, and (3) the large variety in quality and quantity of telework due to differential telework policies. In what follows, we will discuss each of these aspects in more detail.

Individual Differences in Preferences for Telework

The implications of telework for employee work-life balance seem to depend on the personal preferences of workers. Here the distinction between individual integration and segmentation preferences is relevant (e.g., Kreiner, 2006). A high segmentation preference (henceforth labelled "segmentators") implies the need for a relatively rigid separation between work and private life, whereas workers with a low segmentation preference (henceforth labelled "integrators") do not mind the entanglement of work and private life domains. Consequently, integrators may have a higher tolerance or even preference for telework, flourish more when working from home is easily accessible, and may benefit more from telework in terms of work-life balance than segmentators. It thus seems that, depending on one's preference for integration or segmentation, pursuing a proper work-life balance could be a major reason to opt for telework by some workers (i.e., integrators), whereas it may be a prominent reason *not* to work from home by others (i.e., segmentators). It can moreover be expected that especially integrators run the risk of experiencing an unfavorable mismatch between their need for telework and the available access to telework (i.e., need for telework > access to telework). For segmentators on the other hand, problems may arise when telework becomes mandatory (e.g., during the COVID-19 pandemic) or more institutionalized (e.g., boundaryless career and work); both examples imply that workers are requested to work from home more often (Eurofound & ILO, 2017; Lapierre et al., 2016; Wessels et al., 2019). Considering differential preferences among workers, organizations may consider applying a flexible "tailored" telework policy in which access to telework is facilitated, but not mandatory, for all employees.

Individual Differences in the Way Employees Manage Telework

As previously mentioned, the Eurofound report (2017) found that workers who engage in telework on average tend to work more hours per week compared to their counterparts who do not engage in telework. This increase in work hours may potentially be more pronounced among employees with a very high workload, among integrators, and among those who show high work commitment, high job

engagement, and/or high conscientiousness. Although an increase in work hours seems desirable in light of (short-term) performance, it also carries the risk of blurring boundaries between work and leisure time and a disbalance between effort and recovery for those who indeed extend their working days at home. As a consequence, these workers could be exposed to the potential pitfalls of these blurring boundaries such as feeling the need to "be always on and ready to go," especially given that a workday from home has no natural end time as opposed to a traditional workday that ends at a specific time (e.g., 9–5 job). These risks are exacerbated as ICT applications continue to develop, and workers can be plugged into work 24/7 (e.g., e-mails on tablet or smartphone).

A wealth of research suggests that the combination of these long working hours and the inability to take breaks is a serious risk factor for work-home interference and fatigue (Zijlstra & Sonnentag, 2006). As a corollary, organizations should invest in proper recovery management for all workers regardless of their work location and thus also for workers engaging in telework. This could be achieved by means of, for example, well-timed breaks and prevention of long work days. Moreover, employees and employers have a shared responsibility in managing proper working times and recovery, which can be facilitated by proper and transparent organizational policy and managers who explicitly discourage working at unsocial hours, emphasize the importance of sufficient recovery time, and "lead by example."

Variety in Quality and Quantity of Telework Due to Differential Telework Policies

Traditionally, most telework was initiated by request from the employees and limited to 1 day a week. With the introduction of boundaryless work and new ways of working (NWW), the nature (quality) and level (quantity) of working from home changed: the aim to reduce accommodation and commuting costs underlying some NWW initiatives can result in mandatory telework for multiple days a week. It can be expected that after the COVID-19 pandemic, more organizations will opt for far-reaching telework policies and reduce business premises. For employees with a low need for telework (because of a segmentation preference or because of suboptimal conditions for concentrated working at home), this low autonomy over work location can have adverse effects on work-life balance, vitality, and performance (Kecklund et al., 2017). Moreover, high quantity of telework may for some benefit work-life balance and work performance but may at the same time go at the expense of face-to-face social contacts with colleagues that are generally highly valued by workers (Gajendran & Harrison, 2007). In drawing up boundaryless work policies, employers should be aware that every (well-intended) telework policy decision may result in a combination of favorable effects (for some) and unfavorable side effects (for others). Anticipating on this, properly examining employees' fears, reasons for resistance, as well as needs and prerequisites for successful telework helps to formulate flexible telework policies that accommodate the needs of the workforce as

much as reasonably possible while at the same time ensuring organizational cost reductions.

2.1.3 Social Aspects of Work

Teleworking may impact various social aspects of work. A relatively often studied outcome in this respect is workplace isolation, which refers to workers' perceptions of being isolated from the organization and their colleagues (Marshall et al., 2007). Within this construct, we can make a distinction between social isolation and professional isolation. While social isolation refers to a lack of availability of colleagues for casual interactions, camaraderie, or developing friendships, professional isolation refers to feelings of being deprived from work-based support and information from both supervisors and the organization (Marshall et al., 2007). Telework may also affect the quality of employees' relationships with their supervisor and colleagues and the level of social support they experience at work.

Social Isolation

The presumed positive association between telework and *social isolation* can be understood in light of the reduced quality and quantity of interpersonal interactions when workers engage in telework rather than work on location. The quality of interpersonal interactions can be reduced due to the absence of formal (e.g., meetings) and informal (e.g., in the coffee corner) face-to-face communication. Instead, most (if not all) interpersonal interactions are replaced by communication through ICT applications which are less "rich" in information, such as e-mail, phone, or video calls (cf. Media Richness Theory; Daft & Lengel, 1986). The quantity of interpersonal interactions can also be reduced due to, for example, the limited opportunities for spontaneous interpersonal interactions when working from home. Indeed, a poll conducted among 11,838 workers in 24 countries showed that 62% reported that telework makes workers feel socially isolated (IPSOS, 2011). Although this percentage seems to fluctuate anywhere between 32.7% and 54% in other studies (e.g., Maruyama & Tietze, 2012), it seems valid to conclude that roughly one-third of teleworkers experience social isolation. It seems plausible, however, that the extent to which workers experience social isolation depends on the intensity of their telework. That is, the risk of social isolation is arguably much lower among sporadic teleworkers (e.g., working from home 1 or 2 days a week) who have sufficient opportunities for social contact with colleagues in the office on their regular working days.

Teleworkers who experience social isolation are likely to experience a frustration of their basic psychological need for relatedness and connection to others, which in turn may put them at risk of impaired well-being (Ryan & Deci, 2001). A wealth of research has indeed demonstrated a positive relationship with psychological strain (Bentley et al., 2016 and a negative relationship with job satisfaction (Bentley, et al.,

2016) and work engagement (Russell & Cates, 2013). It is nonetheless conceivable that not all workers suffer from social isolation and its associated negative consequences, to the same extent. That is, research has demonstrated that frustration of the need for relatedness at work is associated with impaired well-being especially for those workers who attach a lot of importance to social connections at work (Van Hooff & De Pater, 2019). Moreover, teleworkers may compensate for their experiences of work-related isolation and its associated negative consequences by seeking out meaningful social interactions elsewhere. This assumption was tentatively supported in a study among a large representative sample of the economically active population in the European Union; Kamerade and Burchell (2004) found that teleworkers, compared to non-teleworkers, participated more often in both voluntary and political/trade union activities.

Professional Isolation

Compared to the percentage of teleworkers who experience social isolation, the proportion of workers experiencing *professional isolation* seems lower. In the large international study mentioned above, 56% indicated that teleworking negatively affects their chances of receiving a promotion or advancing in their career (IPSOS, 2011). Although this percentage again seems to fluctuate in other studies (24.9% reported that loss of visibility and lack of career development was a concern before starting telework, and 12.3% labeled it a current concern, Maruyama & Tietze, 2012), it seems valid to conclude that teleworkers are far less concerned about being professionally isolated. In line with this conclusion, a qualitative study (Cooper & Kurland, 2002) found that the level of professional isolation among teleworkers depends on the degree to which developmental activities (i.e., mentoring, interpersonal networking, informal learning) are valued in their organization and the extent to which teleworkers lack these opportunities when they work from home. Generally speaking, teleworkers fear that being out-of-sight will cause them to be out-of-mind, which might negatively affect their opportunities for promotions and organizational rewards (Cooper & Kurland, 2002). However, results regarding the career-related consequences of professional isolation appear mixed. Whereas one study found no association of teleworking with in-role performance and future career prospects (McCloskey & Igbaria, 2003), another study found a negative association between professional isolation and job performance (Golden et al., 2008). There are a few important commentaries to be made with respect to this latter study. First, they found that the negative association between professional isolation and job performance only holds for employees who telework extensively. Second, they found that the effect of professional isolation on job performance is mitigated by the extent to which workers engaged in face-to-face interactions with their supervisor and colleagues. Finally, they also found a positive correlation (r = .39) between teleworking and face-to-face interactions, suggesting that teleworkers may consciously put effort in face-to-face interactions with their supervisor and colleagues

in an attempt to prevent and/or mitigate the potential negative consequences of professional isolation.

Quality of Relationship with Supervisor and Colleagues and Social Support

Several scholars (and popular media) have assumed that the lower quality and quantity of social interactions experienced by teleworkers is negatively related to the quality of their social exchange relationships with supervisors and colleagues. Regarding the relationships with supervisors, meta-analytic evidence by Gajendran and Harrison (2007) found a positive, albeit small (r = .12), relationships between telework and the quality of teleworkers' relationship with their supervisor. It is however important to note that most studies included in this meta-analysis were cross-sectional in nature, making it impossible to determine the causal direction of this effect. More recently, Gajendran et al. (2015) studied the manager's perspective of the extent to which the relationship between the supervisor and his/her subordinate, who engages in telework, is characterized by loyalty, trust, and professional respect. These authors found no significant associations between both a dichotomous measure of telework (r = .12) and telework intensity (r = .11) and the quality of the supervisor-subordinate exchange relationship. Regarding the relationship with colleagues, the same meta-analytic study by Gajendran and Harrison (2007) found no significant association between telework and the quality of relationship with colleagues when telework was low in intensity (i.e., <2.5 days a week), whereas they found a negative association (r = −.19) when telework was high in intensity. However, keep in mind that the causal direction of these associations remains unknown given the cross-sectional nature of most studies included in this meta-analysis.

The literature seems to suggest that the abovementioned reduced quality of teleworkers' social exchange relationships with supervisors and colleagues results in teleworkers receiving less social support during their work. Research indeed shows a negative, albeit small (estimated beta = −.10), association between the extent to which workers engage in telework and the social support they receive from their colleagues or supervisor (Sardeshmukh et al., 2012). Exploring this in more detail, a qualitative study (Collins et al., 2016) found that full-time teleworkers generally sought social support from other teleworkers rather than from office workers. This study also showed that the social support networks of teleworkers mainly centered around people they already knew before they started teleworking, suggesting that it is important for workers to build work-related social support networks before they start teleworking.

3 Automation: A Human Approach

Automation refers to the development and application of technology in the workplace to produce and deliver goods and services with only minimal human intervention (Billings, 1991). Automation has been able to transform work from physically demanding and mundane task to cognitively complex task, allowing for improved working and living conditions (Acemoglu & Restrepo, 2019). Notwithstanding these positive advancements, automation still causes a great deal of anxiety and stress among workers (Chen et al., 2009; Korunka et al., 1996; McClure, 2018). Automation is a continuum, meaning that the degree to which an organization is automated depends on the amount of tasks that are being controlled by technology relative to those that are controlled by employees. For example, Parasuraman et al. (2000) distinguish ten levels of automation, ranging from no technology assistance at all to technology deciding on everything, acting autonomously, and ignoring the human. While the first level is associated with high workload and fatigue in employees, the highest level can lead to boredom, complacency, and erosion of competence.

As automation continues to change the world of work, organizations need to develop ways to promote optimal worker functioning and well-being in the era of automation. In what follows, we discuss three main problems associated with automation: technology apprehension, job insecurity, and perceived lack of control. Moreover, we discuss how organizations can turn these issues into challenges and work toward creating more employee acceptance of technology, more training of employees' technological skills, and more employee involvement in automation processes. In other words, organizations must move beyond perceiving automation as a looming threat to finding ways to effectively deal with the opportunities and challenges associated with the implementation of automation in the workplace.

3.1 Technology Apprehension

Implementation of new technology in the workplace can be experienced as threatening because it often goes hand in hand with numerous other changes, some of which can drastically alter the way workers conduct their work. Automation can make tasks more complex, abstract, and unpredictable, for the employees, increasing their sense of workload (Lagrange, 2001). Furthermore, workers often perceive that organizations make technology-related changes based on economic arguments, such as cost reduction, without considering the human component, such as perceived usefulness and user friendliness of the new technology (Clegg et al., 1997). It hence comes as no surprise that a significant amount of people constitute as "technophobes"—those hesitant of the quick pace of technological change and who fear unemployment and financial insecurity caused by robots, AI, and other smart technologies (McClure, 2018). Prevalence rates of technophobia are close to 50% across different samples, underlining the danger of trivializing this issue as something

affecting only a minority of older workers (Brosnan, 1998, McClure, 2018). Such apprehension toward technology and automation can have profound negative effects on workers. People with negative attitudes toward automation are not only more likely to fear unemployment and financial insecurity but also report anxiety-related mental health issues (McClure, 2018) and burnout symptoms (Salanova & Schaufeli, 2000).

Organizations need to find ways to shift workers' attitudes toward a more positive and accepting view of automation in the workplace. This is especially important because previous research has demonstrated that when positive attitudes increase, worker acceptance of, and satisfaction with, new technologies also increase (Korunka & Vitouch, 1999). Furthermore, improving worker perceptions of the usefulness of the new technology (e.g., by emphasizing how it can make certain tasks easier or more efficient) can also positively influence performance and workers' mental and physical functioning (Chen et al., 2009). However, organizations should keep in mind that a "one size fits all" approach may not work (Stich et al., 2017). Instead, organizations should assess their own particular technological needs in order to improve technology fit and reduce worker stress.

Three strategies are especially relevant in increasing worker acceptance of technological innovations. First, there needs to be a well-defined alignment between the new technology and organizations' performance objectives. An example is Amazon's chaotic storage algorithm, which assigns items to be stored based on space and availability rather than locating similar items close to one another. Consequently, workers are unable to rely on their own cognition to find items when the algorithm breaks down (Danaher, 2016). While Amazon's objective is to produce fast service to their customers, an algorithm that is illogical for workers can produce the opposite effect, slowing down the process of delivering the orders. Such misalignments between technology and the organizational objectives need to be avoided in order to increase both worker and customer satisfaction. Second, there needs to be a smooth integration of technology in the work processes (Clegg et al., 1997). When implementing new technologies, there needs to be a transition period in which workers are given time to get familiar with the new technology before an organization-wide integration takes place. Thus, instead of making rash decisions, organizations and senior management should engage in a needs analysis that accounts for both the cost and the "human" factor of technology implementation. Third, organization should shift their focus from automation as replacement of human labor to automation as *augmentation* of the work experience (Welfare et al., 2019). Managers can play a crucial role in transmitting a positive message to their workers regarding the usefulness of automating. For example, they can underline how new technology can make workers' jobs easier, more enjoyable, and more productive (Chen et al., 2009). By emphasizing ways that new technology can augment worker productivity and well-being, managers can also influence worker acceptance of and engagement with it. In doing so, senior management can increase the likelihood of successful automation and worker acceptance of automation.

3.2 Job Insecurity

Automation is bound to alter the nature and availability of jobs, resulting in an increased sense of job insecurity. For example, AI has shown to outperform human workers in complex performance tasks ranging from speech and perception to cognition and problem-solving (Jarrahi, 2018), making it progressively challenging for workers to compete with machines (Acemoglu & Restrepo, 2019). Different studies have attempted to estimate potential job loss due to automation in the near future, with some studies proposing an average of 57% of jobs being at risks (Frey et al., 2016). Although the US Council of Economic Advisers has argued that less educated individuals, working in low-wage jobs, are most at risk, other scholars (Frey & Osborne, 2017) have argued that a wide range of jobs are at risk of becoming automated. Several of these (well-paid) jobs currently require a higher-educational degree such as legal assistants (94% probability of being replaced by AI) and financial sector personnel (58% probability of being replaced by AI). When employees feel that they job is threatened, this can have profoundly negative effects on them by decreasing their mental and physical health over time (De Witte, Pienaar & De Cuyper, 2016).

This rather pessimistic view regarding automation and job loss has been contested. These scholars claim that when taking into account the adaptability of jobs and the heterogeneity of tasks within occupations, the automation risk estimation significantly drops (Arntz et al., 2017). According to Arntz et al. (2017), most jobs, including those with a high probability of automation, will adapt to the technological changes because all jobs consist of a variety of tasks, including those requiring human involvement (e.g., problem-solving and influencing). Furthermore, scholars have argued that while AI will substitute some tasks, the continued implementation of technology will also create new occupational sectors and jobs (e.g., cybersecurity) with an increasing demand for new types of skilled workers (Acemoglu & Restrepo, 2019; Ramaswamy, 2018).

In light of job insecurity associated with automation, there are several reasons why it is vital to invest in workers' technological skill development (Nokelainen et al., 2017; Pham et al., 2018). First, technological skills play an important role in affecting workers' general attitudes toward technology. Workers who possess technological skills and who are confident in their own abilities to tackle technology-related changes are likely to feel more employable. Furthermore, this can lead to more acceptance of the new technology (Beckers & Schmidt, 2001). Thus, by investing in technological skill development, organizations are not only increasing their employees' confidence but also their own organizational effectiveness in implementing technological changes in the future. Second, by investing in technological skill development, it becomes possible to recruit and retain the next generation of workers who are motivated to use new technology in the workplace (Welfare et al., 2019). Such approach may be the key to winning the new "digital war for talent," in which workers are increasingly looking to work for companies that allow them to develop and demonstrate skills needed to succeed in the digital world (Kane

et al., 2017). Third, research so far has shown that the negative effect of technology implementation on workers' well-being and functioning can be mitigated by enhancing workers' technological skills (Korunka & Vitouch, 1999). So investing in employees' technological skills can help counter negative effects of perceived insecurity caused by automation. In sum, by investing in technological skill development, organizations can decrease their employees' sense of insecurity and by doing so can improve their workers' well-being and the overall effectiveness of their organization.

3.3 Perceived Lack of Control

At the highest level of automation, technology decides on everything, acting autonomously without human input (Parasuraman et al., 2000). This can be problematic for several reasons, such as increased employee boredom and complacency (Parasuraman et al., 2000). Moreover, perceived lack of control associated with technology can result in higher levels of employees' stress (Kolb & Aiello, 1996). When asked about their involvement in the development of new technological systems, workers often report to have no control over the implemented changes and no ways of voicing their opinions and concerns (Clegg et al., 1997). This in turn can result in unsuccessful implementation of new technology (Clegg et al., 1997), as well as to increased perceptions of job insecurity among workers (McClure, 2018). For instance, Uber's algorithmic recommendation system that did not allow Uber drivers to see the passenger's destination and thus estimate profitability before accepting the ride (Rosenblat & Stark, 2016) created frustrations among drivers that could have been resolved by allowing for driver input and feedback when implementing these systems.

Consequently, many authors recognize the importance of getting workers involved in technological changes (Clegg et al., 1997; Welfare et al., 2019) in order to increase workers' perceived control for two main reasons. First, perceived control is an important resource that contributes to workers' adjustment to automation-induced changes. Research has consistently demonstrated beneficial effects of perceived control for individuals facing threat (Thompson et al., 1993). Accordingly, worker participation in, and control over, automation-related changes has been shown to benefit technology implementation in the workplace (Clegg et al., 1997; Korunka & Vitouch, 1999). Second, worker participation in technology-related changes can increase the perceived utility of such changes. That is, because managers and workers may differ in their perceptions of appropriateness and desirability of automation-related changes, a participatory approach ensures alignment between different views. In sum, in order to overcome one of the major stressors associated with automation, which is employees' lack of control, it is important to increase employee participation in designing and choosing automation systems.

4 Artificial Intelligence: Algorithmic Management

AI systems increasingly take over decisions, previously made by humans, related to people management. This is referred to as algorithmic management. Although the literature seems to suggest that AI is to augment, rather than replace, humans in the workplace (Danaher, 2016; Davenport & Bean, 2017), this does not necessarily mean that people are eager to accept algorithmic management to control aspects of their work. Employers can use algorithmic management to establish control over employees through three mechanisms (see Kellogg et al., 2020): *direction* (i.e., which tasks need be performed, in what order and time period, and with what degree of accuracy), *evaluation* (i.e., correct mistakes, assess performance, and identify those who are not performing adequately), and *discipline* (i.e., punishment and reward so as to elicit cooperation and enforce compliance). In this section, we will discuss how AI and algorithmic management are used to (1) direct workers by restricting and recommending work, (2) evaluate workers by recording and rating, and (3) discipline workers by replacing and rewarding. For each section, we will also provide a brief overview of worker reactions to the use of algorithmic management.

4.1 Algorithmic Direction

Employers may rely on algorithmic management to restrict work and to nudge their workers to prioritize certain decisions or tasks over others (Kellogg, 2018). For example, volunteers working for "Crisis Text Line" were prompted to prioritize messages containing the word "ibuprofen" rather than messages containing the word "suicide" because their machine-learning algorithm detected that the term "ibuprofen" was 16 times more likely to predict the need for emergency aid than the word "suicide" (Gupta, 2018). As another example, several public transport platforms (e.g., Uber, Lyft) collect real-time driver data (e.g., speeding, braking patterns, customer feedback) to decide when to recommend their drivers to rest (Rosenblat & Stark, 2016; Scheiber, 2017). In contrast, restricting work implies that workers are only provided with certain information and are only allowed to display certain behaviors. For example, certain companies rely on algorithmic management to monitor electronic communication and remind their workers not to engage in nonwork-related communication when words such as "social media," "Skype," or "phone" were used (Jarrahi et al., 2020).

While organizations hope to increase the accuracy and objectivity of decisions, these forms of algorithmic management may negatively affect workers in numerous ways. First, workers might feel frustrated when AI recommendations are not intelligible to them. An example is the abovementioned chaotic and illogical storage algorithm used by Amazon, with the result that workers are unable to rely on their own cognition to find items when the algorithm breaks down (Danaher, 2016).

Similarly, workers in the legal system resented the nontransparency of predictive algorithms (e.g., risk assessment tools used to predict recidivism rates or to identify high-risk individuals and places) because they found these systems to be unintelligible and societally and racially biased (Angwin et al., 2016; Brayne, 2017; Christin, 2017). Second, employees report a reduced welfare and well-being. For example, several public transport (e.g., Uber, Lyft) and food delivery (e.g., Deliveroo, Doordash) platforms have built features into their services that do not allow drivers to see where a passenger or order is going before accepting a task (Leicht-Deobald et al., 2019; Rosenblat & Stark, 2016). As a consequence, they may experience a lack of control over their job, with well-documented consequential mental and physical health complaints (e.g., Michie & Williams, 2003). Moreover, some jobs have been broken down into discrete or "micro" tasks. For example, people working for food delivery platforms often have unpredictable shifts, have little to no information about delivery orders, and are no longer considered workers of the platform but instead are independent contractors. As a consequence, they may feel manipulation and alienated from work (Beunza, 2019).

4.2 Algorithmic Evaluation

Employers obtain desired behavior from workers not only through direction but also through evaluation of their work. Algorithmic recording and rating entails the use of AI to monitor, quantify, compare, and evaluate work output (Kellogg et al., 2020). For example, Klick Health (a Canadian healthcare consulting firm) and IKEA used machine learning to calculate the average time it took employees to complete a variety of tasks, to reduce behaviors that may hamper worker flow and productivity, and even to stop investing time in customers when the costs of continued interaction are higher than the potential benefits (Segal et al., 2014). The use of AI for recording purposes has moreover led to new ways of employee surveillance. For example, in the public transport (e.g., Uber, Lyft) and delivery (e.g., UPS, DHL) industry, organizations have relied on data provided by smartphone application to monitor a wide range of timekeeping and performance data (e.g., fuel efficiency, speed, braking, and acceleration patterns) which in turn are used to manage their drivers and customers (Davidson, 2016; Levy, 2015; Rosenblat & Stark, 2016). Once employers have recorded the performance of their workers, they can use AI to rate their work. Managers often use computational technologies to measure employees' performance, as well as to predict levels of their future performance. That is, most online marketplaces (Amazon, Craigslist, eBay, Uber, Lyft, Airbnb, Tripadvisor; Rahman, 2018; Rosenblat, 2018; Jhaver et al., 2018), online health providers and communities (Barrett et al., 2016), and hospitality industry (Orlikowski & Scott, 2014) rely on user-generated systems to rate their workers' work, skills, personality, and objective compliance with budgets and deadlines. Moreover, some consulting and financial firms use algorithmic systems to identify "high-flight risk" individuals who are likely to leave the company in the near future. This information can then be used to

restrict access to information and tasks (King, 2016). In sum, algorithms can be used to both record and rate one's performance; the information and ranking resulting from this aspect of algorithmic management can then be used to influence the type of work or tasks one is allowed to do.

Algorithmic recording and rating may trigger feelings of constant surveillance, which in turn can lead workers to police their own, and others', behavior to ensure compliance with organizational expectations (Ahmed et al., 2016; Bailey et al., 2019). Moreover, workers may experience a loss of privacy (Rosenblat & Stark, 2016). For example, organizations have been documented to have used AI to record workers' overall aptitude in various skills and settings, their physical and mental health, their reproductive plans, and their food intake, with the goal of promoting and rewarding healthy behavior (Bock, 2015; O'Connor, 2015). The use of AI for these purposes has been demonstrated to have negative effects on workers' job satisfaction, affective commitment, feelings of self-efficacy and perceived control (Jeske, & Santuzzi, 2015), and beliefs that they are unseen and unnoticed by management (Anteby & Chan, 2018). Moreover, workers have also expressed data accuracy concerns, a lack of transparency about the nature and purpose of the collected data, and the inability to appeal judgments based on incorrect, biased, or incomplete data (Angwin et al., 2016; Bodie et al., 2017; Levy & Barocas, 2017; Rosenblat & Stark, 2016). Finally, algorithmic recording and rating have become essential reputational assets for workers. That is, employers and customers tend to select workers (e.g., which online supplier to use to buy clothes, rent a vacation home, drive to work with) primarily based on ratings from previous customers without having a face-to-face interaction with the supplier; good prior ratings will increase the likelihood of future employment, while poor prior ratings reduce the likelihood of future employment (Chan & Wang, 2018). In sum, it seems that most employees feel as if they are under constant surveillance, akin to experience at least some concerns about the data that is being collected and their associated privacy.

4.3 Algorithmic Discipline

Finally, employers may obtain desired behavior from their workers through reward or punishment. Algorithmic rewarding entails using AI to interactively and dynamically reward high-performing and compliant workers with more opportunities, higher pay, more flexibility, and promotions (Kellogg et al., 2020). A wide range of companies such as Nike, Google, Microsoft, Amazon, Samsung, and Disney have relied on the process of gamification to embed games in their day-to-day business processes (Kim, 2018) when using game-based elements—such as virtual points, badges, scoreboards, and currency—with the intent of advancing employer goals and desired action (Liu et al., 2018). Although the great majority of these "rewards" are small or modest in nature, a small percentage of these rewards are quite substantial. In setting up such reward systems, organizations ensure that workers stay enticed by the gamified reward process and the (very small) likelihood of obtaining

a large reward (Lehdonvirta, 2018). In contrast to rewarding workers, algorithmic replacing entails rapidly or even automatically firing underperforming workers and replacing them with substitute workers who can be recruited at a much faster pace and at a fraction of the normal cost (Kellogg et al., 2020). There are two important parts to this statement. First, organizations can use AI to automatically kick workers off their platform when they do not comply with managerial directives (e.g., Uber can ban drivers from their platform with a low average passenger rating and acceptance rate; Rosenblat & Stark, 2016). Second, organizations can recruit new workers on a greater scale and in a fraction of the time and cost recruiting used to take (Valentine et al., 2017). For example, rather than relying on traditional recruitment methods, organizations can built AI predictive analysis into hiring (e.g., Equifax) and social networking (e.g., LinkedIn) platforms so that algorithms could automatically process and sort applicants based on search criteria (MacKenzie, 2019).

Algorithmic rewarding and replacing may result in greater insecurity for less skilled workers. That is, many less skilled workers fear that their work will be outsourced or that they will be replaced by freelancers on an on-demand basis (Aneesh, 2009; Valentine et al., 2017). Algorithmic rewarding can also create greater experiences of frustration and stress for two main reasons: the nontransparency of the rewarding system and the rapid responsiveness of the rewards. That is, workers have expressed suspicion and frustration about what they were rated on and how these ratings were used in determining their rewards (Rahman, 2018). In addition, when employer payment algorithms changed wages (Lee et al., 2015; Shapiro, 2018), workers often did not know why they were experiencing these pay-related changes and had limited recourse to find out (Raval & Dourish, 2016).

4.4 Algorithmic Management Going Forward

Algorithmic management might sound like the future, but it has an uncanny resemblance to the principles of scientific management by Taylor; modern-day employees are placed under scrutiny and control to the same extent than factory workers were scrutinized and maximized for profit. The only difference is that the foreman is replaced by an algorithm. As Kellogg et al. (2020) argue, algorithmic control has become the new contested terrain of control, and employers use algorithmic management as a major force to reconfigure employer-employee relations within and across organizations. In this view, employers implement new production technologies and control mechanisms (such as the ones we explained above) with the objective of maximizing the value and profit generated from employees' labor (Smith, 2006). In response, employees resist and defend their humanity in the face of being reduced to a number through tighter employer control. In sum, although we have come a long way since Taylor's *The Principles of Scientific Management* (1911), we should treat with caution when embracing algorithmic management or give up a century of progress with respect to labor policies and laws.

5 Conclusion

The goal of this chapter is to help scholars to better understand potential advantages and disadvantages of (1) telework, (2) automation in the workplace, and (3) algorithmic management. In addition, where possible, we offer suggestions and advice to organizations as to how they can successfully implement these new technologies; this is especially relevant for the section on algorithmic management given the widespread negative employee reactions. In what follows, we will provide some concluding thoughts on each of these different types of new technology in the workplace.

First, with respect to *telework*, it appears that a substantial proportion of workers experience negative social consequences of teleworking in terms of social and/or professional isolation. However, given that the negative consequences of telework seem to be more profound as the degree of telework intensifies, it is advisable to take into account the intensity of telework (e.g., 1 day of telework a week versus full-time telework) when developing a teleworking policy and examining its social consequences. It is moreover important to keep in mind that teleworking may also have positive social consequences, in that teleworkers report a higher quality of relationship with their supervisors and are more likely to engage in voluntary and political/trade union activities. Altogether, it seems that we can conclude that telework has the potential to benefit performance, work-life balance, and social aspects of work when telework is aligned with personal preferences and does not coincide with suboptimal recovery management or social isolation associated with a very high intensity of telework. In this respect, managers can play an important role in implementing a favorable and sustainable policy on work location flexibility (i.e., telework). The Results-Only Work Environment (ROWE) intervention literature (e.g., Kelly et al., 2011) pays attention to both the content and the implementation of teleworking policies. In a nutshell, ROWE attempts to change the organizational culture, via team-level training sessions and buy-in from managers, with the objective of creating a teleworking policy that is based on shared positive perceptions about telework.

Second, with respect to *automation in the workplace*, it is important to acknowledge that managers should not overlook the human aspect of implementing new technology. That is, when making the decision to automate, organizations should ideally assess their workers' needs to ensure an optimal fit between the implemented technology and their workers' requirements, as well as to improve the long-term well-being of their workers. They should clearly communicate automation-related changes, including (1) the reason for implementing new technology, (2) the anticipated benefits and challenges this will bring about, (3) the resources that will be provided to workers to adjust to the changes, and (4) changing job expectations as a result of the implemented automation-related changes.

Finally, with respect to *algorithmic management*, it appears that workers generally respond rather negatively to the use of algorithmic management in the workplace (see our detailed overview above under Sects. 6.4.1, 6.4.2, 6.4.3, and 6.4.4).

Hence, we deem it especially important to provide suggestions and advice to organizations as to how they can successfully implement these new technologies. As with many areas in which technology is implemented in the workplace, the use of algorithmic management raises questions about how fair or justified workers perceive these decisions. This is especially important, given that the use of algorithmic management may have significant impact on whether workers have positive or negative experiences at work. Generally, if workers believe organizational decision-making to be fair, they are more likely to accept the decision, remain satisfied in their jobs, and even increase their level of effort (Lind, 2001). However, if workers perceive reduced organizational justice as a consequence of algorithmic management, they may experience reduced effort, lower job satisfaction, lower organizational commitment, and higher likelihood of turnover (Lind, 2001). More specifically, the literature suggests that workers seek a "human touch" and resent "being reduced to a percentage" when algorithms are responsible for decisions impacting them (Binns et al. 2018). It is therefore of crucial importance to ensure that workers believe that they are treated with dignity and respect although they are being managed by an algorithm; these feelings could be fostered by, for example, designing the algorithmic management system in such a way that it can demonstrate sensitivity and empathy and adequately explain a decision (e.g., developing an avatar).

With this chapter we hope to have contributed to designing, introducing, and implementing telework, automation, and algorithmic management at work in a human-friendly manner and protecting and optimizing quality of work, work-life balance, performance capabilities, and sustainable employability of workers.

References

Acemoglu, D., & Restrepo, P. (2019). Artificial intelligence, automation and work. In A. Agarwal, A. Goldfarb, & J. Gans (Eds.), *The economics of artificial intelligence*. University of Chicago Press.

Ahmed, S. I., Bidwell, N. J., Zade, H., Muralidhar, S. H., Dhareshwar, A., Karachiwala, B., Tandong, C. N., & O'Neill, J. (2016). *Peer-to-peer in the workplace: A view from the road.* Paper presented at the Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems.

Allen, T. D., Golden, T. D., & Shokley, K. M. (2015). How effective is telecommuting? Assessing the status of our scientific findings. *Psychological Science in the Public Interest, 16*(2), 40–68.

Allen, T. D., Johnson, R. C., Kiburz, K. M., & Shockley, K. M. (2013). Work–family conflict and flexible work arrangements: Deconstructing flexibility. *Personnel Psychology, 66*(2), 345–376.

Aneesh, A. (2009). Global labor: Algocratic modes of organization. *Sociological Theory, 27*(4), 347–370.

Angwin, J., Larson, J., Mattu, S., & Kirchner, L. (2016). Machine bias: There's software used across the country to predict future criminals. And it's biased against blacks. *ProPublica,* 23, May.

Anteby, M., & Chan, C. K. (2018). A self-fulfilling cycle of coercive surveillance: Workers' invisibility practices and managerial justification. *Organization Science, 29*(2), 247–263.

Arntz, M., Gregory, T., & Zierahn, U. (2017). Revisiting the risk of automation. *Economics Letters, 159*, 157–160.

Bailey, D., Erickson, I., Silbey, S., & Teasley, S. (2019). *Emerging audit cultures: Data, analytics, and rising quantification in professors' work*. Paper presented at the Academy of Management. Boston

Barrett, M., Oborn, E., & Orlikowski, W. (2016). Creating value in online communities: The sociomaterial configuring of strategy, platform, and stakeholder engagement. *Information Systems Research, 27*(4), 704–723.

Beckers, D. G. J., Kompier, M. A. J., Kecklund, G., & Härmä, M. (2012). Worktime control: theoretical conceptualization, current empirical knowledge, and research agenda. *Scandinavian Journal of Work, Environment & Health, 38*(*4*), 291–297.

Beckers, J. J., & Schmidt, H. G. (2001). The structure of computer anxiety: A six-factor model. *Computers in Human Behavior, 17*(1), 35–49.

Bentley, T. A., Teo, S. T. T., McLeod, L., Tan, F., Bosua, R., & Gloet, M. (2016). The role of organisational support in teleworker wellbeing: A socio-technical systems approach. *Applied Ergonomics, 52*, 207–215.

Beunza, D. (2019). *Taking the floor: Models, morals, and management in a wall street trading room*. Princeton University Press.

Billings, C. E. (1991). *Human-centered aircraft automation: A concept and guidelines (NASATM-103885)*. National Aeronautics and Space Administration Ames Research Center.

Binns, R., Van Kleek, M., Veale, M., Lyngs, U., Zhao, J., & Shadbolt, N. (2018). *It's reducing a human being to a percentage' perceptions of justice in algorithmic decisions*. Paper presented at the 2018 Chi conference on human factors in computing systems.

Bock, L. (2015). *Work rules!: Insights from inside Google that will transform how you live and lead*. Grand Central Publishing.

Bodie, M. T., Cherry, M. A., McCormick, M. L., & Tang, J. (2017). The law and policy of people analytics. *University of Colorado Law Review, 88*(1), 961–1042.

Brayne, S. (2017). Big data surveillance: The case of policing. *American Sociological Review, 82*(5), 977–1008.

Brosnan, M. J. (1998). The impact of computer anxiety and self-efficacy upon performance. *Journal of Computer Assisted Learning, 14*(3), 223–234.

Chan, J., & Wang, J. (2018). Hiring preferences in online labor markets: Evidence of a female hiring bias. *Management Science, 64*(7), 2973–2994.

Chen, S., Westman, M., & Eden, D. (2009). Impact of enhanced resources on anticipatory stress and adjustment to new information technology: A field-experimental test of conservation of resources theory. *Journal of Occupational Health Psychology, 14*(3), 219–230.

Christin, A. (2017). Algorithms in practice: Comparing web journalism and criminal justice. *Big Data & Society, 4*(2), 1–14.

Clegg, C., Axtell, C., Damodaran, L., Farbey, B., Hull, R., Lloyd-Jones, R., … Tomlinson, C. (1997). Information technology: A study of performance and the role of human and organizational factors. *Ergonomics, 40*(9), 851–871.

Collins, A. M., Hislop, D., & Cartwright, S. (2016). Social support in the workplace between teleworkers, office-based colleagues and supervisors. *New Technology, Work and Employment, 31*(2), 161–175.

Cooper, C. D., & Kurland, N. B. (2002). Telecommuting, professional isolation, and employee development in public and private organizations. *Journal of Organizational Behavior, 23*(4), 511–532.

Daft, R. L., & Lengel, R. H. (1986). Organizational information requirements, media richness and structural design. *Management Science, 32*(5), 554–571.

Danaher, J. (2016). The threat of algocracy: Reality, resistance and accommodation. *Philosophy & Technology, 29*(3), 245–268.

Davenport, T. & Bean, R. (2017). *Big data executive survey 2017*. Executive summary of findings. NewVantage Partners.

Davidson, A. (2016). Planet money. In J. Goldstein (Ed.), *The future of work looks like a UPS truck*. National Public Radio. Available at https://www.npr.org/sections/money/2014/05/02/308640135/episode-536-the-future-of-work-looks-like-a-ups-truck

De Witte, H., Pienaar, J., & De Cuyper, N. (2016). Review of 30 years of longitudinal studies on the association between job insecurity and health and well-being: Is there causal evidence? *Australian Psychologist, 51*(1), 18–31.

Edwards, J. R. (1996). An examination of competing versions of the person-environment fit approach to stress. *Academy of Management Journal, 39*(2), 292–339.

Eurofound. (2020). *Living, Working and COVID-19 First Findings* – April 2020 [Internet]. Dublin; 2020. Available from: https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef20058en.pdf

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

Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerisation? *Technological Forecasting and Social Change, 114*, 254–280.

Frey, C. B., Osborne, M., Holmes, C., Rahbari, E., Garlick, R., Friedlander, G., … Chalif, P. (2016). *Technology at work v2. 0: The future is not what it used to be*. CityGroup and University of Oxford.

Gajendran, R. S., & Harrison, D. A. (2007). The good, the bad, and the unknown about telecommuting: Meta-analysis of psychological mediators and individual consequences. *Journal of Applied Psychology, 92*(6), 1524–1541.

Gajendran, R. S., Harrison, D. A., & Delaney-Klinger, K. (2015). Are telecommuters remotely good citizens? Unpacking telecommuting's effects on performance via i-deals and job resources. *Personnel Psychology, 68*(2), 353–393.

Golden, T. D., Veiga, J. F., & Dino, R. N. (2008). The impact of professional isolation on teleworker job performance and turnover intentions: Does time spent teleworking, interacting face-to-face, or having access to communication-enhancing technology matter? *Journal of Applied Psychology, 93*(6), 1412–1421.

Gupta, A. (2018). *Detecting crisis: An AI solution, crisis text line blog* (Vol. 2019).

IPSOS. (2011). *The world of work: Global study of online employees shows one in five (17%) work from elsewhere*. Retrieved from: https://www.ipsos.com/en-us/world-work-global-study-online-employees-shows-one-five-17-work-elsewhere

Jarrahi, M. H. (2018). Artificial intelligence and the future of work: Human-AI symbiosis in organizational decision making. *Business Horizons, 61*(4), 577–586.

Jarrahi, M. H., Sutherland, W., Nelson, S., & Sawyer, S. (2020). Platformic management, boundary resources, and worker autonomy in gig work. *Computer Supported Cooperative Work, 29*, 153–189.

Jeske, D., & Santuzzi, A. M. (2015). Monitoring what and how: Psychological implications of electronic performance monitoring. *New Technology, Work and Employment, 30*(1), 62–78.

Jhaver, S., Karpfen, Y., & Antin, J. (2018). *Algorithmic anxiety and coping strategies of Airbnb hosts.* Paper presented at the Proceedings of the 2018 CHI conference on human factors in computing systems

Kamerade, D., & Burchell, B. (2004). Teleworking and participatory capital: Is teleworking an isolating or a community-friendly form of work? *European Sociological Review, 20*(4), 345–361.

Kane, G. C., Palmer, D., Phillips, A. N., & Kiron, D. (2017). Winning the digital war for talent. *MIT Sloan Management Review, 58*(2), 17–19.

Kecklund, G., Beckers, D. G. J., Tucker, P. T., & Leineweber, C. (2017). How does work fit with my life? The relation between flexible work arrangements, work-life balance and recovery from work. In N. Chmiel, F. Fraccaroli, & M. Sverke (Eds.), *An introduction to work and organizational psychology: An international perspective* (pp. 430–447). Blackwell Publishing.

Kellogg, K. (2018). *Employment recontracting for mutually beneficial role realignment around a new technology in a professional organization.* Paper presented at the Oxford Professional Services Conference. Oxford.

Kellogg, K. C., Valentine, M. A., & Christin, A. (2020). Algorithms at work: The new contested terrain of control. *Academy of Management Annals, 14*(1), 366–410.

Kelly, E. L., Moen, P., & Tranby, E. (2011). Changing workplaces to reduce work-family conflict: Schedule control in a white-collar organization. *American Sociological Review, 76*(2), 265–290.

Kim, T. W. (2018). Gamification of labor and the charge of exploitation. *Journal of Business Ethics, 152*(1), 27–39.

King, K. G. (2016). Data analytics in human resources: A case study and critical review. *Human Resource Development Review, 15*(4), 487–495.

Kolb, K. J., & Aiello, J. R. (1996). The effects of electronic performance monitoring on stress: Locus of control as a moderator variable. *Computers in Human Behavior, 12*(3), 407–423.

Korunka, C., & Vitouch, O. (1999). Effects of the implementation of information technology on employees' strain and job satisfaction: A context-dependent approach. *Work & Stress, 13*(4), 341–363.

Korunka, C., Huemer, K. H., Litschauer, B., Karetta, B., & Kafka-Lützow, A. (1996). Working with new technologies: Hormone excretion as an indicator for sustained arousal. A pilot study. *Biological Psychology, 42*(3), 439–452.

Kreiner. (2006). Consequences of work-home segmentation or integration: A person-environment fit perspective. *Journal of Organizational Behavior, 27*(4), 485–507.

Lagrange, V. (2001). *An ergonomic perspective on automation* (pp. 396–399). Institute of Electrical and Electronics Engineers International Workshop on Robot and Human Interactive Communication.

Lapierre, L. M., Van Steenbergen, E. F., Peeters, M. C. W., & Kluwer, E. S. (2016). Juggling work and family responsibilities when involuntarily working more from home: A multiwave study of financial sales professionals. *Journal of Organizational Behavior, 37*(6), 804–822.

Lee, M. K., Kusbit, D., Metsky, E., & Dabbish, L. (2015). *Working with machines: The impact of algorithmic and data-driven management on human workers.* Paper presented at the Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems.

Lehdonvirta, V. (2018). Flexibility in the gig economy: Managing time on three online piecework platforms. *New Technology, Work and Employment, 33*(1), 13–29.

Leicht-Deobald, U., Busch, T., Schank, C., Weibel, A., Schafheitle, S., Wildhaber, I., & Kasper, G. (2019). The challenges of algorithm-based HR decision-making for personal integrity. *Journal of Business Ethics, 160*(2), 1–16.

Levy, K. E. (2015). The contexts of control: Information, power, and truck-driving work. *The Information Society, 31*(2), 160–174.

Levy, K., & Barocas, S. (2017). Designing against discrimination in online markets. *Berkeley Technology Law Journal, 32*, 1183.

Lind, E. A. (2001). Fairness heuristic theory: Justice judgments as pivotal cognitions in organizational relations. In J. Greenberg & R. Cropanzano (Eds.), *Advances in organizational justice* (pp. 56–88). Stanford University Press.

Liu, M., Huang, Y., & Zhang, D. (2018). Gamification's impact on manufacturing: Enhancing job motivation, satisfaction and operational performance with smartphone-based gamified job design. *Human Factors and Ergonomics in Manufacturing & Service Industries, 28*(1), 38–51.

MacKenzie, D. (2019). How algorithms interact: Goffman's 'interaction order' in automated trading. *Theory, Culture & Society, 36*(2), 39–59.

Marshall, G. W., Michaels, C. E., & Mulki, J. P. (2007). Workplace isolation: Exploring the construct and its measurement. *Psychology & Marketing, 24*(3), 195–223.

Martin, B. H., & MacDonnell, R. (2012). Is telework effective for organizations?. A meta-analysis of empirical research on perceptions of telework and organizational outcomes. *Management Research Review, 35*(7), 602–616.

Maruyama, T., & Tietze, S. (2012). From anxiety to assurance: Concerns and outcomes of telework. *Personnel Review, 41*(4), 450–469.

McCloskey, D. W., & Igbaria, M. (2003). Does "out of sight" mean "out of mind"? An empirical investigation of the career advancement prospects of telecommuters. *Information Resources Management Journal, 16*(2), 19–34.

McClure, P. K. (2018). "You're fired," says the robot: The rise of automation in the workplace, technophobes, and fears of unemployment. *Social Science Computer Review, 36*(2), 139–156.

Michie, S., & Williams, S. (2003). Reducing work related psychological ill health and sickness absence: a systematic literature review. *Occupational and Environmental Medicine, 60*(1), 3–9.

Nijp, H. H., Beckers, D. G. J., Kompier, M. A. J., Van den Bossche, S. N., & Geurts, S. A. E. (2015). Worktime control access, need and use in relation to work–home interference, fatigue, and job motivation. *Scandinavian Journal of Work, Environment & Health, 41*(*4*), 347–355.

Nijp, H. H., Beckers, D. G. J., Geurts, S. A. E., Tucker, P., & Kompier, M. A. J. (2012). Systematic review on the association between worktime control and work-non-work balance, health and well-being, and job-related outcomes. *Scandinavian Journal of Work, Environment & Health, 38*(4), 299–313.

Nokelainen, P., Nevalainen, T., & Niemi, K. (2017). Mind or machine? Opportunities and limits of automation. In C. Harteis (Ed.), *The impact of digitalization in the workplace – An educational view* (pp. 13–24). Springer International Publishing AG.

O'Connor, S. (2015). Wearables at work: The new frontier of employee surveillance. *Financial Times, 8*.

OECD. (2016). *Be flexible! Background brief on how workplace flexibility can help European employees to balance work and family*. European Union.

Origo, F., & Pagani, L. (2008). Workplace flexibility and job satisfaction: Some evidence from Europe. *International Journal of Manpower, 29*(*6*), 539–566.

Orlikowski, W. J., & Scott, S. V. (2014). What happens when evaluation goes online? Exploring apparatuses of valuation in the travel sector. *Organization Science, 25*(3), 868–891.

Parasuraman, R., Sheridan, T. B., & Wickens, C. D. (2000). A model for types and levels of human interaction with automation. *IEEE Transactions on Systems, Man, and Cybernetics – Part A: Systems and Humans, 30*(3), 286–297.

Pham, Q. C., Madhavan, R., Righetti, L., Smart, W., & Chatila, R. (2018). The impact of robotics and automation on working conditions and employment. *IEEE Robotics & Automation Magazine, 25*(2), 126–128.

Rahman, H. A. (2018). *Reputational ploys: Reputation and ratings in online markets*. Paper presented at the Academy of Management Proceedings.

Ramaswamy, K. V. (2018). *Technological change, automation and employment: A short review of theory and evidence*. Indira Gandhi Institute of Development Research.

Raval, N., & Dourish, P. (2016). *Standing out from the crowd: Emotional labor, body labor, and temporal labor in ridesharing*. Paper presented at the Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing

Rosenblat, A. (2018). *Uberland: How algorithms are rewriting the rules of work*. University of California Press.

Rosenblat, A., & Stark, L. (2016). Algorithmic labor and information asymmetries: A case study of Uber's drivers. *International Journal of Communication, 10*, 3758–3784.

Russell, D., & Cates, S. V. (2013). The dark side of working in a virtual world: An investigation of the relationship between workplace isolation and engagement among teleworkers. *Journal of Human Resource and Sustainability Studies, 1*(2), 9–13.

Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology, 52*(1), 141–166.

Salanova, M., & Schaufeli, W. B. (2000). Exposure to information technology and its relation to burnout. *Behaviour & Information Technology, 19*(5), 385–392.

Sardeshmukh, S. R., Sharma, D., & Golden, T. D. (2012). Impact of telework on exhaustion and job engagement: A job demands and job resources model. *New Technology, Work and Employment, 27*(3), 193–207.

Scheiber, N. (2017). How Uber uses psychological tricks to push its drivers' buttons. *The New York Times, 2*.

Segal, L., Goldstein, A., Goldman, J., & Harfoush, R. (2014). *The decoded company: Know your talent better than you know your customers*. Penguin.

Shapiro, A. (2018). Between autonomy and control: Strategies of arbitrage in the "on-demand" economy. *New Media & Society, 20*(8), 2954–2971.

Smith, C. (2006). The double indeterminacy of labour power: labour effort and labour mobility. *Work, Employment and Society, 20*(2), 389–402.

Stich, J. F., Tarafdar, M., Cooper, C. L., & Stacey, P. (2017). Workplace stress from actual and desired computer-mediated communication use: A multi-method study. *New Technology, Work and Employment, 32*(1), 84–100.

Taylor, F. W. (1911). *Scientific management*. Harper & Brothers Publishers.

Thompson, S. C., Sobolew-Shubin, A., Galbraith, M. E., Schwankovsky, L., & Cruzen, D. (1993). Maintaining perceptions of control: Finding perceived control in low-control circumstances. *Journal of Personality and Social Psychology, 64*(2), 293–304.

Valentine, M. A., Retelny, D., To, A., Rahmati, N., Doshi, T., & Bernstein, M. S. (2017). *Flash organizations: Crowdsourcing complex work by structuring crowds as organizations.* Paper presented at the Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems.

van Hooff, M. L., & De Pater, I. E. (2019). Daily associations between basic psychological need satisfaction and well-being at work: The moderating role of need strength. *Journal of Occupational and Organizational Psychology, 92*(4), 1027–1035.

Welfare, K. S., Hallowell, M. R., Shah, J. A., & Riek, L. D. (2019). *Consider the human work experience when integrating robotics in the workplace.* Paper presented at the 14th ACM/IEEE International Conference on Human-Robot Interaction. Daegu, Korea.

Wessels, C., Schippers, M., Stegmann, S., Bakker, A. B., Van Baalen, P. J., & Proper, K. (2019). Fostering flexibility in the new world of work: A model of time-spatial job crafting. *Frontiers in Psychology, 10*, 505.

Yerkes, M. A., Andre, S. C. H., Besamusca, J. W., Kruyen, P. M., Remery, C. L. H. S., van der Zwan, R., Beckers, D. G. J., & Geurts, S. A. E. (2020). 'Intelligent' lockdown, intelligent effects? Results from a survey on gender (in)equality in paid work, the division of childcare and household work, and quality of life among parents in the Netherlands during the Covid-19 lockdown. *PLoS One, 15*(11). https://doi.org/10.1371/journal.pone.0242249

Zijlstra, F. R., & Sonnentag, S. (2006). After work is done: Psychological perspectives on recovery from work. *European Journal of Work and Organizational Psychology, 15*(2), 129–138.

Mobile Multilocational Work: Benefits and Drawbacks

Matti Vartiainen

1 Introduction

The distribution and mobilization of work activities have dramatically increased in organizations' value chains over the last two decades and will continue to do so as organizations seek to adapt to the pandemic-related changes in their ways of working and to increase their resilience for the future. The concept of a mobile multilocational worker is used here to refer to those employees who frequently move spatially using different locations for work and who communicate often—but not necessarily always—with others via electronic tools as they are both physically and virtually mobile (e.g., Gareis et al., 2006; Hyrkkänen & Vartiainen, 2005). In this sense, mobile multilocational work belongs to the family of remote and telework. The European Foundation for the Improvement of Living and Working Conditions (Eurofound) and the International Labour Office (ILO) (Eurofound and the ILO, 2017) define telework and ICT-based mobile work as working with information and communication technologies (ICT) from more than one location (with different degrees of mobility) with the potential for flexibility as regards the time and place of work. Virtual connections also make it possible for mobile workers to collaborate with others from multiple locations in widely distributed teams (Lipnack & Stamps 2000). In remote work, technologies are not necessarily needed.

M. Vartiainen (✉)
Aalto University, Helsinki, Finland
e-mail: matti.vartiainen@aalto.fi

C. Korunka (ed.), *Flexible Working Practices and Approaches*,
https://doi.org/10.1007/978-3-030-74128-0_7

An Example Day in the Life of a Mobile Multilocational Knowledge Worker

Great! Today I have an opportunity to make an autoethnographic case study about mobile knowledge workers and their use of technology—that is, about myself. It is inspiring because until now I have mainly studied collaboration in virtual teams.

Today I travel to Austria for a small conference to speak about challenges in mobile work. The plane from Helsinki to Munich leaves at 7:45 am. From there, I will continue by train to Innsbruck and further on by bus to a small village called Obergurgl in the mountains, over 2000 meters above sea level, where the University of Innsbruck has a congress center.

Before departure, I have time to upload the emails that have accumulated overnight onto my laptop via my home WLAN. I hurry up to catch tram 7. On the tram, there are only few people as it is rather early; so, nobody disturbs me. I open my smart phone to read the daily news from Finland and world. There's a screen at the end of the tram where I read the weather for the day and the quality of air in the city center. It takes 20 minutes to get to the railway station to continue by local train to airport.

On the train, I check my emails; unfortunately most of the messages are advertisements, which have smartly passed my junk filter. Anyhow, I manage to find my electronic boarding pass. It helps a lot to avoid queueing at the airport. While waiting for access to the plane, I call a colleague to agree on a meeting next week. Connections really work—we may after all be in a knowledge society?

Two hours on the plane pass swiftly by reading a dissertation manuscript, and the plane lands at Munich airport on time. I have a sumptuous 2 hours before my train leaves for Innsbruck. I start looking for a free WLAN; it takes some time because of three competitive offers. I accept the airport offer (free hour!). I also need to charge my computer because there may not be electricity on the train. It is astonishingly hard to find a charging point as most of them are occupied. Meeting Point café is recommended at the information point. So, there I go, and a friendly waitress shows me to my place. The next 2 hours go smoothly, I have coffee with a bun, exchanging emails, chatting and calling, and reading the news.

The train to Innsbruck Hauptbahnhof leaves on time. The train is full, my seat is quite cramped, and a father with his son sit opposite talking constantly. I can't really concentrate on reading the dissertation script. In addition, the landscape becomes remarkably beautiful as the Alps in silhouette come closer.

Near the station, I meet a group of people who are going to the same conference; they are mostly researchers from German and Swiss universities. Then, onto the bus and up to the mountains, we start climbing little by little upward. On the bus, there is plenty of time to catch up with people you know. It's a great place to meet old acquaintances face-to-face—and take a little nap. We arrive at Obergurgl around 8 pm. After making it to my room, I start to check my emails and call requests. If I do not answer today, I may have trouble tomorrow morning. In addition, I need to finalize my presentation….

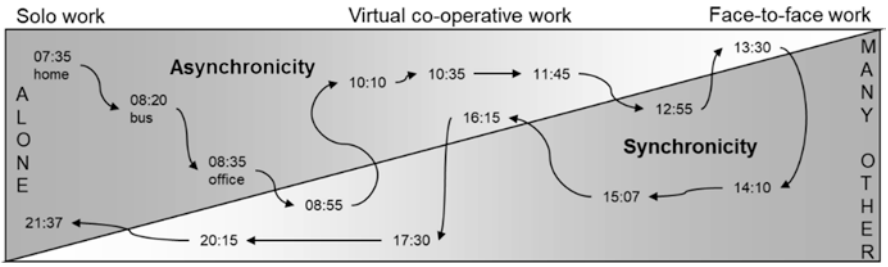


Fig. 1 A mobile multilocational worker's working day is a blurred mixture of working alone and asynchronously and synchronously with others

The working days of many mobile workers are blurred, as there is no specific time or place for the work to start or end. People can potentially work all the time in solitude, virtually asynchronously and synchronously, online, and in face-to-face collaboration with others. It is often rather difficult to separate solo working from collaborative work, even when working from home (Fig. 1). Working with electronic tools takes place in "pseudo-privacy" as it is often interrupted by emails, text messages, calls, and online virtual meetings. The increasing findability and awareness of other people's locations and their availability on the Internet reduces the feeling of autonomy and increases that of external controllability (Zuboff, 2019). Thus, the nature of work requires presence at several levels creating a need to be "multi-present." This "multi-presence" (Koroma & Vartiainen 2017) refers to mobile workers' urge to be simultaneously present in physical, virtual, and social spaces while working across boundaries from multiple locations and on the move. States of presence arise from different combinations of physical, virtual, and social spaces ranging from absence to presence, both socially and virtually.

2 Drivers of Mobile Multilocational Work

2.1 External Needs for Change in the Organization of Work

It is evident that many changes in jobs, tasks, and the organization of work are brought about by the digitalization of tasks (Vartiainen, 2020). Digitalization means the intrusion of digital technology into people's everyday activities and communication, a phenomenon which started in the 1980s with the introduction of desktop computers (see, e.g., Hertel et al., 2017). The development of mobile devices and Internet and cloud services in the 2000s has enabled mobile, multilocational work (Andriessen & Vartiainen, 2006; Koroma et al., 2014).

Digitalization and changes in work and working environments influence professions and employment relationships by making organizational structures, working times, places of work, and collaboration more flexible in terms of time and place. All the more, work today is often organized within and between workplaces in temporary projects. The flexibility paradigm has long roots (e.g., Skorstad & Ramsdal, 2009) referring sometimes to the potential of individual

autonomy and sometimes to an organization's ability to respond to unexpected occurrences in the work environment. Flexible organization involves temporal flexibility, that is, a worker can, or is expected to, begin and end his or her work according to the situation and the need. The choice of working hours is also affected by international cooperation, which requires, for example, arranging online meetings requiring some participants to be available unusually early in the morning or late in the evening. The point in time of working varies a lot. Cooperation with others is done in local meetings, online, and periodically at the main workplace, if it exists. Virtual teams are used as a common way of cooperating as are digital platforms to arrange global online work. All in all, information technology enables a flexible choice of time and place, but simultaneously it creates psychological, organizational, and societal challenges and hindrances.

2.2 Prevalence of Mobile Multilocational Work

Eurofound (2020a) shows the spread of mobile multilocational work in Europe using available data especially from the European Working Condition Survey (EWCS, Eurofound, 2016). Teleworkers including mobile multilocational employees were defined (Eurofound, 2020a, p. 4) "…as employees and self-employed workers who work with computers, laptops, smartphones, and other forms of ICT 'always' or 'almost all of the time,' and who work in at least one other location than their employer's premises at least several times a month. They are further categorized based on the frequency of ICT use, place of work and level of mobility." Based on this, four types of teleworkers have been identified: regular home-based employees who frequently use ICT to work from home, highly mobile employees who frequently have a high level of mobility, occasional employees who occasionally use ICT to work from locations other than their employer's premises, and the self-employed, who occasionally or frequently use ICT to work from locations other than their own premises.

According to the EWCS study (Eurofound, 2020a), around 19% of employees and 20% of self-employed workers in Europe are teleworkers. Almost half of self-employed are highly mobile, compared to 27% of dependent employees. There are large differences between countries, and the mobile and multilocational work mode is most widespread in the Scandinavian countries. It is most widespread in information and communication, financial services, professional and scientific activities, and public administration. The proportion of professional male employees aged under 49 years is larger than for women. There is rather little information about mobile and multilocational work outside Europe. However, based on very scarce data, Eurofound and the International Labour Office (2017, p. 16) report that in the USA 37% of all workers say that they "telecommuted" or teleworked in 2015, which is up slightly from 30% during the previous decade. Due to the technological changes—and today the pandemic and similar—there is reason to presume that this development will gain speed.

To summarize, the market, working conditions, and work processes stimulate the work-demand side—that is, what needs to be done and how. Demographic and social changes influence the work-supply side—that is, the kinds of workers that are available and their preferences, competencies, and behavior. These changes force and enable organizations to develop new business strategies including increased shares of mobile multilocational work. The direct consequence of all this is to be found in the growth of distributed work processes, network organizations, the physical mobility of workers, and intensive mediated interaction. This may bring many benefits for the organization such as greater flexibility, effectiveness, and innovativeness and also benefits for employees such as dynamic and enriched work contents, autonomy, and a more flexible integration of work and private life. However, it is clear that the new possibilities can also bring risks. They may increase the societal and economic divide, content-wise creating narrow and tailored jobs, for example, gig work. They may lead to workaholic behavior, higher stress levels, and lower job satisfaction. The work-life balance at home may be disturbed and interpersonal relations in the workplace loosened. Not enough is known about the working conditions and safety of workers at home and when traveling. Therefore, it is beneficial to identify and profile what types of mobile multilocational can be found, before analyzing their implications and success conditions and developing guidelines that are both effective and sustainable.

3 Types of Mobile Multilocational Work

Many things in work can be mobile (Vartiainen, 2006). It helps to think of work as a system consisting of several interrelated components: an employee or a group working purposefully using tools to handle objects of work in a working environment. Mobility is related to all the components of this work system. The mobility of a team is shown in its members' physical mobility when they use different locations and move between them using their mobile devices. From the perspective of tools, team members may also be virtually and mentally mobile, meaning that they work together on virtual platforms, exchanging and sharing thoughts and ideas in digital format and externalizing them as products and services, for example, as documents and drawings. The object of work moves as well or is transported from one place to another in physical (material) form or is transformed into electronic (i.e., immaterial, digitalized, or virtual) form. In addition, concrete tools—that is, technologies such as the means of production and communication, for example, mobile phones—are moved.

The physical mobility of employees is realized on at least two levels: individuals move alone doing solo work, for example, local and global freelancers, or they move as members of a distributed team or organization doing collaborative work. There are also examples of fully mobile teams (Verburg et al., 2006) and organizations (Stieglitz & Brockmann, 2012). Moving employees establish an "instant office" by adapting to and using the environment at hand and do so both repeatedly

and quickly. If collaboration with distant colleagues and customers is needed, this is possible via mobile, wireless information, and communication technologies. Mobile employees travel, using ICT for communicating and collaborating with others at different locations. Therefore, mobile work is also remote work or telework in its traditional meaning of being performed out of the main workplace.

3.1 A Garden of Individual Mobility

Mobile multilocational work belongs to the family of remote and telework. At the individual level, *telework* and *remote work* are terms that refer to all kinds of work and working arrangements carried out outside of a main workplace but related to it (Olson & Primps, 1984, p. 98). Due to historical reasons, there is an essential difference between the concepts of "telework" and "remote work." Telework means ICT-enabled remote work. According to ILO (2020, p. 6), the difference is that a teleworker uses personal electronic devices, whereas a remote worker works without communication technology in an alternative location to the default place of work, i.e., main workplace or home (e.g., ILO, 2020). In addition, both in telework and remote work, the physical location is a criterion for categorizing their basic types (e.g., Electronic Commerce and Telework Trends [ECATT], 2000, pp. 8–11; Gareis et al., 2004; Garrett & Danziger, 2007; Eurofound and the International Labour Office, 2017; ILO, 2020):

(a) *Home-based telework* is the most widely recognized and best-known type of telework. Home-based teleworkers use technologies to communicate and collaborate. The majority of teleworkers divide their time between the home and the office, and they are therefore called "alternating teleworkers." Individuals who spend more than 90% of their working time at home are called "permanent teleworkers." "Supplementary teleworkers" are those who spend less than one full day per week teleworking from home. They are also called "occasional teleworkers" to distinguish them from regular teleworkers. A remote worker can also use home as a workplace option.
(b) *Self-employed teleworkers* in SOHOs (small office home offices) are private, organization-independent entrepreneurs such as freelancers or consultants, who work and communicate at or from home with their contractors, partners, and clients by means of new technologies. There are also self-employed remote workers. The critical difference between remote and teleworkers concerning SOHOs and home-based remote and teleworkers is their market position as self-employed. A self-employed remote worker such as a hairdresser can receive customers at home or go to them.
(c) *Mobile multilocational remote or teleworkers* are those who agree with the question: "In the last four weeks, have you spent any of your working time away from your home and from your main place of work, e.g., on business trips, in the field, travelling or on the customer's premises?" (Lilischkis & Meyer,

2003, p. 8). *High-intensity mobile remote or teleworkers* are those who do so for 10 hours or more per week. In both cases, commuting to work is not included. High-intensity mobile teleworkers use personal electronic devices always or almost always, whereas a high-intensity remote worker does not.

Types of individual physical mobility. For the identification of physically mobile employees, Lilischkis (2003) used a still-valid topology based on the dimensions of physical space and time (Fig. 2). *Space criteria* include (a) the number of locations, (b) the recurrence of the locations, (c) whether there are headquarters to return to (d) whether work takes place while moving or at a destination, (e) whether work can take place at fixed locations without changing it, (f) whether there is a limitation of the work area, and (g) the distance between locations. *Time criteria* include (a) the frequency of changing location, (b) the time spent moving between work locations, and (c) the time spent at a certain work location if not moving. Each type of mobile work has its own constitutive criterion. *On-site movers* work in a limited work area, *yo-yos* return to a main office, *pendulums* have two recurrent work locations, *nomads* work in more than two places, and *carriers* cannot do their work at a fixed location while moving.

The categories of micro-mobility (desk-based), multi-mobility (campus), and total mobility are also fruitful. The micro-mobility of an employee—that is, in-house and on-site mobility—increases primarily because of the implementation of the open office "flexispace" concept. A flexispace is a generic, adaptable space that can be used for a wide range of activities. Campus mobility, that is, city-level mobility, stems from the need for multiple face-to-face meetings with colleagues, clients, subcontractors, and partners in different nearby places. Employees use visitors' working places at other sites belonging to the company in the district and work at

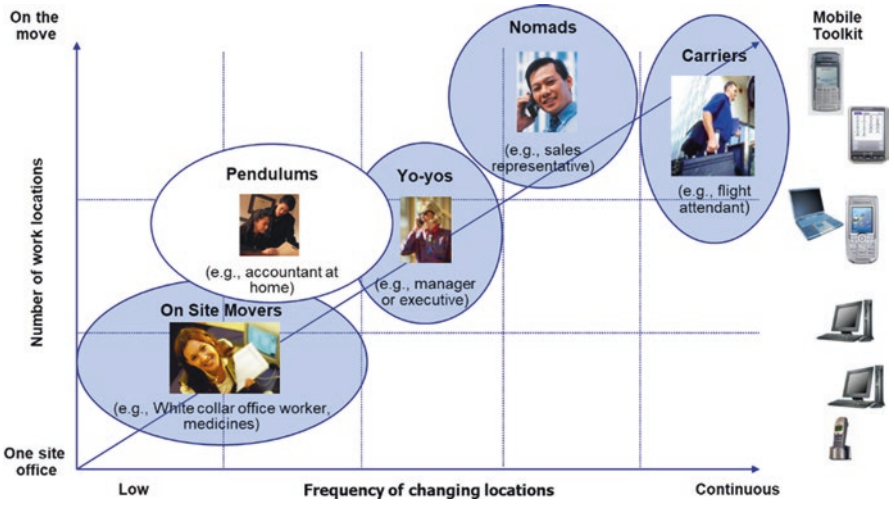


Fig. 2 Types of physically mobile employees (Vartiainen & Andriessen, 2006, p. 272 based on Gareis, 2006, p. 22; Lilischkis, 2003; Schaffers et al., 2006)

home as well. Together with flexible working hours, this may also make a better work-life balance possible and result in savings regarding total transportation times and distances. Fully mobile employees are nomadic, moving all the time, for example, journalists, multisite managers, and global sales representatives.

3.2 A Mobile Employee as a Member of a Team

Remote mobile workers very often collaborate with their work colleagues, supervisors, and customers. This collaboration takes place either face-to-face or virtually from afar with at least one other person; it is dyadic or takes place with more other people. So, it is typical that a mobile multilocational worker is a member of a permanent or a temporary fluid team sharing his/her time between solo work and asynchronous and synchronous virtual online work and occasional face-to-face work with others.

Demand characteristics of collaboration. Virtual teams (VTs) are groups of people who work interdependently with a shared purpose across space and time, using technology to communicate and collaborate (Lipnack & Stamps, 2000; Martins et al., 2004). Virtuality is a team characteristic that is often also related to the degree of geographical distribution of the team members. In a similar manner, physical mobility is just one characteristic of team working. However, virtual teams have many forms as they operate in a variety of environments with different purposes, and they may adopt a variety of internal regulative processes to adapt to their environments. In addition, the mobility of their members brings along tensions related to their functionality. The job demands from the viewpoint of mobile work in virtual teams can be conceptualized as the contextual complexity and operationalized by using six generic demand characteristics (Vartiainen, 2006, p. 30):

(a) *Location*, for example, where team members work and how far these places are from each other
(b) *Mobility*, for example, how many team members work in the same place and how many use multiple locations
(c) *Time*, for example, whether team members work synchronously or asynchronously;
(d) *Temporariness*, for example, whether employees work temporarily on a project or in a permanent team
(e) *Diversity*, for example, the composition of a team and the diversity of its members' backgrounds
(f) *Mode of interaction*, for example, the proportion of face-to-face vs. mediated communication.

The task content together with the context characteristics of a team creates demands to organize intragroup processes and social support in such a manner that the team can survive and remain resilient.

Next, the differences between different team types are explored in detail in order to identify the role of mobility in collaboration. The task and contextual complexity characteristics are used as differentiating factors.

Conventional, distributed, virtual, and mobile teams. There are four basic types of teams (Fig. 3), which are different from their demand characteristics. *Conventional teams* comprise members who work together in the same location and communicate face-to-face. At most they include micro-mobile team members who are moving in-house. Other terms that have been used as synonyms include *traditional teams*, *face-to-face teams*, and *co-located teams.*

Task complexity itself does not differentiate *distributed teams* from conventional teams; the variation of task ranges from simple to complex and their interdependence may be the same in both. Conventional team members jointly solve problems that are just as demanding and perform tasks that are just as creative as is the case with distributed teams. When studying the similarities from the viewpoint of contextual complexity, members of conventional teams, as well as of distributed teams, often divide their efforts in synchronous *time*, though work only *temporarily* in a team, and are *diverse* in terms of their members' backgrounds and personal characteristics. In addition, distributed team members can also work in fixed places, though they are distributed. Therefore, the key characteristic that makes a distributed team different from a conventional team is the *location* of its members, i.e., in distributed teams, team members are located geographically far from each other. However, the use of communication technologies for collaboration is not a necessity.

When mediated communication is added as a demand characteristic to a distributed team, it is transformed into a virtual team. The *mode of interaction makes a distributed team a virtual team. Mobility* is an additional characteristic and transforms a virtual team into a mobile virtual team. In mobile teams, team members move and work in many places and collaborate from them virtually. At the other end, there are the "ideal types" or prototypical global, highly mobile, virtual teams and projects such as management, marketing and sales teams, and new product design teams whose members may constantly move and may never meet each other face-to-face.

In practice, teams and projects are only seldom fully distributed and "virtual" in the sense of being at the extreme ends of spectrum regarding the six demand characteristics, in which all members, who are different in terms of their backgrounds,

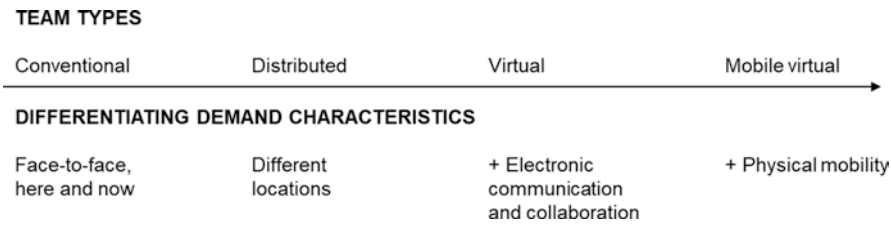


Fig. 3 Types of groups and teams by increasing contextual complexity (Vartiainen et al., 2007, p. 25)

move and work temporarily and asynchronously together over large distances using only ICT for their communication. The six characteristics of contextual complexity are closely related to and dependent on each other: a change in one results in changes in some or all of the others. Two examples are (1) the greater the distance between distributed employees, the greater the use of ICT for collaboration (2) and the greater the physical mobility of an employee is, the more likely he or she is to meet and collaborate with people from diverse backgrounds.

In summary, the main types of nonconventional teams are (a) distributed, (b) virtual, and (c) mobile virtual teams. Team members working in different locations and their geographical distance from each other make a distributed team. A team becomes virtual when group members communicate and collaborate with each other from different locations via electronic media and do not meet each other face-to-face. The physical mobility of group members adds a new demand characteristic to distributed work. Mobile, virtual teams are always distributed; however, not all distributed, virtual teams are mobile. Virtuality, as in the use of ICT for communication and collaboration, makes a team into a distributed virtual team or mobile virtual team. In conclusion, it can be said that mobile virtual teams are the most complex types of teams to lead and manage because of the changing contexts (spaces) of individual mobile employees.

4 The "Life Space" of a Mobile Multilocational Worker

What makes the research on mobile multilocational work and the life of mobile employees a challenge are their continuously changing working contexts. This implies that workers find themselves in different situations requiring them to continuously adapt and change their mindset and behavior. The "life space" concept nicely illustrates the mental space and other related spaces of mobile workers staying and working in multiple locations. The well-known classic social scientist Lewin (1951) described the "life space" or "psychological field" in his field theory (Burnes & Cooke, 2013). The formula $B = f(p,e)$ compactly explains the main idea of the theory: behavior (B) is a function of the person (p) and their environment (e). "Life space" is a highly subjective space that deals with the world as the individual sees it. The life space is, however, according to Lewin, embedded in the objective socio-material elements of the physical and social fields and their demands. Today in working life, the life spaces are layered with physical, virtual, and social demand characteristics, which vary in different contexts. From the psychological point of view, each individual perceives, experiences, and interprets these demands transforming them to regulate their actions. This implies and underlines the meaning of personal perceptions and interpretations of the contexts in use.

As life space describes individual contexts, the concept of "ba" (Nonaka et al., 2000)[1] focuses on shared contexts, in which knowledge is created, shared, and

[1] *Ba* roughly means *place*. The concept was originally proposed by the Japanese philosopher Nishida (1921) and further developed by Shimizu (1995; see also Nonaka et al., 2000, p. 14).

utilized by those who interact and communicate there, as often happens in collaborative knowledge work. Ba does not just mean a physical space, but a specific time and space that integrates layers of spaces. In this way, ba unifies the physical space, such as office premises, with the virtual space, using means such as email, and the mental and social spaces using aspects such as common experiences, ideas, values, and ideals shared by people with common goals as a working context. Physical, virtual, and social spaces and their interpretation in the mental space vary between mobile and multilocational workers driven by changing locations (Fig. 4). Next, the characteristics of the spaces are shortly described.

Physical spaces. The physical environments that mobile employees use for working are divided into five categories (Gareis et al., 2004): (a) *home*; (b) the *main workplace* (i.e., "main office"); (c) *moving places* such as cars, trains, planes, and ships; (d) a customer's and partner's premises or their own company's other premises (*other workplaces*); and (e) hotels, cafés, and so forth (*third workplaces*). As they all can be used for work purposes, they could all be referred to by the general term *workplace.*

Virtual spaces. A virtual space refers to a digital platform, a virtual workspace, or collaborative working environments consisting of various hardware, software, and media for individual employees, groups, and whole organizations. The Internet and intranet provide digital platforms to communicate, collaborate, and find knowledge and other people both with simple tools (e.g., email, audio conferencing, videoconferencing, chat, group calendar, document management, presence awareness, and findability tools) and with collaborative working environments (e.g., personal digital assistants [PDAs], smart phones, groupware systems, and social software,

Physical Space - Premises, workspace, working environment	**Home** e.g., home office, workstation	**Main workplace** e.g., open office, own office	**Moving places** e.g., train, tram, airplane, ship	**'Other workplaces'** e.g., client' s and supplier's premises, hubs	**'Third workplaces'** e.g., hotel, cafe, congress venue, summer house
Virtual Space - Available information and communication technologies and software - Collaboration platforms	PC, phone, Internet, broadband, wlan	Intranet, communication and collaboration systems	Mobile devices 	Intra- and extranet, Internet	Laptop, internet
Social Spaces - Relations to other people	Partner, children, relatives, friends	Colleagues, leaders, managers	Strangers, co-workers	Clients, suppliers, liaisons	Mostly strangers, clients
Mental space - Individual cognitions and emotions, thoughts and feelings	Tranquility, wellbeing, work-life balance, isolation ...	Common values, shared goals, social stress, conflicts ...	Solitude, rest, hustle ...	Trust, conflict ...	Rest, socializing ...

Fig. 4 Types of workspaces in mobile multilocational work (Based on Vartiainen et al., 2007, p. 31)

e.g., Weblogs, wikis, instant messaging, chat), and other communications systems that host many-to-many interactions, support groups, and community interaction.

Social space. The *social environment* covers social relations in the physical and organizational work environments. For example, social support can come from a variety of sources, including coworkers, supervisors, customers, family, and friends (Taylor, 2011). The *organizational context* consists of the norms, rules, and work practices of an organization, including both unarticulated organizational culture and the more tangible work practices, guidelines, and symbols.

Mental space. A mental space refers to individual cognitive constructs, thoughts, beliefs, ideas, and emotional states such as sentiments and moods that employees have and share. Creating and forming joint mental spaces requires communication and collaboration such as exchanging ideas in face-to-face or in virtual dialogs.

In summary, the working contexts of mobile multilocational workers are combinations of physical, virtual, and social spaces perceived through a mental space that are organized for working purposes in various manners including also cultural values especially in collaborative work. The use of various spaces varies depending on the type of work and interdependence of the tasks to be done. Remote solo work in solitude at home without virtual connections with others is an extreme and rather rare case. Usually home-based remote workers communicate sporadically with superiors and colleagues either virtually or face-to-face. When employees are working in multiple locations, the combination and emphasis of their spaces are different from co-located employees, just because of the greater number of physical places they rotate through and use. Still, they need not communicate virtually. The significance of virtual spaces grows when members of a distributed team communicate and collaborate with each other. They not only are distributed in physical places but also simultaneously use virtual places (videoconferencing and documents shared on the intranet), and they are related to other team members who share common goals (social space) to achieve shared aims and possibly share common ideas, beliefs, and values (mental space).

5 Benefits and Drawbacks of Working in Multiple Places

5.1 Workload Factors

In mobile multilocational work, the demand characteristics in work spaces are influenced not only by the complexity of one organization, its resources, and its tasks (Carayon & Zijlstra, 1999) but also by the multiple changing work environments from which the work is executed (Axtell et al., 2008; Hyrkkänen & Vartiainen, 2005, 2007; Vartiainen & Hyrkkänen, 2010). External workload factors refer to those characteristics in work spaces that impinge upon a human being and result in mental strain, which may have either positive, short- or long-term consequences (such as increased vigor, engagement, and motivation) or negative, short- or

long-term consequences (such as fatigue and exhaustion) (Richter & Hacker, 1998). The extant research indicates that the job demands-resources model (JD-R model, Demerouti et al., 2001) is suitable for studying the process that causes the draining of employees' mental and physical energy (Hakanen & Roodt, 2010). In the JD-R model, job demands denote the physical, psychological, social, and organizational aspects of a job that require sustained physical and/or psychological efforts or skills (Demerouti et al., 2001). Job demands may become job stressors when meeting those demands requires considerable efforts from which the employee has not adequately recovered or when sufficient job resources are not provided to counterbalance the strain (Bakker & Demerouti, 2007). For example, the individual's ability to control (Karasek, 1979; Karasek & Theorell, 1990; Bakker & Demerouti, 2007) the multiple environments encountered or the lack of such control results in either well-being or stress.

The job demands in the JD-R model can be divided into two categories, challenge-related and hindrance-related stressors (e.g., Cavanaugh et al., 2000; Podsakoff et al., 2007; Van den Broeck et al., 2010). The extant literature suggests that hindrances (Crawford et al., 2010), daily issues (Zohar, 1999; Mark et al., 2005), discontinuities (Watson-Manheim et al., 2002), discrepancies (Mandler, 1990; Jett & George, 2003), and interruptions (Perlow, 1999; Ziljstra et al., 1999) constitute similar phenomena as they all constrain work-related accomplishments by affecting goal-directed activities, action regulation, and, consequently, employee well-being. According to recent studies, job demands that employees perceive as hindrances are positively associated with exhaustion and negatively associated with vigor (Van den Broeck et al., 2010) and engagement (Crawford et al., 2010).

A limited amount of research is available on the effects of working in multiple locations on the well-being and performance of mobile multilocational employees. Current research (e.g., Becker & Sims, 2000; Bosch-Sijtsema et al., 2010; Eurofound, 2020a; Harrison et al., 2004; Hill et al., 2003; Felstead et al., 2005; Hislop & Axtell, 2009; Uhmavaara et al., 2005; Vartiainen & Hyrkkänen, 2010) is controversial as it shows that while the company and employee recognize that there are benefits to mobile working, there are also drawbacks, which are very often individually experienced as an increase in workload. Overall, although working in different locations and spaces serves the "anytime, anywhere" autonomy, it has working-context-related drawbacks in addition to its benefits. Next, the benefits and drawbacks—including challenges and hindrances—are described for five types of physical locations that mobile employees use for working.

5.2 Working at Home

Homes as workplaces vary a lot. As Harrison et al. (2004) noted, blurring the boundaries between working and private life leads to the temporary use of private spaces for working. Sometimes there are named and specified real and virtual settings for working. However, the homes of mobile workers are usually not ideal places to

work in as they are often not designed for that purpose. The amount of workspace may be inadequate and separate working places are costly. As a consequence, work may, for example, be conducted at the kitchen table, which generally must be cleared to make room for paperwork and often presents ergonomic challenges as well (Halford, 2005; Hislop & Axtell, 2009).

One of the first studies (Olson & Primps, 1984) on working at home concerned the effects of regular work at home on the relationship between an employee and an employer, the connection between work and nonwork domains, and gender issues. Working at home seems to generate some uncertainty and unpredictability between the worker and other family members and, on the other hand, also between employees and their managers (Felstead et al., 2005). A fresh review (Eurofound, 2020a, p. 1) shows that "…within the highly mobile TICTM group, the share of workers with poor work–life balance is considerably larger among those who have children compared to those who do not. By contrast, a poor work–life balance is more prevalent among regular home-based teleworkers without children than those with children."

Table 1 shows the benefits and drawbacks of working at home from the perspectives of employees and employers. The home as a workplace is intended usually for tasks that require concentration. Mobile workers can have uninterrupted time at home to read, plan, schedule, coordinate, prepare, research, and be creative. A home as a work environment provides the mobile worker with an escape from the pressures and interruptions of an office environment. Although they may feel that they are most productive at home, some of the same hindrances that affect home-based teleworkers also exist for mobile workers (e.g., Halford, 2005; Hislop & Axtell, 2009; Venezia & Allee, 2007). For example, Halford (2005) reports challenges in working practices, such as difficulties ending the workday because the space does not restrict working.

The time used for work increases because of the lack of commuting. However, there is also freedom to choose when to work and when to have personal time. This may lead to a higher quality of personal life and more effective work, although such arrangements may lead to the "autonomy paradox" (Eurofound, 2020a) that is to an intensification of work combined with heavy workloads and work cultures dominated by competition, self-management, or mechanisms to enforce performance. The main challenge is work spilling over into family life and leisure time, resulting in an imbalance between these areas. Additionally, there are also interruptions at home if children are small. Because of reduced staff interaction, there is a lack of social contact and isolation from the flow of information, support, and help from management and colleagues. A deterioration of the relationship with supervisors may harm promotion prospects.

Homes as social spaces have inherent hindrances as well. Hislop and Axtell (2009) conclude that the home is not a conducive environment for collaborative work. According to Halford (2005), the main challenges regarding the organizational relationship are the pressures to prove one's availability to others and the fact that the home working environment undermines office sociability. Problems linked to the need for team and managerial support and for training as well as the more

Table 1 Benefits and drawbacks of working at home (Becker et al., 1993, 1995; Boell et al., 2013; Eurofound, 2020a; Felstead et al., 2005; Greengard, 1994; Koroma et al., 2014; Olson & Primps, 1984; Uhmavaara et al., 2005)

Benefits	Drawbacks
From the viewpoint of employees	*From the viewpoint of employees*
Higher quality of personal life	No leisure time if small children are present
Autonomy: freedom to choose when to work and when to have personal time	Work spilling into family life
Ability to avoid interruptions of the main office	Interruptions at home
Increased amount of time used because of no commuting	Deterioration of relationship with supervisors
More effective work	Reduced face-to-face interaction with colleagues, lack of social contacts
	Isolation from the flow of information, support, and help
	Reduced prospects for promotion
	Aggravated "workaholism"
	Need for separate costly workplace, inadequate workspace
From the viewpoint of employers	*From the viewpoint of employers*
Reduction of office space and the associated costs	Enlarging responsibilities based on legislation
Reduction of transportation	Insurance liabilities
Ability to attract and retain certain highly valued employees	Challenges to compensation
Broadening the workforce pool by including people that would otherwise be unable to work	Low commitment of employees to the organization
Reduction of traffic congestion and air pollution	Loss of control over work performance
	Reduced visibility of employees
	Managers' concerns about their own attentiveness
	Trust/availability concerns
	Costs to build up home office, e.g., furniture, equipment, rent, additional media lines

nebulous reliance on visual methods of problem-solving are also described by mobile workers who use their home as a workspace. On the other hand, managers are more concerned with issues of trust and time with respect to mobile workers who work from home. The unpredictability of some of the work causes a particular concern. For example, how would a manager know whether a worker had really encountered a problem that took longer to resolve than expected or whether the worker was slacking off? Managers also expressed protective concerns for their staff as they worry that the worker may be struggling on a work-related issue or struggling with working from home. They were concerned that when working from

home, workers may not always receive important information in a timely manner. Again, based on the reviewed literature, it is evident that mobile workers must develop new working practices when working from home.

5.3 Main Workplace

For a mobile worker, the main workplace is only one of many locations used for work. It is a place for meeting and interacting with colleagues and team members both formally and informally (Table 2). The first challenge when arriving at the main workplace is to find a suitable non-occupied place to work that meets the demands of the task at hand. Finding an appropriate space that can accommodate the various work activities, such as creative tasks, can be difficult. After finding an appropriate space, often in an open office, the work environment must be structured to be conducive for work (Brown & O'Hara, 2003; Bosch-Sijtsema et al., 2010; Hislop & Axtell, 2009). An open environment is beneficial as mobile desk workers mainly come to the office to meet with colleagues, interact, and collaborate. On the other hand, an open environment can be noisy and may disturb those who need to concentrate or need a private place for other reasons. The number of meetings, phone calls, and informal interactions means that the periods of undisturbed time are limited (Hislop & Axtell, 2009; Bosch-Sijtsema et al., 2010; Vartiainen & Hyrkkänen, 2010).

Tasks conducted at the main workplace often require team and managerial support, training in unfamiliar tasks, or joint problem-solving (Halford, 2005). Furthermore, mobile workers usually have an accumulation of work that requires timely attention (Vartiainen & Hyrkkänen, 2010; Venezia & Allee, 2007) as a result of their visits to other places. They do not only report and complete administrative tasks, but they also negotiate, gather knowledge, make decisions, and plan their next trip. Consequently, they are under significant pressure to achieve a considerable amount of work when they are in the main office, but the perceived productivity of mobile desk workers appears to be significantly lower than that of those employees who have a dedicated desk (Bosch-Sijtsema et al., 2010).

Although the social environment is often rather hectic, and there are many other people around, there is the risk of the lack of identification as belonging to a certain group is difficult and frequent absences of all group members reduce informal interactions even when a mobile worker is in the main office (Bosch-Sijtsema et al., 2010). Difficulties in group relationships also occur, such as issues in social relationships and conflicts between and among teams and their members. Therefore, there is the need to manage and build work-related, frequently changing networks. It can be concluded that companies do not provide sufficient support for their mobile multilocational workers (Vartiainen & Hyrkkänen, 2010).

Table 2 Benefits and drawbacks to working in a main workplace (Becker et al., 1991; Becker & Sims, 2000; Greengard, 1994; Felstead et al., 2005; Koroma et al., 2014)

Benefits	Drawbacks
From the viewpoint of employees	*From the viewpoint of employees*
Face-to-face interaction	Different mindsets of local and mobile workers
Fluent communication	Feelings of lost privacy
Social support from colleagues	Uncontrolled noise and interruptions (uninvited chatting and questions) in work
Explicit and tacit learning	Disturbance created by meetings within the space ➔ difficulties in concentrating
Feedback is available	Unpredictable situations
Rich communication	Overhearing coworkers
Business is performed in a spontaneous, informal, and flexible manner	Two people trying to use the same desk, not finding a place to work
	Storage of materials in an open office can be problematic
From the viewpoint of employers	*From the viewpoint of employers*
Lower costs of office space when compared to private work rooms	Employees may be reluctant to give up their own space
Better use of space with an increased headcount per desk	An overly high density may become counterproductive
More face-to-face interaction between managers and their teams (if that is valuable)	The size of teams may create space shortages
Enhanced flexibility and satisfaction of employees when implemented carefully and effectively	Managing turnover of spaces between users
Quicker decisions because of enhanced communication	Scheduling conflicts
	Investments in equipment and training

5.4 Moving Places

It is a sort of a paradox that people are today moving even more in their work than before, although new digital working environments allow working from "anywhere"—including working permanently from one fixed place (Table 3). Temporary stopping places such as hotels and airport lounges are discussed in the section "Third Workplaces." Work-related moving can be divided into commuting, i.e., traveling between a place of residence and a place of work and traveling for work. In both cases, cars, trains, taxis, buses, trams, aeroplanes, ships, bicycles, and other vehicles are used for moving and sometimes as moving workplaces.

Rather little is known about working in moving workplaces. From the employees' point of view, there is an opportunity to interact with interesting strangers, and sometimes moving places such as ships are exotic places to work. On the other hand, moving places also provide chances to be alone and to think and reflect. The opportunities to concentrate on reading, writing, using a smart phone, and consulting documents also increase, for example, on trains. On the other hand, the main

Table 3 Benefits and drawbacks to working while on the move (Greengard, 1994; Harrison et al., 2004; Felstead et al., 2005; Koroma et al., 2014)

Benefits	Drawbacks
From the viewpoint of employees	*From the viewpoint of employees*
Possibility of interacting with interesting strangers	Missing privacy in public transportation
Possibility of being in interesting and exotic places to work	Limited time in use
Possibility of being alone, to think and reflect	Unwanted interaction with strangers
Possibility to concentrate on reading, writing, using a smart phone, and consulting documents	Diminished spatial isolation and temporal freedom from work
	Continuous need to adapt to new environments
	Unexpected tasks and unforeseen demands
	Need to carry heavy bags and numerous devices to communicate and collaborate
	Missing power sockets
	Limitations due to public space norms
	Traffic: culture and conditions, insecurity, attention and concentration needed for driving, changes in route
From the viewpoint of employers	*From the viewpoint of employers*
Cutting costs of office space	Costs of communication and collaboration technologies
More responsiveness to customers	No direct control
	Tracking where employees are; "telepresence"
	The length of the journey restricts work activities (short journeys)

challenge is the necessity to adapt to changing environments again and again. What is possible in one space may not be possible in another. In order to work, it is necessary to take along numerous devices to communicate and collaborate, and missing power sockets are a common nuisance.

Once again, a company can save on the costs of premises, and it is better able to respond to customers' needs. On the other hand, providing employees with communication tools increases costs. There is no direct control over employees, as tracking them may be unethical.

There also seems to be some difference between working in public places such as on trains and working in a private car. Public transport throws large numbers of strangers together in enclosed spaces under the observation of each other.

The places to work when moving are quite often public places; therefore it is significant to notice differences between the activities that should be executed in private and those that can be done in public places. Because public places, such as trains, were not originally designed as work sites, they tend to be noisy and filled with commotion (Breuer & Van Mel, 2003; Forlano, 2008; Lyons et al., 2008). Furthermore, a lack of privacy is a limitation for confidential issues, because when tasks can be overheard and/or overseen, they are less likely to be performed (Axtell

et al., 2008; Forlano, 2008). There may also be restrictions associated with mobile phone usage in some places, such as specific train carriages or public locations (Brown & O'Hara, 2003). In some cases, mobile workers feel that their work-related phone calls are disruptive to others (Perry & Brodie, 2006).

A train is a very public physical place. Sustained concentration in a noisy, public space, even under the best conditions, is difficult (Lyons et al., 2008). Consequently, there is a need to take breaks and alternate between business and relaxation (Axtell et al., 2008; Brown & O'Hara, 2003; Lyons et al., 2008). Accordingly, certain precautions are required to guard a personal workspace as it is not easy to leave a seat or specific location even for a short period of time (Axtell et al., 2008). Furthermore, the length of the journey affects the type of tasks that can be accomplished. For example, during short journeys, it may not be practical to set up certain technologies simply due to the time required to do so (Axtell et al., 2008). The research indicates that if workers are not directly told that they are expected to work while in transit on the train, they may have less motivation to engage in mobile working when the local conditions are prohibitive (Axtell et al., 2008).

The basic task associated with cars is to move persons and things from one location to another. While cars may be somewhat precarious places from which to conduct work, it is not uncommon for mobile workers to conduct business while driving. Laurier (2004) describes how a mobile worker reads printed emails and other documents and makes phone calls while driving (multitasking). Many of the tasks conducted while driving are micro-tasks. Micro-tasks are defined as short but complete action cycles, such as reading a text message on a car or smart phone's display and responding with a "yes" or "no." Concentration is thus divided between working and driving, according to the demands of the traffic. One aspect of these environments which is different from traveling on public transport is that a car offers the needed privacy, thus allowing mobile workers to use their mobile phones quite freely while driving (Laurier, 2004). Forlano (2008, p. 39) claims that nontraditional work settings are locations of "inconvenience, constraint, and specificity" and are the opposite to the anytime, anywhere philosophy and ideology. The car allows drivers more choices as to the type of social encounters. Felstead et al. (2005, p. 139) name different ways to use the private space of a car. First, it can be used to extend private time, that is, time outside the view of others that is used to think, to reflect, to talk aloud, or to express emotions. The second use is to promote varying levels of intimacy between friends and colleagues. The time used in the car is used in committed social interaction, which otherwise would not be possible. The third use is to connect to the outside world via communication devices.

5.5 Other Workplaces

Other workplaces include a multitude of premises such as a company's own offices at different sites, telework and satellite offices, business offices provided by commercial providers, and guest offices on the premises of partners' and clients' (e.g., Harrison et al., 2004). "Hubs," "telework centers," "satellite work centers,"

"satellite offices," or "tele-cottages" are remote from the main office and possibly close to employees' homes. Often these places are transitional places where employees work only temporarily, though sometimes for longer periods. The first of these were built at the beginning of the 1970s in the USA (Nilles et al., 1976; Jaeger & Bieri, 1989) and later in other industrial countries. They were considered alternatives to working at home and aimed at avoiding the harmful mixture of work, family, and leisure time there and, at the same time, avoiding unnecessary time-consuming commuting to the main office. From the viewpoint of companies, the reasons for using them are also the shortage and cost of office space and a shortage of skilled personnel (Olson & Primps, 1984). Benefits and drawbacks of transitional other places are shown in Table 4.

Table 4 The benefits and drawbacks of working in transitional fixed places (Becker et al., 1992, 1993; Eurofound, 2020a; Greengard, 1994; Jaeger & Bieri, 1989; Koroma et al., 2014)

Benefits	Drawbacks
From the viewpoint of employees	*From the viewpoint of employees*
Helps to avoid the harmful mixture of work and family life	The amount of work and salary paid
More and better quality time with family	Technological limitations: missing power sockets and wireless connections
Reduced commuting time to and from the main office	Unpredictability of the working conditions
Reduced employee stress related to commuting to main workplace	Difficulties to locate people
Social contacts, preserved professional identity	Feelings of disconnectedness from the organization
Enhanced productivity	Unexpected tasks and unforeseen demands
	Maintaining privacy and personal space
	Missing competence for self-management
	May impede inter-office communication
	Diverse cultures and individuals
	Demanding social situations and a need to respond within a time limit
From the viewpoint of employers	*From the viewpoint of employers*
Lower rentable costs per square meter	Costs of communication and collaboration technologies
Availability of skilled personnel	Missing indicators to measure performance
Reduction of traffic congestion, energy consumption, air pollution, and number of commutes	Remote management is a challenge
More productive working time	Difficulties in team activities and coordination
Demonstration and promotion of new telecommunication products and services	Missing guidelines
	Challenges to protect company secrets

Other workplaces are locations to concentrate on your own work and to meet clients, partners, or suppliers. The time spent at other places is often devoted to meetings or to preparing for upcoming meetings and, as such, there may be a continuous change in topics or activities. There may also be demanding negotiations or tasks that require extensive responsibility. In other words, the working days at other places are often long and fragmented (Vartiainen & Hyrkkänen, 2010). Informal socializing with colleagues and partners is also a common occurrence at other workplaces when they belong to the company's own premises, while spare time is often used for reading documents and catching up on emails.

Mobile workers seek out resources when they arrive at a new site. Challenges associated with new sites include finding appropriate places from which to perform relevant tasks (Bosch-Sijtsema et al., 2010) and locating the local people who can facilitate the successful completion of the necessary tasks (Mark & Su, 2010). A lack of meeting rooms often occurs because of the habit of not cancelling unnecessary bookings; the result is fully booked but often unused meeting rooms. As a result, visiting workers may be asked to vacate the room in the middle of a meeting (Mark & Su, 2010). Mobile workers realize that they will encounter unpredictable situations, but they cannot know exactly what those situations might be or what is required of them to resolve such conflicts (Perry et al., 2001), and therefore, they have difficulty in developing helpful routines (Mark & Su, 2010). Problems occur especially in those places that are not intended to serve as a main workplace and are used asynchronously by various users (Laurier & Philo, 2003; Mark & Su, 2010; Vartiainen & Hyrkkänen, 2010). Mobile workers cannot rely on the organization to provide a local office or even a stable set of artifacts (Mark & Su, 2010). The multitude of different individuals encountered, the cultural differences, and sometimes dissatisfied or non-communicative clients can result in pressure and difficulties to complete work assignments (Vartiainen & Hyrkkänen, 2010).

From a company's viewpoint, "other workplaces" such as satellite and telework offices also usually reduce costs per square meter because of their location away from business centers. Working in them may also promote environmental protection by reducing traffic congestion, energy consumption, air pollution, and the number of commutes. They may also increase the availability of skilled personnel. Alternatively, there are extra costs related to communication and collaboration technologies. Remote management is a challenge as indicators to measure performance may be missing, as well as guidelines on how to act. In some cases, protecting company secrets represents a challenge.

From an employee's viewpoint, working near home may bring about a better quality of life, though working far from the main office may disconnect an employee from his or her work community. Working in a satellite office near the home helps to avoid the harmful mixing of work and family life, compared to teleworking at home. In addition to saving time, the reduced commuting time to and from the main office reduces employee stress related to commuting. On the other hand, social contacts with peers and preserving one's professional identity are challenges.

5.6 Third Workplaces

After traveling, mobile workers *land* somewhere. One type of landing space is "a third workplace." Third workplaces are hotels, cafés, pubs, restaurants, conference venues and fairs, as well as public areas, such as parks, airport lounges, railway stations, and motorway service stations (Vartiainen, 2006, 2007). Third workplaces are also for short-term transitional stops. Usually they are used only temporarily, for hours or, maximally, some days. They are the places where a mobile worker stops for a while and maybe does something related to work. Felstead et al. (2005) refer to these places as in-between transitional spaces, as they are often visited only briefly. Harrison et al. (2004, p. 24) refer to workplaces that are instantly created by the user in an airport lounge or a train as "instant offices." Table 5 shows some benefits and drawbacks of third places.

In a study by Vartiainen and Hyrkkänen (2010), third places represent a forum for informal meetings with colleagues or an environment for conducting necessary business activities using laptops and other technologies. Often, this is conducted after official office hours in hotel rooms or restaurants. Forlano (2008) notes that

Table 5 Benefits and drawbacks to work in third places (Becker & Tennessen 1995; Felstead et al., 2005; Koroma et al., 2014)

Benefits	Drawbacks
From the viewpoint of the employees	*From the viewpoint of the employees*
Freedom and control of time and schedule	Reduced ability to separate work from personal life
Improved concentration in privacy	Missing privacy and personal space, interruptions
Easy access	Need to find reliable people and trust them
	Reduced social interaction with coworkers
	Unexpected tasks and unforeseen demands
	Loss of opportunity to learn from others
	Limited time in use
	Missing technological infrastructure and devices and little control over resources in the environment result in nonproductive time
	Inconvenient spaces
From the viewpoint of employers	*From the viewpoint of employers*
Cutting costs of office space	Low public image
More working hours	Challenge to protect confidential information
Tailored work environment	
Quick availability and access	

these places, especially cafés, are used as innovative spaces to enhance one's productivity, to collaborate, and to participate in specific work communities and networks. Locally mobile workers frequently use service stations and other agreed-upon rendezvous points for both informal and formal meetings.

Today, cafés have become increasingly more important and more common as places for both work and social activities. Mobile workers can work from their laptops, conduct business calls, and socialize from a café. Forlano (2008) found that the traditional division of work and leisure, public and private, blurs when working in cafés. She also notes that in popular cafés, it is often difficult to find an available workplace or table and doing so may require queuing and table-hopping. Specific cafés may be important to different people for varied reasons. For example, the trustworthiness of the other patrons is important because each interaction entails a negotiation for location and security. Accordingly, Brown and O'Hara (2003) as well as Forlano (2008) found that the lack of privacy and confidentiality in cafés limits the work activities that can be conducted in them. Forlano (2008, pp. 28–42) studied cafés as mobile workplaces. She describes them richly as public or semi-public places blurring and often contradicting traditional dichotomies such as employee and employer, work and play, online and offline, public and private, presence and co-presence, individual and community, and local and global aspects. Work and play are blurred, for example, some people may work using their laptops, while others are talking with their friends. Some come there to use the free wireless network, while others just want to write offline. Public and private aspects mix in various manners, for example, cafés are places to have interesting conversations, but on the other hand the presence of work and availability may be clearly signaled, for example, with headphones, and private space is sometimes found outside in the street. Further, more permanent social network can be built while working in cafés; informal short discussion can grow into long-term collaboration concerning work issues. Cafés themselves transform to different usages at different times of the day. In the morning, they are places for relaxed newspaper reading, at noon they turn into working places with laptop users, and in the evenings they turn into bars.

Airports are used for reading documents and emails, working from a laptop, making business calls, and conducting meetings. The time spent traveling and waiting at airports is associated with delays and waiting times over which the mobile worker has little control (Breuer & Van Mel, 2003; Perry et al., 2001). Workers can only partially use the available time for their work activities as there is little control over the resources in the environment available to the mobile worker (Perry et al., 2001). Breuer and Van Mel (2003) found in their study of Dutch business travelers that quiet work environments such as airline lounges may allow more privacy, but they are often too far from the terminal and access is therefore limited.

The benefits of third places from a company's point of view once more concentrate on cutting costs. Working in these places also means more working hours. On the contrary, if they are in permanent use, the public image of the company may suffer. Investing in the technologies that are needed is not without its costs. Additionally, protecting confidential information is a challenge. From the viewpoint of third place owners, the possibility of working may attract new customers, as

happens in cafés. From an individual viewpoint, feelings of freedom and control over time and schedule may increase. Easy access contrarily may reduce the ability to separate work from personal life. Privacy and personal space are missing, and there may be interruptions. Reduced social interaction with coworkers may result in the loss of opportunities to learn from others. The technological infrastructure and devices that are needed in order really to be able to work are often lacking.

5.7 *Challenges and Hindrances in Mobile Multilocational Work*

In their review, Koroma et al. (2014) conclude that mobile multilocational workers can be characterized as "lonely riders" as they are strangers wherever they are. The most common challenges and hindrances show that problems concerning incompatible and limited working space, ICT connections, and access are found in all identified locations, while interruptions are related to most of the identified locations, except the home, and that being an outsider with respect to the work community is common to all places except third places (Fig. 5). The continuous change in physical locations results in an ongoing search for a place to conduct the day's business. Time after time, mobile workers must address problems caused by limited working space. The main challenge, however, of virtual spaces seems to be limited

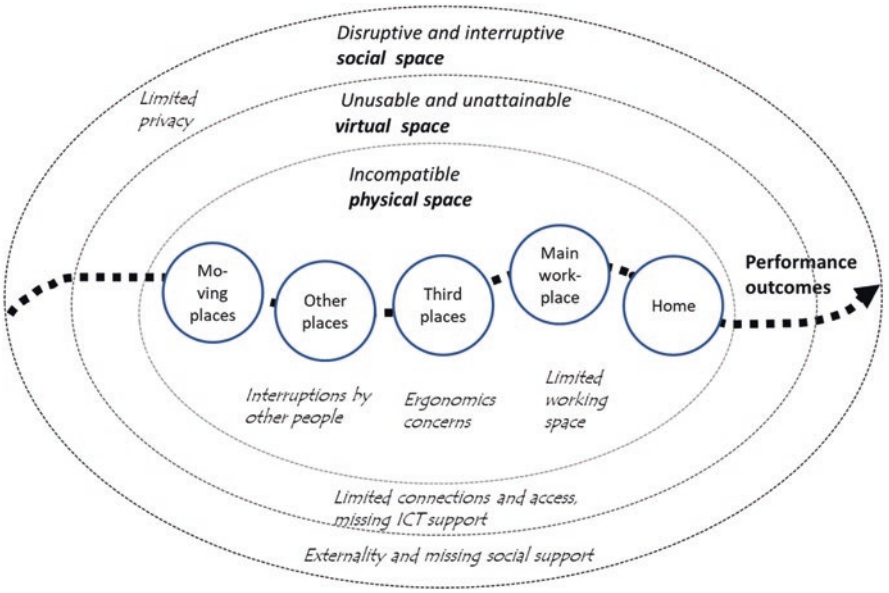


Fig. 5 The most common hindrances affecting mobile multilocational workers in physical (P), virtual (V), and social (S) spaces (Koroma et al., 2014, p. 150)

connections and a lack of Internet access despite the technological improvements in recent years. From the social space perspective, mobile multilocational workers remain outsiders when visiting their clients or partners, and even when at their main workplace, they are not considered part of the workplace community. Mobile workers are alone while traveling and visiting their contacts, thus resulting in a lack of support, a challenge in terms of synchronizing with colleagues (perhaps due to different time zones), and sometimes a feeling of being marginalized.

Specific, mainly physical hindrances are associated with moving places emerging both from internal and external demands. In addition, behavioral norms limit the possibilities to work. In some places, it is difficult to find people and suitable places to work. In addition, meeting people is demanding due to cultural factors. In third places, a mobile worker has little control over the physical resources. In addition, the people in the area, for the most part, are strangers. In the main workplace, a mobile worker has difficulties finding a place for his or her belongings. Furthermore, he or she may have difficulties adapting to the local community. At home, a mobile worker is confronted with spatial and social availability challenges. Limited privacy and ergonomic concerns are mostly related to moving, other, and third places. Technological problems and the lack of ICT support are associated especially with the main workplace and other places. Working in places other than the home or a private car is characterized by restlessness and interruptions because of other peoples' behavior. While public places are busy and crowded settings, they are regularly used for working. There seems to be a distinct difference between behavior in a private space (private car) and behavior in a public space (cafe, airport, train, airplane). Private cars may afford more privacy, but it is impossible to perform tasks that require space or the use of both hands even though employees often find themselves multi- and micro-tasking. As the access to space is even more limited on public transportation, adjustments are required to provide suitable space for any work purpose.

6 Leading and Managing a Mobile Workforce

Uncertainty and the need for continuous change have implications for mobile work management strategies. As Ashby's (1958) law of requisite variety says, the greater the variety in the environment of a system, the greater the variety that should be within the system to adapt properly to its environment. The changes in workplace strategy and alternative officing have great effects on the organization, on its human resource functions, and on the required technologies. Mobile multilocational work challenges the social functions of a traditional organization such as socializing, commitment, knowledge sharing, and organizational learning. The challenge is to develop a model for which alternative work options are the norm. This requires a fundamental change of mindset.

New types of work are challenges for managers and workplace designers, as well as for human resources and knowledge management specialists, not to mention

employees themselves, who should change their mindsets to be able to adapt to and participate in the change by crafting their work. Helping corporations to gain the competence to design the infrastructure to support and enable this distributed mobile work is at the core of helping them to be productive and agile. The alignment of work, space, people, and information technology, in fact, has become a practical necessity for all organizations.

Some tentative and general practical implications can be derived for improving human resources and re-designing multilocational work even though mobile workers are autonomous and generally able to draft their jobs. We should not regard mobile work as a constrained form of static work but rather as a type of work that has different values for different people and companies, different opportunities for actions, and different methods for performing work. Accordingly, the following are suggested for human resource professionals:

1. *Promote the awareness of mobile multilocational work-specific challenges and hindrances* to develop practical improvements and solutions to work practices that could positively impact employee engagement and vigor.
2. The contents of recruiting and training employees should be reconsidered. Not everyone is suited to working in a mobile virtual manner, perhaps for work-family-leisure-balance reasons, for example. The integration of newcomers into a mobile work environment is a challenge because they traditionally learn "tacitly" by observing, experimenting, and acquiring information from supervisors and coworkers.
3. *Be aware of assuming that changing physical spaces and mobile devices are a complete virtual office.* Physical premises are still needed as the basic preconditions for adequate working.
4. *Analyze the needs and provide applicable ICT support.* The main challenge related to the use of ICT are the limited connections and access despite the technological improvements in recent years. Information and communication technologies are the enablers of multilocational work. They are a necessity to access information and knowledge and other people. Electronic communication and collaboration can replace social contact to some degree, but not fully.
5. For the management, telework requires managers to *establish different ways of supervising and assessing the performance of subordinates* (Boell et al., 2013). Management needs to identify objectives that can be allocated to individual employees.
6. The increased autonomy of the individual requires *more explicit articulation of the formal and informal contracts* that bind him or her to the purposes of the organization. In addition, a legal framework clearly showing each stakeholder's entitlements and obligations is needed so that there is a shared understanding what to do and how.
7. Developing this kind of *an agreement requires explications of a psychological contract*. It represents the mutual beliefs, perceptions, and informal obligations between an employer and an employee. It sets the dynamics for the relationship and defines the detailed practicality of the work to be done. It is distinguishable

from a formal written contract of employment, which, for the most part, identifies only mutual duties and responsibilities in a generalized form.

The roles and practices of participating employees must necessarily shift in order to maximize the benefits arising from the new mobile work situation. Team members know how to exploit the skills and expertise of others, but the mutual understanding that makes such behavior possible is more difficult to achieve with greater dispersion and mobility of team members. There is a loss of subtlety in communication from not being able to see facial expressions and bodily gestures and from not being able to share informal moments between substantive exchanges. Moreover, when relationships with other team members become restricted to formal occasions that have strictly to do with project purposes, a diminution of the opportunity for further communication can arise in informal situations.

7 Future Developments

In the future, the development and increase of remote and virtual work including mobile multilocational work will be closely integrated into though not determined by the development of technologies, expanding 5-G bandwidths, and ever-smarter mobile devices and the organization of work, organizational policies, management culture, and societal regulations. Technologies serve as enablers of flexible ways of working, especially coworking.

The COVID-19 epidemic created a natural experiment that highlighted the importance of competencies to adapt and overcome the abrupt changes in work and its contexts. It showed that quick changes are not only possible but also expected in working life. A survey by EuroFound (2020b) in April 2020 showed that over a third (37%) of those working in the EU began to telework as a result of the pandemic—over 30% in most Member States. However, as Sostero et al. (2020) note, the large expansion of telework since the COVID-19 outbreak has been strongly skewed toward high-paid white-collar employment. This development may continue, resulting in strong digital divide. For comparison, a US survey (Brynjolfsson et al., 2020) collecting a total of 25,000 responses from April 1 until April 5, 2020, showed that over one-third of workers responded to the pandemic by shifting to remote work. The studies on telework during the pandemic show that most teleworkers collaborated virtually with their colleagues, managers, and customers during their working days. Therefore, digital competences are especially needed in remote virtual work. These and similar studies around the globe show that this "natural experiment" has until now brought forth unanswered questions on how to anticipate these kinds of partly unexpected situations, organize remote work and working conditions, and provide needed social and virtual support. It has been anticipated (Sostero et al., 2020) that the share of work ("teleworkability") that could be carried out remotely is much greater than the pre-outbreak prevalence of teleworking, which was marginal in most countries.

It is evident that digitalization and organizational and societal decision-making have changed our working environment, work processes, task and job content, structures and organizations, and products and services in many ways—resulting in the need for partly and completely new ways of working and competencies. This development has resulted in various types of present and future jobs—some are hybrid, and some others are completely new. Their common feature is the multipurpose use of digital technologies, especially those technologies used for communication and collaboration and the search for new knowledge.

References

Andriessen, J. H. E., & Vartiainen, M. (Eds.). (2006). *Mobile virtual work—A new paradigm*. Springer.

Ashby, W. R. (1958). Requisite variety and its implications for the control of complex systems. *Cybernitica, 1*, 83–99.

Axtell, C., Hislop, D., & Whittaker, S. (2008). Mobile technologies in mobile spaces: Findings from the context of train travel. *International Journal of Human-Computer Studies, 66*(12), 902–915.

Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology, 22*(3), 309–328.

Becker, F., & Sims, W. (2000). *Managing uncertainty. Integrated portfolio strategies for dynamic organisations*. Cornell University, International Workplace Studies Program.

Becker, F., & Tennessen, C. M. (1995). *Social connectivity in the mobile workplace*. Cornell University, International Workplace Studies Program.

Becker, F., Simms, W., & Davis, B. (1991). Excuse me. I think that's my desk. *Facilities Design & Management, 10*, 48–51.

Becker, F., Rappaport, A. J., Quinn, K. L., & Sims, W. R. (1992). *Telework centers. An evaluation of the North American and Japanese experience*. Cornell University, International Workplace Studies Program.

Becker, F., Quinn, K. L., Rappaport, A. J., & Sims, W. R. (1993). *New working practices. Benchmarking flexible scheduling, staffing, and work location in an international context*. Cornell University, International Workplace Studies Program.

Becker, F., Quinn, K. L., & Callantine, L. U. (1995). *The ecology of the mobile worker*. Cornell University, International Workplace Studies Program.

Boell, S. K., Campbell, J., Cecez-Kecmanovic, D., & Cheng, J. E. (2013, August 15–17). Advantages, challenges and contradictions of the transformative nature of telework: A review of the literature. In *Proceedings of the nineteenth Americas conference on information systems* (pp. 1–10).

Bosch-Sijtsema, P., Ruohomäki, V., & Vartiainen, M. (2010). Multi-locational knowledge workers in the office: Navigation, disturbances and effectiveness. *New Technology, Work and Employment, 25*(3), 183–195.

Breuer, A., & Van Mel, J. (2003). Airport offices: Facilitating nomadic workers. *Facilities, 21*(7/8), 175–179.

Brown, B., & O'Hara, K. (2003). Place as a practical concern of mobile workers. *Environment and Planning A, 35*(9), 1565–1587.

Brynjolfsson, E., Horton, J., Ozimek, A., Rock, D., Sharma, G., & TuYe, H.-Y. (2020). *COVID-19 and remote work: An early look at US data*. https://john-joseph-horton.com/papers/remote_work.pdf. Accessed 15 Dec 2020.

Burnes, B., & Cooke, B. (2013). Kurt Lewin's field theory: A review and re-evaluation. *International Journal of Management Reviews, 15*(4), 408–425.

Carayon, P., & Zijlstra, F. (1999). Relationship between job control, work pressure and strain: Studies in the USA and in the Netherlands. *Work & Stress, 13*(1), 32–48.

Cavanaugh, M. A., Boswell, W. R., Roehling, M. V., & Boudreau, J. W. (2000). An empirical examination of self-reported work stress among U.S. managers. *Journal of Applied Psychology, 85*(1), 65–74.

Crawford, E. R., LePine, J. A., & Rich, B. L. (2010). Linking job demands and recourses to employee engagement and burnout: A theoretical extension and meta-analytic test. *Journal of Applied Psychology, 95*(5), 834–848.

Demerouti, E., Bakker, A. E., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology, 86*(3), 499–512.

Electronic Commerce and Telework Trends. (2000). *Benchmarking progress on new ways of working and new forms of business across Europe: ECATT final report. IST programme, KAII: New methods of work and electronic commerce*. Empirica. http://www.flexibility.co.uk/flexwork/location/ecatt.htm. Accessed 31 June 2020

Eurofound. (2016). *Sixth European working conditions survey—Overview report*. Publications Office of the European Union.

Eurofound. (2020a). *Telework and ICT-based mobile work: Flexible working in the digital age* (New Forms of Employment Series). Publications Office of the European Union.

Eurofound. (2020b). *Living, working and COVID-19* (COVID-19 Series). Publications Office of the European Union.

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

Felstead, A., Jewson, N., & Walters, S. (2005). *Changing places of work*. Palgrave Macmillan.

Forlano, L. (2008). Working on the move. The social and digital ecologies of mobile workplaces. In D. Hislop (Ed.), *Mobility and technology in the workplace* (pp. 28–42). Routledge.

Gareis, K. (2006). Mapping the mobile eWorkforce in Europe. In J. H. E. Andriessen & M. Vartiainen (Eds.), Mobile virtual work – A new paradigm? (pp. 45–69). Springer.

Gareis, K., Kordey, N., & Müller, S. (2004). Work in the information society. BISER Domain Report No. 7. http://www.biser-eu.com/results.htm. Accessed 6 Mar 2006.

Gareis, K., Lilischkis, S., & Mentrup, A. (2006). Mapping the mobile eWorkforce in Europe. In J. H. E. Andriessen & M. Vartiainen (Eds.), *Mobile virtual work—A new paradigm* (pp. 45–69). Springer.

Garrett, R. K., & Danziger, J. N. (2007). Which telework? Defining and testing a taxonomy of technology-mediated work at a distance. *Social Science Computer Review, 25*(1), 27–47.

Greengard, S. (1994). Making the virtual office a reality. *The Personnel Journal, 73*(9), 66–79.

Hakanen, J. J., & Roodt, G. (2010). Using the job demands-resources model to predict engagement: Analyzing the conceptual model. In A. B. Bakker & M. P. Leiter (Eds.), *Work engagement: A handbook of essential theory and research* (pp. 85–101). Psychology Press.

Halford, S. (2005). Hybrid workspace: Recapitalizations of work, organization and management. *New Technology, Work and Employment, 20*(1), 19–33.

Harrison, A., Wheeler, P., & Whitehead, D. (2004). *The distributed workplace*. Spon Press.

Hertel, G., Stone, D. L., Johnson, R. D., Johnson, R. D., & Passmore, J. (2017). The psychology of the internet @ work. In G. Hertel, D. L. Stone, R. D. Johnson, & J. Passmore (Eds.), *The Wiley handbook of the psychology of the internet at work* (pp. 1–18). Wiley Blackwell.

Hill, E. J., Ferris, M., & Märtinson, V. (2003). Does it matter where you work? A comparison of how three work venues (traditional office, virtual office, and home office) influence aspects of work and personal/family life. *Journal of Vocational Behavior, 63*(2), 220–241.

Hislop, D., & Axtell, C. (2009). To infinity and beyond?: Workspace and multi-location worker. *New Technology, Work and Employment, 24*(1), 60–75.

Hyrkkänen, U., & Vartiainen, M. (2005). *Mobile work and well-being* (Työpoliittinen Tutkimus, No. 293). Työministeriö.

Hyrkkänen, U., & Vartiainen, M. (2007). Hyvinvoinnin haasteet mobiilissa työssä [Well-being challenges in mobile work]. *Työ ja ihminen, 21*(2), 160–172.

ILO. (2020). *Defining and measuring remote work, telework, work at home and home-based work*. ILO Policy Brief.

Jaeger, C., & Bieri, L. (1989). *Setellitenbüros: Eine Soziotechnische Innovation. Hinweise zu Einführung and Organisation*. Geographisches Institut, ETH Zürich: Verlag der Fachvereine Zürich.

Jett, Q. R., & George, J. M. (2003). Work interrupted: A closer look at the role of interruptions in organizational life. *Academy of Management Review, 28*(3), 494–507.

Karasek, R. A. (1979). Job demands, job decision latitude and mental strain: Implications for job redesign. *Administrative Science Quarterly, 24*(2), 285–308.

Karasek, R. A., & Theorell, T. (1990). *Healthy work: Stress, productivity, and the reconstruction of working life*. Basic Books.

Koroma, J., & Vartiainen, M. (2017). From presence to multipresence: Mobile knowledge workers' densified hours. In S. Taylor & S. Luckman (Eds.), *The new normal of working lives: Critical studies in contemporary work and employment* (pp. 171–200). Palgrave Macmillan.

Koroma, J., Hyrkkänen, U., & Vartiainen, M. (2014). Looking for people, places and connections: Hindrances when working in multiple locations—A review. *New Technology, Work and Employment, 29*(2), 139–159.

Laurier, E. (2004). Doing office work on the motorway. *Theory, Culture & Society, 21*(4–5), 261–277.

Laurier, E., & Philo, C. (2003). The region in the boot: Mobilizing lone subjects and multiple objects. *Environment and Planning D: Society and Space, 21*(1), 85–106.

Lewin, K. (1951). Designing the "field at a given time". In D. Cartwright (Ed.), *Field theory in social science, selected theoretical papers by Kurt Lewin* (pp. 43–59). Harper.

Lilischkis, S. (2003). *More yo-yos, pendulums and nomads: Trends of mobile and multi-location work in the information society* (STAR, Socioeconomic Trends Assessment for the Digital Revolution, Issue Report No. 36). Empirica.

Lilischkis, S., & Meyer, I. (2003). *Mobile and multi-location work in the European Union—Empirical evidence from selected surveys* (Socioeconomic Trends Assessment for the Digital Revolution, Issue Report No. 37). Empirica.

Lipnack, J., & Stamps, J. (2000). *Virtual teams: People working across boundaries with technology*. Wiley.

Lyons, G., Holley, D., & Jain, J. (2008). The business of train travel. In D. Hislop (Ed.), *Mobility and technology in the workplace* (pp. 74–86). Routledge.

Mandler, G. (1990). Interruption (discrepancy) theory: Review and extensions. In S. Fisher & C. L. Cooper (Eds.), *On the move: The psychology of change and transition* (pp. 13–32). Wiley.

Mark, G., & Su, N. M. (2010). Making infrastructure visible for nomadic work. *Pervasive and Mobile Computing, 6*(3), 312–323.

Mark, G., Gonzales, V. M., & Harris, G. (2005). No task left behind? Examining the nature of fragmented work. In *Proceedings of ACM CHI 2005* (pp. 321–330). ACM Press.

Martins, L. L., Gilson, L. L., & Maynard, M. T. (2004). Virtual teams: What do we know and where do we go from here? *Journal of Management, 30*(6), 805–835.

Nilles, J. M., Carlson, F. G., Gray, P., & Hannemann, G. J. (1976). *The telecommunications-transportation trade-off: Options for tomorrow*. Wiley.

Nishida, K. (1921). *Fundamental problems of philosophy: The world of action and the dialectical world*. Sophia University.

Nonaka, I., Toyama, R., & Konno, N. (2000). SECI, *ba* and leadership: A unified model of dynamic knowledge creation. *Long Range Planning, 33*(1), 5–34.

Olson, M. H., & Primps, S. B. (1984). Working at home with computers: Work and nonwork issues. *Journal of Social Issues, 40*(3), 97–112.

Perlow, L. A. (1999). The time famine: Toward a sociology of work time. *Administrative Science Quarterly, 43*(1), 328–357.

Perry, M., & Brodie, J. (2006). Virtually connected, practically mobile. In J. H. E. Andriessen & M. Vartiainen (Eds.), *Mobile virtual work. A new paradigm?* (pp. 95–126). Springer.

Perry, M., O'Hara, K., Sellen, A., Brown, B., & Harper, R. (2001). Dealing with mobility: Understanding access anytime, anywhere. *ACM Transactions on Computer-Human Interaction, 8*(4), 323–347.

Podsakoff, N. P., LePine, J. A., & LePine, M. A. (2007). Differential challenge stressor-hindrance stressor relationship with job attitudes, turnover intentions, turnover, and withdrawal behaviour: A meta-analysis. *Journal of Applied Psychology, 92*(2), 438–454.

Richter, P., & Hacker, W. (1998). *Belastung und Beanspruchung*. Asanger.

Schaffers, H., Brodt, T., Pallot, M., & Prinz, W. (2006). *The future workspace: Perspectives on mobile and collaborative working*. Telematica Instituut.

Shimizu, H. (1995). Ba-principle: New logic for real-time emergence of information. *Holonics, 5*(1), 67–79.

Skorstad, E. J., & Ramsdal, H. (Eds.). (2009). *Flexible organizations and the new working life*. Ashgate.

Sostero, M., Milasi, S., Hurley, J., Fernández-Macías, E., & Bisello, M. (2020). *Teleworkability and the COVID-19 crisis: A new digital divide?* (p. JRC121193). European Commission.

Stieglitz, S., & Brockmann, T. (2012). Increasing organizational performance by transforming into a mobile enterprise. *MIS Quarterly Executive, 11*(4), 189–204.

Taylor, S. E. (2011). Social support: A review. In M. S. Friedman (Ed.), *The handbook of health psychology* (pp. 189–214). Oxford University Press.

Uhmavaara, H., Niemelä, J., Melin, H., Mamia, T., Malo, A., Koivumäki, J., et al. (2005). *Joustaako työ? Joustavien työjärjestelyjen mahdollisuudet ja todellisuus* [Is work flexible? The potentialities and the realities of flexible work arrangements]. Työministeriö.

Van den Broeck, A., de Cuyper, N., de Witte, H., & Vansteenkiste, M. (2010). Not all job demands are equal: Differentiating job hindrances and job challenges in the job demands-resources model. *European Journal of Work and Organizational Psychology, 19*(6), 735–759.

Vartiainen, M. (2006). Mobile virtual work—Concepts, outcomes and challenges. In J. H. E. Andriessen & M. Vartiainen (Eds.), *Mobile virtual work—A new paradigm* (pp. 13–44). Springer.

Vartiainen, M. (2007). Distributed and mobile workplaces. In M. Vartiainen, M. Hakonen, S. Koivisto, P. Mannonen, M. P. Nieminen, V. Ruohomäki, & A. Vartola (Eds.), *Distributed and Mobile work—Places, people and technology* (pp. 13–85). Tammer-Paino Oy.

Vartiainen, M. (2020). Competencies in digital work. In H. Schaffers, M. Vartiainen, & J. Bus (Eds.), *Digital innovation and the future of work* (pp. 225–247). River Publishers.

Vartiainen, M., & Andriessen, E. (2006). Mobile virtual work: what we have learned? In J. H. E. Andriessen & M. Vartiainen (Eds.), Mobile virtual work - A new paradigm? (pp. 369–386). Springer.

Vartiainen, M., & Hyrkkänen, U. (2010). Changing requirements and mental workload factors in mobile multi-locational work. *New Technology, Work and Employment, 25*(2), 117–135.

Vartiainen, M., Hakonen, M., Koivisto, S., Mannonen, P., Nieminen, M. P., Ruohomäki, V., et al. (2007). *Distributed and mobile work—Places, people and technology*. Yliopistokustannus University Press Finland.

Venezia, C., & Allee, V. (2007). Supporting mobile worker networks: Components of effective workplaces. *Journal of Corporate Real Estate, 9*(3), 168–182.

Verburg, R. M., Testa, S., Hyrkkänen, U., & Johansson, N. (2006). Case descriptions of mobile virtual work in practice. In J. H. E. Andriessen & M. Vartiainen (Eds.), *Mobile virtual work—A new paradigm* (pp. 267–288). Springer.

Watson-Manheim, M. B., Chudoba, K. M., & Crowston, K. (2002). Discontinuities and continuities: A new way to understand virtual work. *Information, Technology and People, 15*(3), 191–209.

Ziljstra, F. R. H., Roe, A. R., Leonora, A. B., & Krediet, I. (1999). Temporal factors in mental work: Effects of interrupted activities. *Journal of Occupational and Organizational Psychology, 72*(2), 163–185.

Zohar, D. (1999). When things go wrong: The effect of daily work hassles on effort, exertion and negative mood. *Journal of Occupational and Organizational Psychology, 72*(3), 265–283.

Zuboff, S. (2019). *The age of surveillance capitalism: The fight for a human future at the new frontier of power*. PublicAffairs.

ICT-Enabled Work Extension and Its Consequences: A Paradoxical Situation Between High Performance and Low Wellbeing

Julia Schöllbauer, Martina Hartner-Tiefenthaler, and Clare Kelliher

1 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 USA, 44 percent now work from home 5 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).

J. Schöllbauer (✉)
University of Vienna, Vienna, Austria
e-mail: julia.schoellbauer@univie.ac.at

M. Hartner-Tiefenthaler
Technical University of Vienna, Vienna, Austria
e-mail: martina.hartner-tiefenthaler@tuwien.ac.at

C. Kelliher
Cranefield University, Bedfordshire, UK
e-mail: clare.kelliher@cranfield.ac.uk

C. Korunka (ed.), *Flexible Working Practices and Approaches*,
https://doi.org/10.1007/978-3-030-74128-0_8

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.

2 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).

2.1 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.

2.2 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.

3 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 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*),

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*

Note. 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

we screened 22,386 records for duplicates. In the next step, we manually screened 13,442 titles for eligibility.

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 6 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.

4 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 & Hollensbe, 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.

5 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. Tables 8.2 and 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 and psychological and physiological health problems as well as with an unbalanced interface between

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

Note. 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

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

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.

5.1 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).

5.2 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 & Hollensbe, 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.

6 Integrative Summary of Findings

As can be seen in 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 2 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 1 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.

7 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.

7.1 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) 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.

7.2 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 non-work 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.

8 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[1]

*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.

*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*. Centre for Reviews and Dissemination, University of York.

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

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.

[1] Literature included in the review is marked with an asterisk

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.

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.

Eurofound. (2020). *Living, working and COVID-19* (COVID-19 Series, p. 80), Publications Office of the European Union.

*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]. *Wirtschafts- und Sozialpolitische Zeitschrift (WISO), 39*, 69–82.

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

Golden, A. G., & Geisler, C. (2007). Work-life boundary management and the personal digital assistant. *Human Relations, 60*, 519–551. https://doi.org/10.1177/0018726707076698

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.

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

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

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.

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* (Work psychology) (Vol. 2, pp. 5–33). 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.

*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.

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

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). 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.

Statista. (2020). *Change in remote work trends due to COVID-19 in the United States in 2020*, https://www.statista.com/statistics/1122987/change-in-remote-worktrends-after-covid-in-usa/

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

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). 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.

Digitalization of Employment: Working via Online Platforms

Lena Hünefeld, Sophie-Charlotte Meyer, and Nils Backhaus

1 Introduction

Under the heading of digitization, a fundamental change in the world of work is being addressed in public and scientific debates (OECD, 2019). Digitization refers to the increasing dissemination of modern information and communication technologies (ICT) across the world of work, driven by a constant increase in computing power and the use of artificial intelligence at work. Changes can be observed at the macro, meso, and micro level (Korunka & Kubicek, 2017) involving new challenges for organizations and individuals (Pongratz, 2009). At the macro level, digitization is integrated into already known changes such as the emergence of international markets, the tertiarization of the working world, individualized products, or the decrease of regulations on the labor market (Watson, 2011). What is new is the acceleration of change through available technologies (Rosa, 2005). This can also be observed at the organizational level (meso level). Organizations are in a continuous restructuring process to adapt to changing market requirements (Gazier & Bruggeman, 2008). The restructuring processes aim at organizational growth, cost reductions, and quality improvements by simultaneously maintaining or improving the market position. In this context, a change in organizational structures and the organization of work can be observed. For instance, we see the emergence of more flexible, project- and customer-oriented forms of management and flatter hierarchies, in which work is done in a results-oriented manner (Green, 2001; Menz & Kratzer, 2015). Changes at the societal and organizational level are also reflected at the micro level, that is, the individual work situation: work content, work context, and work organization but also the way individual employees organize their

L. Hünefeld (✉) · S.-C. Meyer · N. Backhaus
Federal Institute of Occupational Health and Safety, Dortmund, Germany
e-mail: Huenefeld.Lena@baua.bund.de; Meyer.Sophie-Charlotte@baua.bund.de; Backhaus.Nils@baua.bund.de

C. Korunka (ed.), *Flexible Working Practices and Approaches*,
https://doi.org/10.1007/978-3-030-74128-0_9

non-working life are changing as well (Cascio, 2003). One example is the increase in flexible work in terms of time and space (Gerdenitsch, 2017).

In light of the changing world of work as a result of digitization, one phenomenon directly related to changes in work organization and the individual's work situation is the platform economy, which has recently received a lot of attention. Platform work increasingly shapes our everyday life, as we make use of food delivery, driving, and household services, for example, but it is also found in online work such as copywriting and programming or creative activities. The use of new technologies enables platforms to act as "employment agents" on the Internet; a global online labor market has emerged. In this chapter, we focus on crowdwork, representing one specific type of platform work. Platform work refers to a form of employment that uses an employer's/client's access to organizations or individuals to perform certain tasks for a fee (see Florisson & Mandl, 2018). In particular, crowdwork refers to digital platforms that organize various services, ranging from so-called clickwork or micro tasks to more demanding and qualified activities such as graphic design or website programming (Kirchner & Matiaske, 2020), in a fully digital workflow. In this contribution, we discuss opportunities and risks related to platform work in general but also to crowdwork in particular. For instance, being independent of local workplaces is an opportunity for individuals who have so far been denied access to the labor market because of social (e.g., illness, criminal records) or geographical (e.g., rural regions) exclusion (Zyskowski et al., 2015; Kittur et al., 2013) and may hence be considered an advantage. At the same time, there is a risk that organizational forms of work and the associated labor protection frameworks may be undermined, resulting in a precarious digital labor market. The first aim of this chapter, therefore, is to review existing studies with respect to the organizational and working conditions of platform workers and crowdworkers.

In the public debate, platform work is often described as an entirely new form of digital work that breaks with the regulations governing traditional employment relationships. Some studies point out that platform work may be new – but not so much as a distinct new form of work but rather as an extreme example of a much broader set of trends affecting all employment forms (Gerber & Krzywdzinski, 2019; Huws et al., 2018). Based on this assumption, the second aim of this paper is to take a closer look at the work situation of employees in digitized work environments. Drawing on the BAuA-Working Time Survey, we empirically analyze the working conditions of employees using information and communication technologies (ICT, i.e., desktop PC, laptop, or tablet PC) in general and compare these figures with the results of our review of platform worker studies presented. The chapter is structured as follows. In a first step, we define platform work and crowdwork (Chapter 2.1) and describe the developments on the labor market to date, which provide starting points for the analysis of platform work (Chapter 2.2). We also summarize previous literature to give an overview of how platform work is distributed across the labor market and to identify the typical platform or crowd worker (Chapter 3). In a second step, we look at the organizational conditions and the work situation of platform workers (Chapter 4.1 and 4.2) on the basis of existing studies and compare them to the situation of employees using ICT in general (Chapter 4.3).

2 Definition and Theoretical Background

2.1 Definition of Crowdwork

Although the literature offers various definitions and concepts of online platforms (Eurofound, 2018a; Huws, 2016; Broughton et al., 2018), they all consistently emphasize the fact that online platforms enable innovative business models and new forms of work organization. The platform economy comprises a variety of platforms with various purposes, including search, networking, and messaging platforms (e.g., Google) or trading platforms (e.g., Amazon), as well as brokerage platforms for various products or services (e.g., Etsy; Kirchner & Matiaske, 2020). With regard to work, platforms offering paid work tasks online are of particular interest (e.g., Uber, CrowdFlower, and Amazon Mechanical Turk). Buying and selling jobs and services via online platforms is known as "platform work" (Florisson & Mandl, 2018; Eurofound, 2019), "online labor" (Beerepoot & Lambregts, 2015; Pongratz, 2018), "online outsourcing" (Kuek et al., 2015; Heeks, 2017), or "gig economy" (Wood et al., 2019; Taylor et al., 2017). Crowdsourcing and crowdwork are among the most commonly used terms (Green et al., 2014; Leimeister et al., 2016a; Durward et al., 2016; Huws et al., 2018). Platform work covers different ways of working that can be broken down further along several dimensions (Eurofound, 2019). One central distinction is made as to whether the work arranged via platforms is fully digital[1] or performed offline. Another criterion of distinction, especially for online work involving online management, is the skills level required for a specific task. Platform jobs range from high-skilled work such as programming, translation, design, or copywriting to routine micro tasks such as indexing pictures (Huws, 2018; micro tasks are sometimes also referred to as "clickwork"; Kirchner & Matiaske, 2020). Further criteria include workers' employment status (employment or self-employment), customer status (company or private client), whether the job is performed as a main job or a supplementary source of income, and type of payment (e.g., regular salary, hourly rate, or piece rate; Huws, 2016). An overview of possible classifications of platform work is offered by various authors (e.g., Florisson & Mandl, 2018; Huws, 2018; Heeks, 2017; Howcroft & Bergvall-Kåreborn, 2019; Schmidt, 2016; Greef et al., 2020). In the following, we mainly focus on online work defined as paid employment, arranged and processed via an online platform. Thus, both service provision and the result are digital. In line with Bormann (2018) and Pongratz and Bormann (2017), we refer to this as crowdwork. Since studies do not always explicitly report results for crowdworkers as defined here, we will also discuss results for platform workers in general.[2]

[1] This is referred to as "cloudwork" (Leimeister et al., 2016a) or "online task crowdwork" (Howcroft & Bergvall-Kåreborn, 2019), for example, sometimes also called "crowdwork," "crowdsourcing," or "online work" (Pongratz & Bormann, 2017).

[2] Findings referring to platform work performed locally or offline are not the focus of this chapter and can be found in Schreyer and Scharpe (2018), Ivanova et al. (2018), or Lee et al. (2018), for example.

2.2 Changing World of Work: Marketization, Flexibilization, and Subjectification

Although platform work as a phenomenon is quite new, the existing empirical evidence shows similarities to previous developments. Platform work is used to develop new potential for productivity and rationalization by mobilizing mechanisms of marketization, flexibilization, and subjectification (Gerber & Krzywdzinski, 2019). Companies are increasingly confronted with economic pressure and unpredictability because of changes in the market. It is not new for companies to use outsourcing strategies such as contract labor or temporary agency work to purchase services to cover irregular and temporary changes in labor demands and to reduce labor costs (Clott, 2004). The outsourcing of digital work tasks by companies to digital platforms, which in turn delegate them to an undefined mass of people on the Internet, represents another strategy to increase flexibility and reduce costs. Thus, work on many platforms is not performed in a formal employment relationship; instead, platform workers are often self-employed (Berg, 2016). Self-employed work arranged via digital platforms often appears to be highly marketized. This directness of the market often goes hand in hand with job insecurity, strong competition, and low wages. As a result, platform work is often far removed from the regulated context of standard employment, offering flexibility and freedom on the one hand while on the other hand enabling adverse work situations and the exploitation of labor (Kirchner & Matiaske, 2020). Existing studies have already shown outsourcing strategies to lower labor standards in terms of pay or working hours (Benner, 2015; Ittermann et al., 2013).

In addition to its strong marketability, platform work, and especially crowdwork, also offers workers much flexibility and freedom in terms of time, place, content, and social life. The various flexibility options may help them improve their work-life balance. However, workers also face a high risk of blurring boundaries between their work and private life or between their professional role and personal identity. Likewise, the boundaries between paid and unpaid work can be fluid (Gerber & Krzywdzinski, 2019). Crowdwork thus requires a high degree of self-organization and self-control (Stone, 2004; Flecker et al., 2017). Therefore, platform work is also a highly subjectified kind of work. Platform workers are responsible for every aspect of their work: actively producing and marketing their abilities and services; planning, controlling, and monitoring their actions; and organizing their everyday life (Pongratz & Voß, 2002). Platform work thus represents an ideal type of "labor power entrepreneurs" (Voß & Pongratz, 1998). In summary, this autonomy and flexibility may open up opportunities for a self-directed work life, but it may also promote self-exploitation (Kubicek et al., 2017). Some studies show that flexibility and job autonomy have a dark side if they exceed a certain level. Workers can be "lost in autonomy," which in turn is associated with a lower level of health and well-being (Väänänen et al., 2020). Studies on self-employed individuals already point to that ambivalent role of flexibility and autonomy at work (Kottwitz et al., 2019).

3 Distribution and Sociodemographic Characteristics of Platform and Crowdworkers

3.1 Distribution of Platform and Crowdworkers

Platform work, including crowdwork as such, is a new phenomenon for which limited official data is available. Further, no standardized measure for this specific group of workers has yet been established. Consequently, definitions of platform and crowdwork are inconsistent across studies, resulting in the fact that very different questions are used in surveys to capture platform work (Pesole et al., 2019). Furthermore, Bonin and Rinne (2017) show that respondents often mistakenly classify themselves as platform workers or crowdworkers, for example, because they think selling goods and services via their own homepage is platform work. Keeping these difficulties in mind, we nevertheless try to give an overview of the distribution of platform work and crowdwork across recent studies (Table 1). We focus on studies providing estimates for the period from 2017 to 2020.[3] With regard to platform work, we further distinguish between individuals who have at least once worked as platform workers and individuals who do this on a regular basis. The overview shows that the proportion varies substantially across studies and countries. With regard to platform work, the proportion varies between 7.8% (France) and 27.5% (Spain) for people who have done this type of work at least once. Platform work on a regular basis ranges from 1.0% (USA) to 17.0% (Spain). On average, the studies indicate that in the EU, 11.0% of the workforce work as platform workers (on a regular basis: about 5.5%). Regarding crowdwork in a narrow sense, the proportions vary between 2.6% in Germany and 14.3% in Spain. Given the large differences in prevalence across the selected studies, it is difficult to make a precise statement about the distribution of platform work and crowdwork, respectively. It is thus not surprising that some of the existing studies conclude that the distribution of platform work and crowdwork is rather limited (e.g., Bonin & Rinne, 2017; Farrell & Greig, 2016; Current Population Survey staff, 2018) whereas other studies find platform and crowdwork to be widespread (e.g., Huws et al., 2019; Pesole et al., 2018). Across the selected studies, however, platform work emerges as particularly prevalent in Spain.

Suggesting another reason for the vast variation in proportions, Pesole et al. (2019) state that the interviewing method – online vs. offline – may be crucial as well. As working on platforms inherently involves a high level of Internet usage, it is plausible to assume that online surveys include a higher number of platform workers and lead to an overestimation platform and crowdworkers.

Huws et al. (2019) use different survey methods, offline and online, allowing for a direct comparison of results. Comparing platform work rates in the UK and Switzerland, the authors show that the rates are higher in online surveys than in

[3] Information about the distribution of platform work before 2017 can be found in Eurofound (2018b), Florisson and Mandl (2018), and Freudenberg et al. (2019), for example.

Table 1 Distribution of platform work and crowdwork – a study overview

Source	Survey year	Country	Platform work – at least once[1]	Platform work – on a regular basis	Crowdwork – at least once
Urzì Brancati et al. (2020)[a]	2018	Germany	12.3%	5.7%	–
		Spain	18.1%	9.3%	–
		France	7.8%	3.7%	–
		UK	12.8%	7.3%	–
		EU-16 (average)	11.0%	5.5%	–
Huws et al. (2019)[b]	2018	Spain	27.5%	17.0%	14.3% [2]
	2019	France	15.4%	7.7%	6.1% [2]
	2017	Italy	21.7%	12.4%	10.4% [2]
	2019	UK	15.3%	9.6%	7.8% [2]
Pesole et al. 2018[c]	2017	Germany	11.8%	6.6%	10.0%
		Spain	15.1%	6.6%	12.0%
		France	8.8%	4.2%	6.5%
		UK	12.6%	6.7%	10.2%
		EU-14 (average)	11.9%	5.6%	–
Current Population Survey Staff (2018)[d]	2017	USA	–	1.0%	–
Serfling (2018)[e]	2017–2018	Germany	7.7 %	4.8%	
Lepanjuuri et al. (2018)[f]	2017	UK		4.4%	
Mrass and Peters (2017)	2017	Germany			2.6%*

On a regular basis means:
[a]Minimum 10 hours per week or minimum 25% of the person's income
[b]At least weekly
[c]Minimum 10 hours per week
[d]Platform work in the last week
[e]Actual active platform workers
[f]Worked in the gig economy in the last 12 months
[1]Platform workers who have ever gained income from providing services via online platforms
[2]At least weekly
*Own calculation based on the working population in Germany (total number: 1,162,059)

corresponding offline surveys. The majority of the studies discussed are also based on online surveys (Pesole et al., 2018; Urzì Brancati et al., 2020; Serfling, 2018; Lepanjuuri et al., 2018). The studies of Pesole et al. (2018), Serfling (2018), and Urzì Brancati et al. (2020) report the distribution of platform work among Internet users, while the other studies – with the exception of Mrass and Peters (2017, estimations based on information from platform CEOs) – report the distribution in the labor force (Current Population Survey Staff, 2018) or general population

(Lepanjuuri et al., 2018). Given the existing methodological challenges in measuring platform work and crowdwork, the values reported have to be interpreted with caution.

Given the (methodological) challenges mentioned above, it is also difficult to determine whether platform work or crowdwork has become more important in recent years. One exception is the Collaborative Economy and Employment (COLLEEM) survey, which analyzes platform work in selected EU Member States (Pesole et al., 2018; Urzì Brancati et al., 2020). Comparing the two existing waves reveals a slight increase in the prevalence of individuals who have at least once gained income from providing services via online platforms from 9.5% to around 11% (Urzì Brancati et al., 2020).

The Online Labour Index (OLI) is another possible data source, measuring the utilization of online labor across countries and occupations by tracking the number of projects and tasks posted on major online platforms (Kässi & Lehdonvirta, 2018, p. 2). The Index indicates that between May 2016 and May 2020, the utilization of online labor increased by around 72 index points (i.e., 72%) worldwide.[4] After a decline in recent months, the index value is currently at around 118 (August 3, 2020). Based on the results of the OLI and in line with other studies (Farrell et al., 2019), it is reasonable to assume an increase in the importance of the platform economy. The current COVID-19 pandemic, which forces some employees to compensate for job losses or financial losses, may also lead to a further increase. However, given the interplay of various factors, it is unclear whether the platform economy, including crowdwork, will indeed continue to grow. On the one hand, technological developments and new product ideas may lead to further growth. The growing proportion of digital natives in the labor market may also result in an increase, as they are assumed to be more open-minded with respect to new technologies and new forms of work. Moreover, crowdwork in particular is an attractive option for specialists in global demand, because it gives them the necessary flexibility. On the other hand, stronger government regulation of platform work may inhibit its growth. Similarly, the growing desire of the working population for secure employment may also prevent further growth. Moreover, parts of platform work might be substituted by algorithms, artificial intelligence, and machines (Freudenberg et al., 2019). These opposing potential developments make it difficult to predict the relevance of platform and crowdwork in the future.

[4] The index is normalized so that 100 index points on the y-axis represents the daily average number of new projects in May 2016 (https://ilabour.oii.ox.ac.uk/online-labour-index/).

3.2 Sociodemographic Characteristics of Platform and Crowdworkers

Since the studies only rarely report differentiated results for crowdworkers (i.e., platform work that is performed completely online), the following sections discuss results for platform workers in general, thus also including non-digital platform workers. If specific results for crowdworkers are available, they are reported separately.

Most studies find the *gender* ratio to be balanced or that men tend to predominate in platform work (Marshall and Shipman, 2015; Huws et al., 2016). In the UK, for example, 54% of respondents are male; in Italy, men make up 45% and in Estonia 69% (Huws et al., 2019). Furthermore, Pesole et al. (2018) indicate that the proportion of women decreases as the amount (regarding income and/or working hours) of platform work increases.

Platform work can be found in all *age* groups, but it is more prevalent among younger individuals (e.g., Huws et al., 2019; Lepanjuuri et al., 2018; Kuek et al., 2015) with 40–50% of platform workers younger than 35 years (Bertschek et al., 2015; Huws et al., 2016). The proportion of young platform workers also increases with the amount (regarding income and/or working hours) of platform work (Pesole et al., 2018).

The existing studies mainly find that platform workers are highly *educated* (e.g., Ipeirotis, 2010; Berg et al., 2018; Serfling, 2018). This is not surprising, given that digital platforms appear to be used more frequently by Internet users, a subpopulation with an above-average educational level. Furthermore, Pesole et al. (2018) and Urzì Brancati et al. (2020) point out that the highest educational attainment varies across age groups and that the proportion of respondents with high education is substantially lower among very young platform workers (aged 16–25). This can simply be explained by the fact that many platform workers aged 16–25 have not yet completed their tertiary education.

The results regarding the *employment status* of platform workers are ambiguous. A literature review by Freudenberg et al. (2019) shows that between 31% and 68% of platform workers are employees. In the group of crowdworkers, the share of employees varies between 34% and approximately 50%. Regarding the prevalence among other employment groups, the proportion of self-employed platform workers and crowdworkers varies across studies between 5% and 13%, while 6–13% are students/pupils, and about 2% are retired employees (Huws et al., 2017; Pesole et al., 2018; Urzì Brancati et al., 2020). The differences in employment status can partly be attributed to differences across countries. Overall, it is surprising that the vast majority of platform workers, including crowdworkers, report to be employees. This might be explained by how employment status is measured in the surveys, as respondents are most often asked to define what they believe is their main or primary employment status (e.g., Berg et al., 2018; Lepanjuuri et al., 2018). Therefore, it remains unclear whether the platform work is carried out in an employed or self-employed relationship, as platform work is often not the main/primary employment.

Freudenberg et al. (2019) assume that the individuals are employees in their main job and platform workers in their secondary job (hybrid employment). In line with this result, it can be assumed that platform workers are more likely to be self-employed (Jäger et al., 2019).

The *income* earned through the platforms also indicates that platform work tends to be performed as a sideline. Only about 25–30% of platform workers report to have earned at least half of their income through platform work (Berg et al., 2018; Pesole et al., 2018; Huws et al., 2016). The study of Berg et al. (2018) points to a similar direction, finding that 32% of crowdworkers performing micro tasks identified crowdwork as their main source of income. The largest proportion of platform workers generates a maximum of 25% of their income via platforms (e.g., Sweden 46%, Austria 73%, Huws et al., 2016; EU-14 (average) 38%, Pesole et al., 2018). Furthermore, the studies point out that the income earned through platform work varies substantially and depends on the specific task performed (Eurofound, 2018c). In the German study by Serfling (2018), platform workers earn on average €808 gross per week, with 40% generating more than €1000 per week and 22% earning less than €25 a week. Studies also show strong differences in terms of hourly wages. For highly qualified crowdworkers, the hourly wage varies between €5 and €20. However, experts could also receive a wage of more than €100 per hour. For crowdworkers performing micro tasks, the gross hourly wages tend to be between €1 and €5 (Freudenberg et al., 2019). This finding thus emphasizes that crowdwork and platform work in general are accompanied by unpaid work, for instance, related to generating new business. De Groen and Maselli (2016) show that the effective hourly wages are up to 60% lower when unpaid working time is taken into account.

4 Work Situation of Platform Workers and Crowdworkers

It is clear from the above that platform work, including crowdwork, represents a specific form of employment, because digital platforms take over digital work tasks from companies and assign them to people on the Internet. The review of existing studies also indicates that platform work is mainly carried out as self-employed work. Both aspects imply that the organization of work is rather different from employment outside the platform. Furthermore, the advantages and disadvantages of platform work have recently been discussed very intensively. Table 2 briefly summarizes the possible advantages and disadvantages of platform work in general.

In the following, we take a deeper look at how platform work, and especially crowdwork, is organized and what this means in terms of working conditions.

Table 2 Advantages and disadvantages of platform work

Advantages	Disadvantages
Enables access to work for people who would otherwise be excluded (e.g., people with disabilities, caregivers, persons in economically deprived areas)	Precarious employment
Additional income	Health and safety risks (e.g., non-ergonomic workplaces, high work intensity, monotony)
Flexibility (time and space)	Job insecurity
Autonomy	Lack of control
Anonymity	Lack of social standards/protection
Enables social innovations	No/low employee participation
Low-cost access to employees around the world for companies	Social isolation
	Digital monitoring
	Nontransparent rating systems

Based on Berg et al. (2018), Eurofound (2019), Haider (2018), Huws (2016, 2018), and Schramm & Tietgen-Simonsen (2019)

4.1 Organizational Conditions

Working Hours As mentioned above, platform work in most cases is performed as a secondary activity in addition to regular work. It is not surprising, therefore, that platform workers more often report to work more than 40 h per week as compared to non-platform workers (Pesole et al., 2018; Urzì Brancati et al., 2020; Huws et al., 2017). This result has already emerged in other studies on multiple job holders (Hünefeld, 2019; Marucci-Wellman et al., 2014). In addition, Pesole et al. (2018) and Urzì Brancati et al. (2020) point out that full-time platform workers are almost twice as likely as non-platform workers to report more than 60 h of work per week. However, the number of hours per week spent on platform work alone is highly variable, ranging from 4 to 29 h in the COLLEEM study (Pesole et al., 2018; Urzì Brancati et al., 2020), for example. The authors report that the number of hours in non-platform work tends to decline when the amount of platform work increases. Leimeister et al. (2016b) also show that the number of hours worked by crowdworkers also varies by task. In their study, crowdworkers performing micro tasks had a maximum weekly working time of 25 h, while those with more complex tasks reported up to 80 h.

Platform workers and crowdworkers also more often report non-standard work schedules. For instance, Urzì Brancati et al. (2020) report that more than two thirds of all platform workers work on weekends and at night. Similar results can be observed for crowdworkers performing micro tasks. The authors argue that platform workers must look for new jobs all the time and that the idiosyncrasies of job posting, as well as differences in time zones, lead to long and atypical working hours (Berg et al., 2018).

Payment There are three different ways of getting paid for platform work: (1) based on tasks performed (piece-rate pay), (2) based on time worked, and (3) based on fixed daily, weekly, or monthly payments. The COLLEEM study shows that approximately 60% of platform workers get paid based on tasks performed; 25–39% get paid based on time worked; and 7–16% are paid a fixed daily, weekly, or monthly rate (Pesole et al., 2018; Urzì Brancati et al., 2020). However, the study also shows that the basis of remuneration depends on the amount of platform work. For instance, 51% of full-time platform workers are paid based on fixed daily, weekly, or monthly rates, in comparison with 29% of the less frequent platform workers. The authors of the study also point out that the high proportion of platform workers getting paid based on tasks performed or time worked indicates that many of them have to do a significant amount of unpaid work (online search, waiting for tasks, etc.) to get paid work (Urzì Brancati et al., 2020).

Legal Regulations and Social Protection The quality and amount of social protection (e.g., pension insurance, health and nursing care insurance, unemployment insurance) for new forms of employment and the way it is legally regulated (e.g., via an employment contract) is a key question. Although this is still a new field of research in the area of platform work – regulations differ by country and platform (Leimeister et al., 2016b) – we make a first step and try to give an overview of the most important findings from existing studies.

Given that platform work is mainly performed on a self-employed basis, numerous insurance and protection regulations do not apply, including overtime compensation, minimum wage protections, vacation pay, health insurance, disability insurance, unemployment insurance, maternity and paternity leave, or paid sick leave (Freudenberg et al., 2019; Huws et al., 2016). Using Amazon Mechanical Turk (AMT) as an example, Berg et al. (2018) show that AMT explicitly states that crowdworkers perform tasks as independent contractors, not as employees of the company, and that they are not entitled to company benefits like vacation pay, sick leave, or insurance programs. In line with this example, Berg et al. (2018) also reveal a lack of social protection of crowdworkers performing micro tasks. While at least 61% of the respondents were covered by health insurance, only 35% had a pension or retirement plan, and only 16% had unemployment insurance. In line with Leimeister et al. (2016b), the study points out that whether crowdwork is carried out as a main or secondary activity is crucial for workers' social protection status. Those who perform crowdwork as a secondary activity were more likely to have health insurance and other social insurance benefits as part of their main job (or dependents' co-insurance) than those whose main source of income was crowdwork.

Certainly, various European and non-European countries offer very different forms of protection for self-employed persons, sometimes with very specific regulations (Freudenberg et al., 2019). Based on a study of national policies in 35 European countries, Spasova et al. (2017) show that self-employed individuals in Romania, the Netherlands, the UK, Spain, and Germany are only partially covered by pension insurance. Furthermore, as many platforms have their headquarters outside Europe,

it can be assumed, at least for European crowdworkers, that they carry out cross-border platform work. At first glance, it is thus not always clear which legal regulations apply. Moreover, as self-employed individuals, platform workers cannot rely on company-related mechanisms such as co-determination in order to improve their work situation. In addition to the lack of safety and protection regulations, platform workers do not receive any company benefits (including access to HR measures such as training, mentoring, or coaching; Eurofound, 2018c).

Management of Work Processes Technology is a core element of platform work, serving as the main tool for allocating tasks, process monitoring and rating, and communicating with employees and customers but also for processing payments (Huws et al., 2017). More specifically, algorithmic management of the work force is a key feature of digital work platforms (Berg et al., 2018). This means that tasks are assigned to the crowd by algorithms and tracked data; algorithms also optimize and evaluate the work done (Lee et al., 2015). In line with this, about 60% of the platform workers in the COLLEEM study, for example, report being under constant monitoring, and approximately 70% emphasize that ratings are key for getting work on platforms. The study also highlights that the distribution of monitoring and the importance of ratings depend on the type of platform work. Thus, these two aspects are more pronounced in online professional work than in online micro tasks, for instance (Urzì Brancati et al., 2020).

In contrast, the dependence of platform work on technology and algorithmic management goes hand in hand with a certain degree of anonymity, which some service providers prefer. On the other hand, this may also imply certain problems. Employer or customer ratings have a high impact on whether the employee is given additional tasks, is able to charge a reasonable fee, or whether he or she remains in the database at all, for example (Eurofound, 2019; Huws et al., 2016). This system could also result in unfair ratings. Qualitative studies in particular indicate that platform workers are repeatedly confronted with unfair ratings and that it is difficult to challenge them (Huws et al., 2019; Berg et al., 2018). The rating systems can also lead to a power asymmetry (Kingsley et al., 2015). Some respondents report that customers are aware of their power over platform workers through the rating system and use this to their advantage (Huws et al., 2017). Furthermore, the rating systems are often not transparent, and/or ratings may not be fully accessible to the platform workers (Huws et al., 2019). As a consequence, workers face an increased risk of experiencing stress from being continuously evaluated and assessed (Garben, 2017).

Another specific difficulty results from the lack of opportunities to communicate with the platforms. Sometimes, the only way to communicate with the platforms is via email, and there is often no direct contact person in the case of problems (Huws et al., 2017, 2019). One aspect of the poor communication between platform and platform workers is the arbitrariness of decisions. For example, platform workers report that they could not accept tasks or were deactivated on the platform or their work was rejected without explanation (Huws et al., 2017). Berg et al. (2018) report that almost nine out of ten workers in the ILO survey saw their work rejected or payment refused. Only 12% of respondents said that all rejections were justifiable.

The authors also show that platform workers are frustrated by their inability to appeal unfair rejections. Asymmetric information between client, worker, and platform is also reported. Whereas workers usually have little information about the client and the tasks to be performed, clients have detailed information about the worker through rating systems and profiles (Eurofound, 2018c; Florisson & Mandl, 2018).

The unpaid time of waiting or bidding for work also represents a challenge in platform work (Broughton et al., 2018; Huws et al., 2017; Berg et al., 2018). First, platform workers report periods waiting for work (Huws et al., 2017). Second, since platforms are located in different time zones, it is necessary to check regularly whether new tasks are available (Berg et al., 2018). Third, companies assign their tasks through competitions, meaning only the best worker is selected and thus paid (Jäger et al., 2019).

Finally, the organization of work via online platforms results in challenges regarding data protection and privacy. Workers often have to disclose personal information if they want to get jobs through platforms. Furthermore, behavioral data, such as the number of clicks on a page or likes, can be recorded, analyzed, and used for internal purposes or sold to third parties. For the worker, it is not always clear whether their data is handled confidentially (Eurofound, 2018c; Florisson & Mandl, 2018).

4.2 Job Demands and Outcomes[5]

For a safe and healthy workplace, it is not only the organization of work that matters but also the specific working conditions. In a first step, we evaluate the working conditions of platform workers based on existing studies. To the best of our knowledge, studies allowing for a direct comparison of the working conditions between platform workers and non-platform workers are scarce. In a second step, we therefore analyze the working conditions of employees who also work extensively with ICT (self-employed individuals and employees) in order to gain a better understanding of the differences and similarities of platform work and digitized employment forms outside a platform.

Flexibility, Autonomy, and Control As discussed earlier, a central aspect associated with platform work is flexibility (e.g., Berg et al., 2018; Graham et al., 2017; Huws et al., 2017). Urzì Brancati et al. (2020) show, for example, that 80% of platform workers characterize their work as highly flexible. In the qualitative study of Broughton et al. (2018), platform workers commonly respond that they are able to make their own decisions regarding when and how long to work and what tasks to do. The study also shows that individuals with childcare responsibilities doing

[5] A summary of the most important literature on the working conditions of platform workers can be found in Florisson and Mandl (2018).

online administrative tasks are especially appreciative of the high degree of working time flexibility. At the same time, this flexibility involves a high degree of autonomy, and platform workers have control over scheduling their work tasks (Berg et al., 2018).

However, some platform workers also report a lack of flexibility, autonomy, and control. For instance, offers are often made at the last minute, leading to short-term changes of plan (Broughton et al., 2018). In addition, work might not be available when the platform workers plan to work (Berg et al., 2018). Finally, customers and platforms have a certain degree of control over the platform workers via the rating system (Huws et al., 2017). In the study of Serfling (2018), for example, about 30% of respondents report that they have little or no control over the time they spend completing paid tasks mediated via online platforms. The degree of flexibility, autonomy, and control varies by platform and type of work. For example, offline platform workers have less control over when, where, and how they perform the tasks than crowdworkers (De Groen et al., 2018). Likewise, online clickworkers have less autonomy and control over their work than other platform workers. The technology enables the monitoring of workers while the task is being performed. For example, non-compliance with instructions provided by the platform can be detected, resulting in negative consequences for the workers (Eurofound, 2019).

Job (In)security The previous findings already suggest that platform work can be associated with increased job insecurity. First, the lack of social protection resulting from the status of self-employment is accompanied by uncertainties. Second, the often short duration of tasks, the varying availability of orders, the lack of a guaranteed minimum wage, and competition lead to low security for workers (Florisson & Mandl, 2018). Third, the unpredictability of work opportunities also results in unpredictability of income (Eurofound, 2019).

Work Intensity and Stress On the one hand, platform work – especially crowdwork – goes hand in hand with a fast work pace. By working fast, more tasks can be completed, and thus more money can be earned. Furthermore, a fast pace of work can also be accompanied by better ratings, thus leading to more job offers (Broughton et al., 2018). Platform work also goes hand in hand with the expectation that workers respond quickly to incoming tasks/orders (Huws et al., 2017). Eurofound (2019) also points out that increased work intensity in platform work especially occurs when customers underestimate the amount of work a job requires. On the other hand, platform workers also report periods during the year in which not enough work tasks are available (Broughton et al., 2018). Analyzing clickworkers, the study of Berg et al. (2018) points out that a frustrating part of platform work is waiting for tasks and that 88% of respondents would like to work more. For 58%, the reason is that not enough jobs are available. Similar results can be found in Graham et al. (2017), who emphasize an oversupply of labor as one risk of platform work.

In the study of Leimeister et al. (2016b), crowdworkers rated time pressure and workload as moderate to poor. Crowdworkers performing testing tasks gave the

lowest ratings for both aspects compared to crowdworkers performing micro or design tasks, for example. Furthermore, the studies indicate that platform work involves a variety of tasks, including cognitively demanding tasks (Leimeister et al., 2016b; Huws et al., 2017). For example, in the study of Graham et al. (2017), 53% report a diversity of tasks, including solving complex tasks. However, in other studies, platform workers also report that their work is monotonous (Pesole et al., 2018; Urzì Brancati et al., 2020). Overall, the studies conclude that platform workers are able to influence the intensity of their work. However, this can also vary according to the type of platform work performed and the specific platform. Work intensity is likely to increase, for example, if the calculated time is too short (e.g., food delivery), if breaks are too short, or if the amount of work is unpredictable (e.g., high-skilled crowdwork; Eurofound, 2018b).

The study of Urzì Brancati et al. (2020) shows that 50% of platform workers experience stress at work. Broughton et al. (2018) point out that some platform workers are stressed by not knowing their schedule, the type of work, or their earnings for the next week. Furthermore, stress may arise when platform workers live with the constant fear of bad ratings (Huws et al., 2019). As pointed out above, platform workers mostly highlight the benefit of working from home. However, working from home might also lead to social isolation (Graham et al., 2017). Huws et al. (2016) argue that crowdworkers in particular may experience increased psychological stress caused by a lack of support and social isolation, the geographical distance to the client, and the absence of colleagues.

Safety and Health Risks Safety and health risks vary considerably across the different types of work. Platform workers who perform online tasks and work mainly at home (crowdworkers) mention long periods of sitting and spending long hours in front of the screen as a health risk (Huws et al., 2017). Huws et al. (2016) emphasize that workplaces that do not meet ergonomic standards and the non-use of preventive medical examinations (e.g., eye tests) might be a health risk in crowdwork. Overall, however, health risks are more likely to be reported by platform workers engaged in outdoor tasks (e.g., physically strenuous work, traffic accidents, suspicious types of offers, attacks and harassment by clients; Broughton et al., 2018; Huws et al., 2016, 2017). The study of Urzì Brancati et al. (2020) also highlights the different health risks associated with different types of platform work. In total, 47% report that their work involves health or safety risks – ranging from 34% among platform workers with online micro tasks to 54% among workers with online professional services. Eurofound emphasizes that the physical environment in platform work hardly differs from comparable work environments in the traditional economy. However, the responsibilities for ensuring the physical health and safety of platform workers are often unclear given the ambiguous employment status of workers. This can become especially problematic if platforms use the pay-by-task mechanism and if tasks are primarily performed quickly and with insufficient care (Eurofound, 2019).

Job Satisfaction In the study of Broughton et al. (2018), crowdworkers in particular are highly satisfied with their working conditions. Working in their home

environment, they believe it is their own responsibility to change things (e.g., office equipment, work environment) if they are not appropriate. In addition, other studies indicate that platform workers are generally satisfied with their work (Leimeister et al., 2016b; Bertschek et al., 2015; Serfling, 2018). However, there are also indications of dissatisfaction among platform workers with regard to the predictability of work and their income (Bertschek et al., 2015; Berg, 2016).

Overall, it is evident that platform work is associated with a high degree of flexibility. Platform workers also appear to be predominantly satisfied with their work. However, there are also some negative aspects, such as a fast work pace, lack of predictability, low income, or the importance of ratings. The actual working conditions also depend on the platform under consideration and the specific type of task. Furthermore, Pesole et al. (2018) indicate that the negative conditions increase with the amount of platform work.

4.3 Comparison with Other Employees

The study by Huws et al. (2017) reveals some similarities between platform workers and non-platform workers regarding work-related electronic communications from home or the use of digital apps for workflow management and reporting. However, this study does not allow for comparing the job quality (e.g., physical workload, working intensity, or job autonomy) of platform workers and non-platform workers.

To get a better insight into how the work situation and the job quality of platform and crowdworkers differs from that of other employees who also work extensively with digital media (i.e., desktop PC, laptop, or tablet PC) but not on platforms, we draw on 9382 employed individuals in the BAuA-Working Time Survey 2019 (Häring et al., 2020). Specifically, we compare solo self-employed workers using ICT (3%, n = 307) to employees using ICT (75%, n = 7,053). For comparison, we also include the group of (self-)employed individuals not using ICT at work (18%, n = 1724). Overall, the group of ICT-using solo self-employed individuals identified in the data is similar in various sociodemographic characteristics to the group of platform workers and crowdworkers described in previous studies. The group of solo self-employed individuals using ICT mainly consists of well-educated men, a high proportion of whom only work few hours per week and have a rather low income.

Table 3 summarizes the prevalence of certain working conditions across the three different groups. As expected, individuals using ICT at work seem to perform physically demanding tasks (19%) less often than workers not using ICT at work (53%). Regarding work intensity, multitasking seems to be especially common among individuals using ICT. In accordance with the results of previous studies, individuals doing digital work and solo self-employed individuals in particular seem to have a higher level of job autonomy. However, solo self-employed individuals are also more often confronted with blurring boundaries, long hours, and non-standard

schedules. This is also reflected in the increased frequency of being contacted in private life for work-related reasons. Interestingly, there are hardly any differences in the ability to detach from work across the three groups (42–45%). As indicated by the previous studies, solo self-employed individuals on average also report somewhat better health outcomes, higher job satisfaction, and higher satisfaction with the compatibility of private life and work.

5 Conclusion

This chapter took a detailed look at the phenomenon of platform work and crowdwork. Specifically, we tried to assess the prevalence of platform work, the characteristics of platform workers and the typical working conditions related to platform work. On the one hand, existing studies provide rather clear answers, although some evidence is still ambiguous and requires further research. For instance, it is apparent that it is difficult to precisely estimate the distribution of platform work and crowdwork based on the available database. The values range from 8% to 28%, depending on the country (crowdwork: 3–14%). Given the methodological heterogeneity of the studies, it is reasonable to assume that platform work is not such a widespread phenomenon at this point. However, the proportion of platform workers may increase as a result of certain developments such as new technologies, new product ideas, or calls for even more flexibility among employees and companies. In contrast, the studies uniformly indicate that platform workers tend to be male, younger (<35 years), and highly educated. With regard to employment status, platform workers are mostly employees in their main job, pursuing platform work as a secondary occupation. The platform work itself is based on self-employment. The income earned through the platforms also indicates that platform work tends to be performed as a sideline, with the largest proportion of platform workers generating a maximum of 25% of their income via platforms.

With regard to the work situation of platform workers, the studies suggest that platform work is related to certain advantages and disadvantages, which may vary by type of platform work (e.g., crowdwork or gig work), type of platform, country, and the individual's personal circumstances. In general, the advantages include a high degree of flexibility in terms of time and place, autonomy, or a better balance between work and private life for employees. Because of its flexibility and independence from the local labor market, platform work, and especially crowdwork, also creates access to work for people who would otherwise likely be excluded. Disadvantages include blurring boundaries, a high amount of unpaid work, lack of social protection, and social isolation.

Furthermore, it becomes clear that there are similarities in the work situation of platform workers and other employees who also work extensively with digital media (regarding e.g., flexibility, autonomy, work-life balance, blurring boundaries, or low income). As the special feature of platform work and crowdwork is that the work is organized entirely online according to the rules of an Internet platform,

Table 3 Working conditions of solo self-employed individuals and employees using ICT in comparison to non-ICT users

		ICT use		No ICT use	Total
		Solo self-employed	Employed		
Work intensity	High deadline or performance pressure[1]	39%	47%	38%	46%
	Multitasking[1]	42%	39%	27%	37%
	Working very quickly[1]	32%	47%	49%	47%
	Interruptions[1]	23%	55%	31%	49%
Temporal boundarylessness	Long working hours (at least 48 hours per week)	27%	12%	14%	14%
	Contacted in private life for work-related reasons[1]	31%	11%	10%	12%
	Weekend work (at least once a month)	80%	38%	54%	43%
	Atypical working hours (outside 7am to 7pm)	19%	19%	31%	21%
Job autonomy	Work is stipulated in the minutest details[1]	.	24%	34%	25%
	Ability to plan and schedule work[1]	92%	78%	56%	75%
	Influence on assigned workload[1]	72%	35%	24%	35%
Detachment	Ability to detach from work	42%	45%	43%	44%
Physical workload	Physically demanding work tasks[2]	19%	19%	53%	26%
Well-being	Scheduling of working hours allowances private life[3]	67%	62%	56%	61%
	(Very) good general state of health[4]	77%	72%	55%	70%
	(Very) satisfied overall with work[5]	97%	93%	91%	93%
	(Very) satisfied with how work life and personal life fit together[5]	85%	80%	81%	81%

Data: BAuA-Working Time Survey 2019 ($8872 \leq n \leq 9348$)

[1]Scale: "often," "rarely," "sometimes," and "never"; percentages correspond to the share of "often" (vs. "rarely," "sometimes," and "never")

[2]Items "lifting and carrying heavy loads" and "working in a bent, squatting, kneeling or recumbent position, working overhead" were combined. Scale: "often," "rarely," "sometimes," "never"; percentage corresponds to share of "often" in at least one of the two items (vs. "rarely," "sometimes," and "never" in both items)

[3]Item "In the scheduling of working hours, I manage to make allowances for family and private interests" scale ranges from 1 "strongly agree" to 5 "strongly disagree"; percentages correspond to 1–2 "(strongly) agree" (vs. 3–5 "partly," "(strongly) disagree")

(continued)

Table 3 (continued)

[4]General state of health scale: 1 "very good" to 5 "very bad"; percentages correspond to 1–2 "(very) good" (vs. 3–5 "partly," "bad," "very bad")

[5]Overall work satisfaction scale: "very satisfied," "satisfied," "somewhat satisfied," and "not satisfied at all"; percentages correspond to "very satisfied" and "satisfied" (vs. "somewhat satisfied" and "not satisfied at all")

·Sample size too small, n (unweighted) < 30

platform work is also accompanied by very specific conditions (e.g., anonymity, monitoring, rating systems, or specific channels for communicating with the platforms). Furthermore, the flexibility of platform workers may also be limited by the platforms' specific work organization, making it unclear whether it is the employees who gain flexibility or rather the clients. Furthermore, using the example of people with disabilities, Frieß & Nowak (2021) point out that the specific work organization on platforms can also exclude people from this work.

It also remains unclear whether the COVID-19 pandemic will have a lasting impact on platform work. Given the diversity of platform work, different effects can be expected. On the one hand, we see that food delivery platforms play an important role during lockdown periods, providing essential services to consumers (Rani & Dhir, 2020). Accordingly, the Online Labour Index also suggests an increase in crowdwork. On the other hand, platform workers working in passenger transport or household services, for example, experienced a decrease in work and thus also in income (Eurofound, 2020). In general, the uncertainties in platform work are also growing. During the COVID-19 pandemic, there is stronger fluctuation in job availability for platform workers (Online Labour Index). Whereas crowdworkers can work safely from home, location-based platform workers, such as delivery service workers or cab drivers, are at a particular risk because they cannot always ensure social distance (Rani & Dhir, 2020).

Taken as a whole, it becomes apparent that platform work is associated with both opportunities and risks for employees and presents a challenge for the safe and healthy organization of work. First research has ignited a debate about the needs for regulating platform work. In the future, platform workers, platform owners, unions, and policymakers must continue their conversations and address important questions regarding the safety and health of platform workers, including social protection, minimum wages, and psychological and physical well-being.

Acknowledgment The authors thank F. Kopatz for valuable help in the publication process.

References

Beerepoot, N., & Lambregts, B. (2015). Competition in online job marketplaces: towards a global labour market for outsourcing services? *Global Networks, 15*(2), 236–255.

Benner, C. (2015). *Crowdwork – zurück in die Zukunft – Jobmaschine oder moderne Sklaverei?* Bund-Verlag.

Berg, J. (2016). Income security in the on-demand economy: Findings and policy lessons from a survey of crowdworkers. *Comparative Labor Law & Policy Journal, 37*(3), 543–576.

Berg, J., Furrer, M., Harmon, E., Rani, U., & Silberman, S. M. (2018). *Digital labour platforms and the future of work. Towards decent work in the online world.* : International Labour Organization. http://wtf.tw/text/digital_labour_platforms_and_the_future_of_work.pdf. Accessed 22 Aug 2020.

Bertschek, I., Ohnemus, J., & Viete, S. (2015). *Befragung zum sozioökonomischen Hintergrund und zu den Motiven von Crowdworkern an das Bundesministerium für Arbeit und Soziales, Berlin: Endbericht zur Kurzexpertise*. ZEW-Gutachten und Forschungsberichte.

Bonin, H., & Rinne, U. (2017). Omnibusbefragung zur Verbesserung der Datenlage neuer Beschäftigungsformen. *IZA Research Report, 80*.

Bormann, S. (2018). Crowdworking: Potenzielle Auswirkungen und gewerkschaftliche Handlungsfelder. In Wissenschaftliches Zentrum für Informationstechnik-Gestaltung (Ed.), *Herausforderung Cloud & Crowd: Good Practices und Handlungsempfehlungen*. Kassel: University Press.

Broughton, A., Gloster, R., Marvell, R., Green, M., Langley, J., & Martin, A. (2018). *The experiences of individuals in the gig economy*. HM Government. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/679987/171107_The_experiences_of_those_in_the_gig_economy.pdf. Accessed 22 Aug 2020.

Cascio, W. F. (2003). Changes in workers, work, and organizations. *Handbook of Psychology, 12*, 401–422.

Clott, C. B. (2004). Perspectives on global outsourcing and the changing nature of work. *Business and Society Review, 109*(2), 153–170. https://doi.org/10.1111/j.0045-3609.2004.00189.x

Current Population Survey Staff. (2018). Electronically mediated work: New questions in the Contingent Worker Supplement. *Monthly Labor Review, 9*, 1–32.

De Groen, W., Kilhoffer, Z., Lenaerts, K., & Mandl, I. (2018). *Employment and working conditions of selected types of platform work*. Cornell University ILR School. https://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?article=1640&context=intl. Accessed 28 Aug 2020.

De Groen, W., & Maselli, I. (2016). *The impact of the collaborative economy on the labour market*. Brüssel: Centre for European Policy Studies. http://aei.pitt.edu/76467/1/SR138CollaborativeEconomy_0.pdf. Accessed 24 Aug 2020.

Durward, D., Blohm, I., & Leimeister, J. M. (2016). Crowd work. *Business & Information Systems Engineering, 58*(4), 1–6.

Eurofound. (2018a). *Automation, digitalisation and platforms: Implications for work and employment*. Publications Office of the European Union. https://www.eurofound.europa.eu/publications/report/2018/automation-digitisation-and-platforms-implications-for-work-and-employment. Accessed 2 Dec 2020.

Eurofound. (2018b). *Employment and working conditions of selected types of platform work*. Publications Office of the European Union. https://www.eurofound.europa.eu/publications/report/2018/employment-and-working-conditions-of-selected-types-of-platform-work. Accessed 2 Dec 2020.

Eurofound. (2018c). *Overview of new forms of employment – 2018 update*. Publications Office of the European Union. https://www.eurofound.europa.eu/publications/customised-report/2018/overview-of-new-forms-of-employment-2018-update. Accessed 2 Dec 2020.

Eurofound. (2019). *Platform work: Maximising the potential while safeguarding standards?* Publications Office of the European Union. https://www.eurofound.europa.eu/publications/policy-brief/2019/platform-work-maximising-the-potential-while-safeguarding-standards. Accessed 2 Dec 2020.

Eurofound. (2020). *Platform economy: Developments in the COVID-19 crisis*. https://www.eurofound.europa.eu/data/platform-economy/dossiers/developments-in-the-covid-19-crisis. Accessed 2 Dec 2020.

Farrell, D., & Greig, F. (2016). *The online platform economy: Has growth peaked?* JPMorgan Chase & Co. Institute. https://institute.jpmorganchase.com/institute/research/labor-markets/jpmc-institute-online-platform-econ-brief. Accessed 21 Aug 2020.

Farrell, D., Greig, F., & Hamoudi, A. (2019). The evolution of the online platform economy: Evidence from five years of banking data. *AEA Papers and Proceedings, 109*, 362–366.

Flecker, J., Fibich, T., & Kraemer, K. (2017). Socio-economic changes and the reorganization of work. In C. Korunka & B. Kubicek (Eds.), *Job demands in a changing world of work* (pp. 7–24). Springer.

Freudenberg, C., Schulz-Weidner, W., & Wölfle, I. (2019). Soziale Sicherung von Plattformarbeit im internationalen Vergleich – Gute Praxis und Handlungsoptionen für Deutschland. *Deutsche Rentenversicherung, 4*, 365–397.

Florisson, R., & Mandl, I. (2018). *Platform work: Types and implications for work and employment – Literature review*. Working paper WPEF18004 Eurofound. Dublin. https://www.eurofound.europa.eu/data/platform-economy/records/platform-work-types-and-implications-for-work-and-employment-literature-review. Accessed 2 Dec 2020.

Frieß, W., & Nowak, I. (2021). Menschen mit Beeinträchtigungen als Crowdworker_innen – Inklusion in die Prekarität? In M. Altenried, S. Animento, J. Drück, & M. Wallis (Eds.), *Plattformkapitalismus und die Krise der sozialen Reproduktion* (pp. 252-273). Westfälisches Dampfboot.

Garben, S. (2017). *Protecting workers in the online platform economy: An overview of regulatory and policy developments in the EU*. : Publications Office of the European Union. https://osha.europa.eu/en/publications/protecting-workers-online-platform-economy-overview-regulatory-and-policy-developments. Accessed 24 Aug 2020.

Gazier, B., & Bruggeman, F. (2008). *Restructuring work and employment in Europe: managing change in an era of globalisation*. Edward Elgar Publishing.

Gerber, C., & Krzywdzinski, M. (2019). Entgrenzung in der digitalen Onlinearbeit am Beispiel von Crowdwork. In H. Hanau & W. Matiaske (Eds.), *Entgrenzung von Arbeitsverhältnissen. Arbeitsrechtliche und sozialwissenschaftliche Perspektiven* (pp. 25–48). Baden-Baden.

Gerdenitsch, C. (2017). New ways of working and satisfaction of psychological needs. In C. Korunka & B. Kubicek (Eds.), *Job demands in a changing world of work* (pp. 91–109). Springer International Publishing.

Graham, M., Lehdonvirta, V., Wood, A., Barnard, H., Hjorth, I., & Simon, D. P. (2017). *The risks and rewards of online gig work at the global margins*. . University of Oxford. https://ora.ox.ac.uk/objects/uuid:8c791d5a-e3a5-4a59-9b93-fbabea881554/download_file?file_format=pdf&safe_filename=Risk%2Band%2BRewards%2Bof%2BOnline%2BGig%2BWork.pdf&type_of_work=Report. Accessed 5 Aug 2020.

Greef, S., Schroeder, W., & Sperling, H. J. (2020). Plattformökonomie und Crowdworking als Herausforderungen für das deutsche Modell der Arbeitsbeziehungen. *Industrielle Beziehungen. Zeitschrift für Arbeit, Organisation und Management, 2*, 205–226.

Green, A., de Hoyos, M., Barnes, S.-A., Baldauf, B., & Behle, H. (2014). *Exploratory research on internet-enabled work exchanges and employability*. Luxembourg: European Commission. Institute for Prospective Technological Studies. ftp://ftp.jrc.es/pub/EURdoc/JRC85646.pdf. Accessed5 Aug 2020.

Green, F. (2001). It's been a hard day's night: The concentration and intensification of work in late twentieth-century Britain. *British Journal of Industrial Relations, 39*(1), 53–80.

Haider, R. (2018). *Auswirkungen der Digitalisierung auf Arbeitswelt und Gesellschaft Frühlingswerskatt*. Spital am Pyhrn. https://renner-institut.spooe.at/wp-content/uploads/sites/202/2018/04/Unterlagen_Digitalsierung.pdf. Accessed 25 Aug 2020.

Häring, A., Schütz, H., Kleudgen, M., Brauner, C., Vieten, L., Michel, A., et al. (2020). *Methodenbericht und Fragebogen zur BAuA-Arbeitszeitbefragung 2019. baua: Bericht*. Dortmund/Berlin/Dresden: Bundesanstalt für Arbeitsschutz und Arbeitsmedizin. www.baua.de/dok/8840832. Accessed 31 Aug 2020.

Heeks, R. (2017). Decent work and the digital gig economy: A developing country perspective on employment impacts and standards in online outsourcing, crowdwork, etc. *Development Informatics. Working Paper*, *71*.

Howcroft, D., & Bergvall-Kåreborn, B. (2019). A typology of crowdwork platforms. *Work, Employment and Society, 33*(1), 21–38.

Hünefeld, L. (2019). *Belastungsfaktoren, Ressourcen und Beanspruchungen bei Soloselbstständigen und Mehrfachbeschäftigten. baua: Bericht kompakt*. Bundesanstalt für Arbeitsschutz und Arbeitsmedizin.

Huws, U. (2016). *A review on the future of work: Online labour exchanges or crowdsourcing: Implications for occupational health and safety*. European Agency for Safety and Health at Work.

Huws, U. (2018). *Protecting workers in the online platform economy*. Workshop on protecting workers in the online platform economy. Brussels. https://osha.europa.eu/de/tools-and-resources/seminars/workshop-protecting-workers-online-platform-economy. Accessed 5 Aug 2020.

Huws, U., Spencer, N., Coates, M., & Holts, K. (2019). *The platformisation of work in Europe. Results from research in 13 European countries*. FEPS, UNI Europa, & the University of Hertfordshire. https://www.researchgate.net/publication/339727028. Accessed 21 Aug 2020.

Huws, U., Spencer, N. H., & Joyce, S. (2016). *Crowd work in Europe*. Foundation for European Progressive Studies. https://www.feps-europe.eu/Assets/Publications/PostFiles/463_1.pdf. Accessed 22 Aug 2020.

Huws, U., Spencer, N. H., & Syrdal, D. (2018). Online, on call: The spread of digitally organised just-in-time working and its implications for standard employment models. *New Technology, Work, Employment, 33*(2), 113–129.

Huws, U., Spencer, N. H., Syrdal, D. S., & Holts, K. (2017). *Work in the European gig economy*. FEPS, UNI Europa & the University of Hertfordshire. https://uhra.herts.ac.uk/bitstream/handle/2299/19922/Huws_U._Spencer_N.H._Syrdal_D.S._Holt_K._2017_.pdf?sequence=2. Accessed 23 Aug 2020.

Ipeirotis, P. G. (2010). *Demographics of mechanical turk*. NewYork University. https://archivefda.dlib.nyu.edu/jspui/bitstream/2451/29585/2/CeDER-10-01.pdf. Accessed 22 Aug 2020.

Ittermann, P., Abel, J., & Hirsch-Kreinsen, H. (2013). Mitbestimmung bei Einfacharbeit-eine Grauzone betrieblicher Interessenregulierung in der Industrie. *AIS-Studien, 6*(2), 24–40.

Ivanova, M., Bronowicka, J., Kocher, E., & Degner, A. (2018). *Foodora and Deliveroo: The app as a boss? Control and autonomy in app-based management-the case of food delivery riders*. Working Paper Hand-Böckler-Stiftung.

Jäger, G., Zilian, L. S., Hofer, C., Füllsack, M., & Coordination. (2019). Crowdworking: Working with or against the crowd? *Journal of Economic Interaction, 14*(4), 761–788.

Kässi, O., & Lehdonvirta, V. (2018). Online labour index: Measuring the online gig economy for policy and research. *Technological forecasting, 137*, 241–248.

Kingsley, S. C., Gray, M. L., Suri, S., & Internet. (2015). Accounting for market frictions and power asymmetries in online labor markets. *Policy & Internet, 7*(4), 383–400.

Kirchner, S., & Matiaske, W. (2020). Plattformökonomie und Arbeitsbeziehungen-Digitalisierung zwischen imaginierter Zukunft und empirischer Gegenwart. *Industrielle Beziehungen: Zeitschrift für Arbeit, Organisation und Management, 27*(2), 105–119.

Kittur, A., Nickerson, J. V., Bernstein, M., Gerber, E., Shaw, A., Zimmerman, J., et al. (2013). The future of crowd work. In *Proceedings of the 2013 Conference on Computer Supported Cooperative Work* (pp. 1301–1318). San Antonio, TX.

Korunka, C., & Kubicek, B. (2017). Job demands in a changing world of work. In C. Korunka & B. Kubicek (Eds.), *Job demands in a changing world of work* (pp. 1–5). Springer International Publishing.

Kottwitz, M. U., Otto, K., & Hünefeld, L. (2019). *Belastungsfaktoren, Ressourcen und Beanspruchungen bei Soloselbstständigen und Mehrfachbeschäftigten*. Bundesanstalt für Arbeitsschutz und Arbeitsmedizin.

Kubicek, B., Paškvan, M., & Bunner, J. (2017). The bright and dark sides of job autonomy. In C. Korunka & B. Kubicek (Eds.), *Job demands in a changing world of work* (pp. 45–63). Springer.

Kuek, S. C., Paradi-Guilford, C., Fayomi, T., Imaizumi, S., Ipeirotis, P., Pina, P., et al. (2015). *The global opportunity in online outsourcing*. World Bank. https://openknowledge.worldbank.org/bitstream/handle/10986/22284/The0global0opp0n0online0outsourcing.pdf

Lee, M. K., Kusbit, D., Metsky, E., & Dabbish, L. (2015). Working with machines: The impact of algorithmic and data-driven management on human workers. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems (*pp. 1603–1612). : ACM. https://www.researchgate.net/profile/Min_Kyung_Lee/publication/277875720_Working_with_Machines_The_Impact_of_Algorithmic_and_Data-Driven_Management_on_Human_Workers/links/5575a4d308aeb6d8c01985b8.pdf. Accessed 24 Aug 2020.

Lee, Z. W., Chan, T. K., Balaji, M., & Chong, A. Y.-L. (2018). Why people participate in the sharing economy: an empirical investigation of Uber. *Internet Research, 28*(3), 829–850.

Leimeister, J. M., Zogaj, S., Durward, D., & Blohm, I. (2016a). Systematisierung und Analyse von Crowd-Sourcing-Anbietern und Crowd-Work-Projekten. *Study der Hans-Böckler-Stiftung, 324*.

Leimeister, J. M., Durward, D., & Zogaj, S. (2016b). *Crowd Worker in Deutschland: Eine empirische Studie zum Arbeitsumfeld auf externen Crowdsourcing-Plattformen*. Study der Hans-Böckler-Stiftung.

Lepanjuuri, K., Wishart, R., & Cornick, P. (2018). *The characteristics of those in the gig economy*. UK Department for Business, Energy & Industrial Strategy. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/687553/The_characteristics_of_those_in_the_gig_economy.pdf. Accessed 21 Aug 2020.

Marshall, C. C., & Shipman, F. M. (2015). Who owns your social networks? *18th ACM Conference on Computer Supported Cooperative Work*. http://www.csdl.tamu.edu/~shipman/papers/cscw15.pdf. Accessed 22 Aug 2020.

Marucci-Wellman, H. R., Lin, T.-C., Willetts, J. L., Brennan, M. J., & Verma, S. K. (2014). Differences in time use and activity patterns when adding a second job: Implications for health and safety in the United States. *American Journal of Public Health, 104*(8), 1488–1500.

Menz, W., & Kratzer, N. (2015). Qualitative Methoden in der Belastungsanalyse. In N. Kratzer, W. Menz, & B. Pangert (Eds.), *Work-Life-Balance-eine Frage der Leistungspolitik* (pp. 337–353). Springer.

Mrass, V., & Peters, C. (2017). Crowdworking-Plattformen in Deutschland. In J. M. Leimeister (Ed.), *Working Paper Series*. https://www.alexandria.unisg.ch/250739/1/JML_615.pdf.

OECD. (2019). *OECD Employment Outlook 2019: The future of work*. https://www.oecd-ilibrary.org/sites/9ee00155-en/index.html?itemId=/content/publication/9ee00155-en

Pesole, A., Brancati, M., Fernández-Macías, E., Biagi, F., & Vázquez, G. (2018). *Platform workers in Europe.* : Publications Office of the European Union. https://publications.jrc.ec.europa.eu/repository/bitstream/JRC112157/jrc112157_pubsy_platform_workers_in_europe_science_for_policy.pdf. Accessed 21 Aug 2020.

Pesole, A., Fernández-Macías, E., Urzí Brancati, C., & Estrella, G. H. (2019). *How to quantify what is not seen? Two proposals for measuring platform work*. European Commission Joint Research Centre. https://ec.europa.eu/jrc/sites/jrcsh/files/jrc117168.pdf. Accessed 21 Aug 2020.

Pongratz, H. (2009). Konkurrenz und Integration in Reorganisationsprozessen. Zur Problematik „schöpferischer Zerstörung“ innerhalb von Organisationen. *Soziale Welt, 60*(2), 179–197.

Pongratz, H. (2018). Of crowds and talents: Discursive constructions of global online labour. *New Technology, Work, Employment, 33*(1), 58–73.

Pongratz, H., & Bormann, S. (2017). Online-Arbeit auf Internet-Plattformen: Empirische Befunde zumCrowdworkingin Deutschland. *Arbeits- und Industriesoziologische Studien, 10*(2), 158–181.

Pongratz, H., & Voß, G. G. (2002). Unternehmer der eigenen Arbeitskraft. Reichweite und Folgen des Typus des Arbeitskraftunternehmers. In H. Eichmann, I. Kaupa, & K. Steiner (Eds.), *Game Over? Neue Selbständigkeit und New Economy nach dem Hype* (pp. 15–35). Falter.

Rani, U., & Dhir, R. K. (2020). Platform work and the COVID-19 Pandemic. *The Indian Journal of Labour Economics, 63*, 163–171. https://doi.org/10.1007/s41027-020-00273-y

Rosa, H. (2005). *Beschleunigung: Die Veränderung der Zeitstrukturen in der Moderne*. Suhrkamp Verlag.

Schmidt, F. A. (2016). *Arbeitsmärkte in der Plattformökonomie: zur Funktionsweise und den Herausforderungen von Crowdwork und Gigwork*. Friedrich-Ebert-Stiftung.

Schramm, F., & Tietgen-Simonsen, M. (2019). Crowdworking–Menetekel und empirische Evidenz. In H. Hanau & W. Matiaske (Eds.), *Entgrenzung von Arbeitsverhältnissen: Arbeitsrechtliche und sozialwissenschaftliche Perspektiven* (pp. 11–24). Nomos.

Schreyer, J., & Scharpe, J.-F. (2018). Algorithmische Arbeitskoordination in der plattformbasierten Gig Economy: Das Beispiel Foodora. *AIS-Studien, 11*(2), 262–278.

Serfling, O. (2018). *Crowdworking Monitor Nr. 1. Hochschule Rhein-Waal*. https://www.bmas.de/SharedDocs/Downloads/DE/PDF-Meldungen/2018/crowdworking-monitor.pdf?__blob=publicationFile&v=1. Accessed 21 Aug 2020.

Spasova, S., Bouget, D., Ghailani, D., & Vanhercke, B. (2017). *Access to social protection for people working on non-standard contracts and as self-employed in Europe. A study of national policies*. Bruxelles: European Social Policy Network. https://www.researchgate.net/profile/Bart_Vanhercke/publication/316739736_Access_to_social_protection_for_people_working_on_non-standard_contracts_and_as_self-employed_in_Europe/links/591046a4458515978188f7e4/Access-to-social-protection-for-people-working-on-non-standard-contracts-and-as-self-employed-in-Europe.pdf. Accessed 24 Aug 2020.

Stone, K. V. W. (2004). *From widgets to digits: Employment regulation for the changing workplace*. Cambridge University Press.

Taylor, M., Marsh, G., Nicol, D., & Broadbent, P. (2017). *Good work: The Taylor review of modern working practices*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627671/good-work-taylor-review-modern-working-practices-rg.pdf. Accessed 5 Aug 2020.

Urzì Brancati, M. C., Pesole, A., & Férnandéz-Macías, E. (2020). *New evidence on platform workers in Europe.* : Publications Office of the European Union. https://publications.jrc.ec.europa.eu/repository/bitstream/JRC118570/jrc118570_jrc118570_final.pdf. Accessed 21 Aug 2020.

Väänänen, A., Toivanen, M., & Lallukka, T. (2020). Lost in autonomy-temporal structures and their implications for employees' autonomy and well-being among knowledge workers. *Occupational Health Science, 4*, 83–101.

Voß, G. G., & Pongratz, H. (1998). Der Arbeitskraftunternehmer. Eine neue Grundform der Ware Arbeitskraft? *Kölner Zeitschrift für Soziologie und Sozialpsychologie, 50*, 131–158.

Watson, T. (2011). *Sociology, work and organisation*. Routledge.

Wood, A. J., Graham, M., & Lehdonvirta, V. (2019). Good gig, bad gig: Autonomy and algorithmic control in the global gig economy. *Work, Employment and, Society, 33*(1), 56–75.

Zyskowski, K., Morris, M. R., Bigham, J. P., Gray, M. L., & Kane, S. K. (2015). Accessible crowdwork? Understanding the value in and challenge of microtask employment for people with disabilities. In *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing* (pp. 1682–1693). ACM.

Non-standard Employment Contracts: Characteristics and Consequences of New Ways of Working

Anna S. Tanimoto, Isabelle Ferré Hernandez, Johnny Hellgren, and Magnus Sverke

1 Introduction

The recent decades have witnessed a dramatic increase in employment relations that differ from the "standard" employment relationship characterized by full-time employment with an open-ended, or permanent, contract with an employing organization. The development towards an increasing proportion of non-standard employment arrangements that began in the 1980s and intensified in the 1990s has been described as "one of the most spectacular and important evolutions in Western working life" (De Cuyper et al., 2008, p. 25). This development has continued in the first two decades of the twenty-first century, however at a slower pace, and non-standard work, entailing a number of specific employment types and characteristics, now accounts for approximately 25% of the total employment in the OECD countries (Visser, 2019). Prognoses suggest that this development will persevere and even increase in the future (ILO, 2016).

There are many different reasons for the rise in non-standard employment arrangements. Some explanations focus on the economic recessions during the two decades around the Millennium shift, bringing about an intensified global competition in the private sector and budget cuts and restrictions in public sector organizations (e.g., Spreitzer et al., 2017). Other explanations note that technological development continues to fuel changes in terms of the staffing of organizations (e.g., Gunderson, 2020; Spreitzer et al., 2017). Yet others emphasize relaxations in employment protection legislation that have accompanied this development (e.g., Jansen & Lehr, 2019). There is a growing consensus in the literature that this development is associated with employers' strivings to reduce administrative complexity

A. S. Tanimoto (✉) · I. Ferré Hernandez · J. Hellgren · M. Sverke
Department of Psychology, Stockholm University, Stockholm, Sweden
e-mail: anna.tanimoto@psychology.su.se; isabelle.ferre-hernandez@psychology.su.se; jhn@psychology.su.se; magnus.sverke@psychology.su.se

C. Korunka (ed.), *Flexible Working Practices and Approaches*,
https://doi.org/10.1007/978-3-030-74128-0_10

and staffing costs as well as an increased need for flexibility (Connelly & Gallagher, 2004; De Cuyper et al., 2008; Goslinga & Sverke, 2003; Kalleberg, 2000). Indeed, it has long been recognized that organizations strive not only to increase their functional flexibility (by moving people with various skills to different tasks depending on the organization's needs), temporal flexibility (when people work), and locational or spatial flexibility (where the work is actually carried out); they also need to increase their numerical flexibility (by adjusting the staffing to fluctuations in demand and supply) (Kalleberg, 2000; Reilly, 1998).

In the literature, many different labels are being used to describe non-standard work, each involving an emphasis on different aspects of the deviation from standard employment. Some scholars use the term temporary (e.g., De Cuyper et al., 2008) or casual employment (Campbell & Burgess, 2001) to underscore the fixed-term duration characterizing many such employment relations, while others talk about contingent work (McLean Parks et al., 1998) to illustrate that employment depends on staffing needs in organizations. Expressions such as outsiders (e.g., Lindbeck & Snower, 1989) or peripheral workers (e.g., Atkinson, 1984) highlight that non-standard workers differ from the insiders, i.e., those belonging to the core of an organization. Whereas some researchers use the label of flexible employment (e.g., Storey et al., 2002) to indicate that non-standard employment arrangements involve flexibility for the hiring organization – and to some extent perhaps for the individual worker as well – others use the term precarious employment (e.g., Lewchuk et al., 2003) to highlight the employment strain and vulnerability characterizing many such contractual arrangements. Although various terms have been used to underscore the deviation from standard employment, including alternative work arrangements (Spreitzer et al., 2017; Sverke et al., 2000) and atypical work (Goslinga & Sverke, 2003), perhaps the most commonly used label is non-standard work (Bernhard-Oettel et al., 2017).

Earlier research has tended to infer that temporary or non-standard employment arrangements are inevitably associated with poor employee outcomes in terms of poorer working conditions, work-related attitudes and behavior, and health and well-being. However, it has become more evident that simple comparisons between standard and non-standard employment may provide an imbalanced view, given that there exists a plethora of contractual arrangements. Many of these appear to be associated with negative outcomes, whereas some appear to have similar consequences as standard employment (for reviews and meta-analyses, see, e.g., Bernhard-Oettel et al., 2017; De Cuyper et al., 2008; McLean Parks et al., 1998; Spreitzer et al., 2017; Wilkin, 2013). Moreover, given the multitude of non-standard work arrangements, it is important to unravel what characterizes individuals with various types of non-standard work – and what is known regarding the consequences associated with such work arrangements.

In this chapter, we begin by adding to the literature on categorizations of non-standard work by providing a complementary perspective. We then provide a brief overview of some of the demarcating characteristics of people with non-standard employment arrangements. This is followed by a review of research on the potential consequences of non-standard employment for work-related attitudes and behavior,

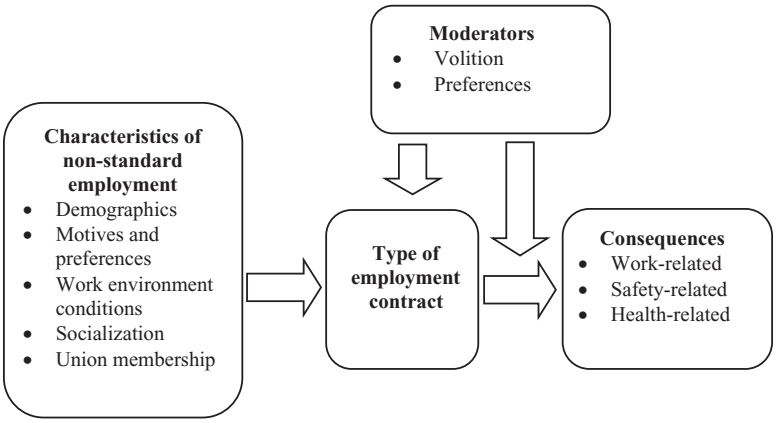


Fig. 1 Conceptual model

workplace safety, and employee health and well-being. Based on this, we outline some implications for individuals, organizations, policy-makers, and unions, as well as for future research.

The chapter is organized around the conceptual model depicted in Fig. 1. The figure indicates not only that there may be a multitude of (non-standard) employment arrangements but also that each of these may be associated with various demographic characteristics and that the motives and preferences for a particular contract may differ between individuals. The figure also indicates that the consequences may differ between different types of contractual arrangements. Moreover, it highlights that the consequences may also depend on whether the contractual arrangement is voluntary or involuntary or how the contractual arrangement corresponds to the individual's preferences for the time being.

2 Defining Non-standard Employment

The first aim of this chapter is to present an overview of the various non-standard contractual arrangements that characterize the current labor market. In contrast to "standard employment," which concerns a permanent contract (on a full-time basis) with an employing organization on whose premises the work is typically carried out (Bernhard-Oettel et al., 2017; De Cuyper et al., 2008; McLean Parks et al., 1998), there are a number of contractual arrangements that deviate from such standard employment. Although several terms, partly synonymous with "non-standard," have been used in the literature (e.g., alternative, atypical, casual, contingent, flexible, and precarious), it is important to note that they are not interchangeable, as some carry certain positive or negative connotations or characteristics of the employment situation. Despite this, they are generally used as umbrella terms to connote a type of employment or contractual arrangement that does not represent a full-time,

open-ended position. Specific employment arrangements include fixed-term or temporary contracts, seasonal employment, contingent work, temporary agency work, consulting and independent contracting, on-call work, and zero-hour contracts. In addition, some jobs are posted via digital platforms where individuals can claim short-term assignments to complete for monetary compensation, and this relatively new type of job is often referred to as platform work (Eurofound, 2020; Spreitzer et al., 2017).

In order to elucidate the characteristics of different employment types, a number of theoretical frameworks have addressed the ways in which non-standard contracts diverge from standard employment. Some have articulated an organizational structure as consisting of multiple layers, where the layers represent different employment statuses. The core–periphery model (Atkinson, 1984) is based on the assumption that permanent, full-time workers are considered "core," while non-standard workers make up the "periphery" around the core of an organization. Core workers are thus seen as more central to the functioning of the organization, while peripheral workers to differing degrees are less essential and can be used to provide flexibility during times of market volatility. Some employment arrangements are closer to the core, such as permanent, part-time employment (Bernhard-Oettel et al., 2017), but there are also scholars who posit that all permanent employees, regardless of full-time or part-time status, belong to the core (e.g., Aronsson et al., 2002). Farther away from the core are temporary employees, and in the outer layers of the periphery are, for instance, temporary agency and on-call workers (Aronsson et al., 2002; Bernhard-Oettel et al., 2017). The distance from the core may also be a determinant of the kind of benefits an employee receives such as job security, career possibilities, and training (Atkinson, 1984).

Other conceptualizations have divided employees into two segmented workforces. This lens through which standard and non-standard employment may be viewed – the dual labor market theory (Doeringer & Piore, 1971) – postulates that the labor market is segmented into two parts, the first characterized by stable employment and good working conditions and the second by less stable employment and poorer working conditions. Individuals belonging to the first segment are commonly referred to as labor market "insiders," whereas those members of the second segment are known as labor market "outsiders" (Lindbeck & Snower, 1989). These terms are comparable to Atkinson's (1984) core and peripheral workers, respectively.

Another theoretical perspective, which focuses on the experience of employees, relates to the psychological contract, that is, the unwritten, mutual expectations and beliefs between the employer and employee (Rousseau, 1995). The expectations that characterize the psychological contract may differ based on the type of formal contract an employee possesses, and studies have found psychological contract differences between permanent versus temporary contract employees (Coyle-Shapiro & Kessler, 2000). It has been suggested that qualities inherent to a non-standard employee's formal contract may inform expectations regarding the content of the psychological contract, as well as perceptions of contract breaches or violations (McLean Parks et al., 1998). Such qualities may relate to whether the individual

reports to more than one employer, if the individual holds a formal contract voluntarily versus involuntarily, or whether the non-standard position is seen as a provisional job or a stepping-stone towards a permanent job (Bernhard-Oettel et al., 2017; De Cuyper & De Witte, 2008).

Previous research has provided several typologies for classifying non-standard work into various contractual categories (e.g., Aronsson et al., 2002; Atkinson, 1984; Bernhard-Oettel et al., 2017; McLean Parks et al., 1998; Spreitzer et al., 2017), but the increased heterogeneity in new ways of working requires that such classifications are regularly updated. Our ambition is to add to the existing literature by providing a complementary perspective on the classification of various types of non-standard work. Our classification is presented in Table 1, which illustrates various employment contracts based on permanent versus temporary status, and the number of parties involved in these contractual arrangements.

As Table 1 indicates, a first distinction can be made regarding whether the relation between the individual and the organization where work is performed can be considered to be continuous, open-ended, and permanent versus limited in duration and with a fixed-term end, that is, temporary (as illustrated in the columns). Another distinction can be made regarding whether the employment arrangement involves two or more parties (as illustrated in the rows). The traditional contractual arrangement concerns a bipartite relation between an individual and an employer, for whom the employee performs their work. There are, however, other contractual agreements involving a bipartite relation, between an individual and a client organization without including an employment relation (for instance, when the individual is their own employer, for example, independent contractors working for one or more clients). Moreover, there are contractual arrangements including a tripartite relation involving the individual, an employer, and one or more clients. Thus, in certain

Table 1 Categorization of contract forms

	Relation/employment status	
Contractual parties	Permanent	Temporary
Bipartite (individual and employer)	Full-time permanent Part-time permanent	Project worker Seasonal worker Substitute On-call
	Floats Zero-hour contracts	
Bipartite (individual and client)	Independent contractor Self-employed Consultant	
		Platform worker[a]
Tripartite (individual, employer, client[s])	Temporary agency worker Leased worker Sub-contractor Consultant	

[a]Platform work is an unofficial employment status where the platform stands in place of an employer

circumstances, an individual may be employed by one organization but perform their work for one or more client organizations, such as in the case of temporary agency work.

Turning first to the bipartite, traditional employer–employee relation, this can characterize both permanent and temporary employment arrangements. *Permanent* employment is open-ended and continuous, while *temporary* employment entails a predetermined end-date for the contract or the completion of a specified task. Permanent employment can be of either full-time or part-time status. *Full-time* employment is generally considered to be between 35 and 40 working hours per week, while *part-time* status represents fewer than approximately 35 working hours a week, but exact numbers may differ by country (Kalleberg, 2000). While many conceptualizations conceive of "standard work" as involving full-time employment, part-time permanent employment is typically considered non-standard (for reviews, see, e.g., Barling & Gallagher, 1996; Bernhard-Oettel et al., 2017; Conway & Briner, 2002).

There are also a number of employer–employee relations that are typically described as non-standard, where the type of contract may serve as an indication of the degree of expendability that the employee provides for an organization. Relationships where an individual is employed by the employer to meet different or fluctuating demands include project workers, seasonal workers, substitutes, on-call, floats, or zero-hour workers. *Project workers* are employed for the duration of a project, and contract lengths can vary, but are often longer-term. Other employment contracts exist to meet staffing-related needs. For instance, *seasonal workers* work in industries where there are periods of high demands, which directly affect the number of staff required such as in tourism, agriculture, and retail; in other words, their contracts expire after the seasonal peak has ended (Marshall, 1999). *Substitutes* cover for the absence of a regular employee, typically with a fixed end-date, while *on-call workers* typically work on an hourly basis or as day laborers (Bernhard-Oettel et al., 2017; Spreitzer et al., 2017). *Floats* can have both permanent and temporary contracts, but regularly move between different departments of an organization (McLean Parks et al., 1998). In some cases, employees may have *zero-hour contracts*, either on a permanent or temporary basis, which organizations make use of in situations where workloads fluctuate and where the employees themselves have to be standby not to miss work opportunities (Gunderson, 2020). Individuals with these contracts are contacted on a needs basis by the employer and have no guaranteed or fixed number of hours (Office for National Statistics, 2015).

Some bipartite relationships do not include an employer per se because the individual is self-employed and therefore their own employer. This means that the employment relationship is directly between the individual and a client. The solo *self-employed* are independent contractors who provide services to a client or customer. A similar type of employment relates to *consultants*, who can be hired by a client organization for their knowledge and expertise in a specific field for the completion of an assignment (McLean Parks et al., 1998). Consultants may be self-employed but can also be employed by a consulting firm (such that the arrangement may also be tripartite).

Platform workers represent a special case of a bipartite relation between individuals and clients. They use an online platform to accept and carry out an assignment for a client or customer for pay (Schoukens et al., 2018). This makes their position in the employer–employee relationship ambiguous, and some platforms insist that the worker is an independent contractor (Thelen, 2018), meaning that the individual has no legal status as an employee of the platform company. Platform work therefore does not entail a traditional individual–client relationship, but instead allows the individual to perform work in place of the platform itself, one example being ride-share services like Uber, another being grocery pickup and delivery services like Instacart. Some platform work may be considered part of a triangular employment relationship, involving the worker, the platform, and the client purchasing the services provided by the platform (Eurofound, 2020). An example of this may include a courier, a food delivery platform (such as Foodora), and a restaurant which uses the platform for their courier services. Although platform work, or "gig work," still represents a rather small share of non-standard work (around 0.5% of the workers), it is a rapidly growing segment (Spreitzer et al., 2017). Platform work is controversial when it comes to the responsibilities of the parties involved since many platform companies tend to exempt themselves from the role as an employer by insisting that platform workers are independent contractors (Thelen, 2018).

There are also a number of non-standard contractual arrangements that represent a tripartite system. Such tripartite relationships consist of the individual, the hiring organization (the de jure employer), and the client organization (the de facto employer), where the individual is employed by the hiring organization to perform work in one or more client organizations (Bernhard-Oettel et al., 2017; Connelly & Gallagher, 2004; McLean Parks et al., 1998). The most common type here is *temporary agency workers*, who are employed by an agency but perform their work in a client organization. In some cases, a whole workforce can be rented by a client organization, and these employees are known as *leased workers* (McLean Parks et al., 1998). In other cases, when specific knowledge or skills are needed, workers belonging to these tripartite relationships can also be referred to as *sub-contractors*, representing the case when "[w]ork is transferred to another organization whose employees perform the tasks on or off the premises of the client company" (p. 702). As mentioned above, *consultants* employed by a consulting company, but performing their work in one or more client organizations, represent another example of such tripartite relations. These tripartite relations can be on either a permanent or a temporary basis, where some individuals have a permanent employment with the employing organizations but work on temporary contracts with the client organization(s).

It is important to keep in mind that an individual can have multiple non-standard employments and combine non-standard work with a permanent job or full-time studies. Such multiple jobholding, which is predicted to be an increasing labor market trend (Barley et al., 2017; Kuhn & Maleki, 2017), refers to cases where individuals possess more than one job with more than one organization. Statistics indicate that approximately 4% of the employees in the EU are multiple jobholders,

although numbers are higher in Sweden (9%), Denmark (7%), and the Netherlands (8%) (Eurofound, 2020). Of those individuals who are multiple jobholders, it is plausible that at least one of their jobs is characterized as non-standard, or they may even possess multiple non-standard contacts. It is also important to note that non-standard work may serve as a bridge from a traditional working career into retirement and, hence, provide opportunities to stay active in the labor market or serve as a means to acquiring a more stable position in the workforce (Gunderson, 2020).

3 What Characterizes Individuals in Non-standard Employment?

The second aim of this chapter is to provide a brief review regarding demographic characteristics of non-standard employment as well as factors contributing to an individual's motivation to possess a non-standard contract. Those who make up the non-standard workforce are a heterogenous group, which necessitates a closer look at those who may be overrepresented or underrepresented in various contracts, specifically concerning age, gender, education level, and ethnic background, along with reasons for having non-standard work.

An important demographic characteristic in non-standard work is age. In the European Union, more than 40% of young workers (between the ages of 15 and 24) have temporary employment contracts, as compared to only 13% of workers aged 25–49 (Eurostat, 2017). Although it is not unusual that young people may deliberately choose temporary employment in order to combine work with education or training, in most European countries it is more likely that young workers are unable to find permanent employment and therefore must settle for temporary contracts (ILO, 2016; Klug, 2020). There is also some evidence to suggest that young workers are more likely to be multiple jobholders than older workers (Dickey et al., 2011).

Another demographic characteristic of significance relates to gender. It is more common that women have part-time employment than men (Bernhard-Oettel et al., 2008; Campos-Serna et al., 2013; Eurofound, 2020), and men are self-employed to a higher extent than women (Eurofound, 2020). A third aspect of importance concerns educational level. There is a clear variation between countries, but in a majority of the OECD countries, people with lower levels of education make up the largest share of fixed-term and temporary agency work (OECD, 2014). Fourth, non-standard work is overrepresented among ethnic minorities and individuals with a foreign background (Hipp et al., 2015).

Non-standard workers differ from standard employees also with respect to unionization. People in non-standard work arrangements tend to be less unionized; in fact, individuals in non-standard employment are approximately 50% less likely to be union members than those with standard employment (OECD, 2019). Research also indicates that employees with fixed-term employment are less prone to join trade unions than permanent employees and that solo self-employed report even

lower willingness to join (Jansen & Lehr, 2019). In line with this, it has long been known that, in many countries, there is little or no protection of non-standard workers through collective agreements and unions (Hipp et al., 2015). This is in spite of the fact that non-standard workers tend to have lower pay and social benefits, fewer career opportunities, and poorer working conditions and experience more unpredictability and uncertainty regarding the future, including higher levels of perceived job insecurity and financial insecurity, as compared to standard employees (e.g., Hipp et al., 2015; Gunderson, 2020; Sverke et al., 2004). However, those individuals with atypical contracts that are unionized appear not to differ from permanent employees as concerns attitudes such as union satisfaction, union commitment, and perceived union support or intentions related to continued union membership (Goslinga & Sverke, 2003).

The reason(s) for choosing or accepting a specific contract is an important aspect in understanding why individuals end up in non-standard employment. Reasons including motives, preferences, and volition contribute to the employee's choice of contract type. There are different motives for taking a non-standard job. For some, it is the solution they prefer, while others may have no other option but to settle for a non-standard employment position (Feldman, 1990). Motives for choosing a certain employment contract may be to have more freedom, flexibility in working hours, and work-life balance or to secure a better job in the future (i.e., non-standard job serves as a stepping-stone). Other reasons for choosing non-standard employment may be job loss, failing to find permanent employment, or limited job opportunities (De Cuyper & De Witte, 2008; Ellingson et al., 1998; Feldman, 1990). If the motive is similar to any of the former reasons, it may be seen as voluntary, while a choice made based on the latter reasons may indicate that acceptance of the contract is involuntary (Ellingson et al., 1998). *Volition*, or contract preference, has been described as an important factor in non-standard work research, as it may influence relationships between non-standard work and potential outcomes (Bernhard-Oettel et al., 2008; de Jong & Schalk, 2010; Ellingson et al., 1998). It has been suggested that workers who hold a certain type of contract (e.g., temporary employment) involuntarily may evaluate their employment situation based on their preferred employment (permanent) and that the wider the gap between the actual and the preferred employment, the more adverse employee responses may be (Feldman & Turnley, 2004). While voluntary versus involuntary is to be seen as a continuum, rather than as a dichotomy, because there may be various reasons behind non-standard work, official statistics indicate that large portions of non-standard workers would prefer permanent employment (Bernhard-Oettel et al., 2017).

4 Consequences of Non-standard Employment

The third aim of this chapter is to explore potential consequences of non-standard work. Non-standard employment may result in a number of outcomes, which can be work-related, safety-related, and health-related. A number of theories inform how

such consequences may occur, one of the most widely used being psychological contract theory (Rousseau, 1995). The psychological contract "is a strong driver of employee attitudes and behaviour" also in the context of alternative employment arrangements (Bernhard-Oettel et al., 2017, p. 265). A breach of the psychological contract, which occurs when the individual feels that the organization has failed to uphold their end of the contract by not fulfilling promises or expectations, can result in negative emotions and psychological withdrawal, for instance, in terms of more negative work-related attitudes and a reduced willingness to work hard (Bernhard-Oettel et al., 2017; Coyle-Shapiro & Kessler, 2000; Knights & Kennedy, 2005; McLean Parks et al., 1998).

Another theoretical perspective that has been used to understand the consequences of non-standard work is the transactional stress theory (Lazarus & Folkman, 1984). An employee with an inherently insecure employment contract (i.e., non-standard) may experience their employment situation as a threat, which, according to transactional stress theory, would require coping responses to address this threat (Lazarus & Folkman, 1984). Such a situation may trigger stress reactions given that the outcome of the threat remains uncertain, thereby preventing the individual from taking any definitive action to mitigate it. Considering the well-established link between stress and adverse health consequences (McEwen, 1998; Ursin & Eriksen, 2004), this may explain the association between non-standard employment arrangements and impaired health and well-being.

4.1 Work-related Consequences

There are a variety of potential consequences of non-standard work, which can be related to both the individual and the organization. Such consequences can be both positive and negative, even if the negative consequences of non-standard employment seem to be predominant in the existing literature. Meta-analytic findings have highlighted that non-standard workers overall are slightly less satisfied with their jobs than permanent employees (Wilkin, 2013). This effect has been seen for agency workers and other non-standard employees, such as those with on-call contracts (Wilkin, 2013) as well as for seasonal workers (Bardasi & Francesconi, 2004). However, some non-standard employment arrangements seem to be more strongly associated with job (dis)satisfaction than others, and findings thus far have not been entirely uniform. For example, research has shown that temporary agency workers typically report lower job satisfaction than contract workers, who in turn report job satisfaction rates similar to permanent employees (Wilkin, 2013). Non-standard employment may be negatively associated with other work-related attitudes such as work engagement (Guarnaccia et al., 2018) and organizational commitment (Bernhard-Oettel et al., 2008; Biggs & Swailes, 2006). It has been found that the level of commitment differs between employment contracts, as on-call and agency workers in particular seem to have lower organizational commitment than other types of non-standard workers (Bernhard-Oettel et al., 2008; Biggs & Swailes,

2006). This may be related to the fact that on-call and agency workers are farther away from the organizational "core" (Aronsson et al., 2002; Atkinson, 1984) than other non-standard workers and thus are less attached to the organization. In the case of temporary agency work, the picture is more delicate, as has been noted in several studies (e.g., Connelly & Gallagher, 2004; Gallagher & Sverke, 2005), since commitment may refer to two (or more) organizations – the agency and the client(s).

While the general tendency is that non-standard work is typically associated with more negative work-related attitudes and behavior, others have found no significant associations, and some have even found that non-standard work may have positive consequences (for reviews, see, e.g., Bernhard-Oettel et al., 2017; Connelly & Gallagher, 2004; De Cuyper et al., 2008). Certain types of non-standard employment arrangements have been associated with consequences that are even more positive than permanent employment. For example, fixed-term workers have shown higher rates of job satisfaction compared to other groups of workers, including permanent employees (De Cuyper et al., 2009; Wooden & Warren, 2004). Why job satisfaction seems to differ between different forms of non-standard employment is not clear, but some of the variation may be attributed to factors such as workers' quality of working life in terms of job demands and autonomy, perceived job insecurity, and employment contract preferences (Bernhard-Oettel et al., 2008; Wagenaar et al., 2012). Different types of non-standard employment, such as part-time and fixed-term employment, have also been related to lower turnover intention in comparison with permanent workers (Bernhard-Oettel et al., 2008), and fixed-term employment has been shown to relate positively to affective organizational commitment (De Cuyper et al., 2009). This indicates that the consequences of working in non-standard employment can differ depending on the type of non-standard employment as well as on other factors.

4.2 Safety-Related Consequences

Workplace safety and individual safety behaviors in organizations usually refer to the employees' own safety, but safety can sometimes also apply to consequences outside the organization, for example, in the case of transport to and from the workplace or in the event of major accidents that may also have consequences for the surrounding society (Chmiel & Grote, 2017). In the context of non-standard employment and safety, previous research has concluded that there is a difference in safety perceptions between permanent and temporary employees. At least two different – but closely related – perspectives can be found in the literature on alternative employment arrangements and safety at work. The first refers to the individuals' safety-related behaviors at work, while the second concerns hazard exposure.

In terms of the first perspective, safety culture and safety climate have been considered important aspects in order to promote good safety behavior in organizations, and it appears that employees with contingent or temporary contracts are less socialized into the safety culture compared to employees with a permanent contract (e.g.,

Kochan et al., 1994). Also, safety climate aspects, including safety-oriented leadership, participation in safety training, safety knowledge, and safety-behavior motivation, appear to be less prevalent – or even lacking – among temporary employees compared to the permanent staff (Quinlan & Bohle, 2004; Underhill & Quinlan, 2011). In line with this, Probst and her colleagues (2018) found contingent work to be negatively related to safety motivation and safety participation; however, there were no significant associations with safety knowledge, safety compliance, or underreporting of accidents. When it comes to safety perceptions and safety attitudes, research has found that temporary and permanent employees differ regarding the relevance and significance of safety issues. For example, Luria and Yagil (2010) concluded that temporary employees considered safety and safety behaviors as something at the individual level (i.e., concerning merely themselves), in contrast to permanent employees who regarded safety issues as something primary at the organizational (climate) or group (supervisor, team) level. This implies that permanent employees tend to see workplace safety more as a collective responsibility as compared to non-permanent workers who tend to have a more individualistic view of workplace safety. Another aspect of this is that temporary workers may have less knowledge and experience of the job and of various hazardous moments and situations in the job. For example, Aronsson (1999) concluded that a large amount of non-permanent employees reported that they had been neglected regarding essential training on the job. In line with this, it has also been suggested that lower job experience and lower knowledge of workplace hazards may be a core mechanism for explaining the relationship between temporary work and workplace injuries (Benavides et al., 2000).

The second perspective relates to the number of hazardous situations employees are exposed to during work hours, where research generally finds temporary employment to be associated with more work-related accidents (e.g., Landsbergis et al., 2014). Previous research has argued that the main difference between temporary and permanent employment lies in the working conditions. The fact that temporary workers are often found in workplaces where the working conditions are deficient has been advanced as a main explanation for their higher accident rates in comparison with permanent employees (Amuedo-Dorantes, 2002). It has also been found that part-time employees to a large extent hold many different jobs to manage their financial situation and that such multiple jobholding can be a safety risk due to extended travels between workplaces, task reorientation between different jobs and work tasks, and long working hours from multiple jobs without proper rest in-between (Quinlan & Bohle, 2004).

4.3 Health-Related Consequences

As for other types of outcomes, the literature indicates that non-standard work is related to poorer health and well-being as compared to permanent full-time work, although there may be differences between various types of non-standard

employment arrangements. Indeed, an important deciding factor for such outcomes relates to the specific type of non-standard employment in question.

Adverse health-related consequences of non-standard employment may manifest in physical as well as psychological symptoms of ill health. Several literature reviews indicate that temporary employment is associated with physical health complaints and musculoskeletal disorders as well as mental health problems and fatigue (e.g., De Cuyper et al., 2008; Kim et al., 2012; Landsbergis et al., 2014). It has also been suggested that prolonged temporary employment can have negative health effects and that women in temporary employment may be more vulnerable than men in the same employment situation (Pirani & Salvini, 2015). A meta-analysis by Virtanen et al. (2005) found that temporary employment was associated with impaired psychological health; yet, the findings indicated substantial heterogeneity, partially due to the various types of temporary employment accounted for in the primary studies. Another meta-analysis comparing temporary employment (as a crude category) against permanent employment (Miraglia & Johns, 2016) found no differences in sickness presenteeism.

Despite the general findings demonstrating an association between non-standard employment and impaired health-related outcomes, there is also literature suggesting the opposite, which indicates that a crude comparison between standard and non-standard workers may be oversimplistic. For instance, a study comparing levels of psychological well-being of permanent and seasonal temporary employees found no differences (Schweder et al., 2015). Similarly, a recent literature review of 28 studies found no consistent association between temporary agency work and psychological health (Hünefeld et al., 2020). Other findings suggest that part-time employment is associated with less negative spillover from the work domain into the personal domain for both men and women (Russell et al., 2009). Inconsistencies or differences in findings relating to employment or contract type and health may be attributed to a number of mediating or moderating factors, including the breadth of terms and characteristics used to define non-standard employment (Virtanen et al., 2005) or the country and welfare system in place (Kim et al., 2012).

4.4 The Role of Volition and Preferences

Previous research indicates that there may be several factors associated with the motives, such as preferences and volition, for accepting a non-standard employment that may play a role in how non-standard work relates to various outcomes (for reviews, see, e.g., Bernhard-Oettel et al., 2017; De Cuyper et al., 2008). Volition has been a topic of interest in research when it comes to understanding differences in relationships between non-standard work and outcomes among non-standard employees and has been deemed a potentially important factor when it comes to understanding the heterogeneity in outcomes related to non-standard work (Ellingson et al., 1998). For example, individuals who have voluntarily chosen non-standard employment tend to report higher job satisfaction than those who have not

(Ellingson et al., 1998; Krausz et al., 1995; Park & Kang, 2017). Others have found that employees with involuntarily temporary employment have greater intentions to quit their jobs (de Jong & Schalk, 2010). Involuntary part-time and temporary workers may also perceive that they have fewer possibilities to develop and grow at work and perceive higher threats of losing their job than others with the same employment contracts but who hold those contracts voluntarily (Kauhanen & Nätti, 2015).

While some studies point out the importance of volition in non-standard work arrangements, others have found inconclusive results when it comes to how volition relates to different outcomes. Some have found that volition does not necessarily serve as a predictor of outcomes such as job satisfaction, organizational commitment, or turnover intention, but that specific motives, such as using non-standard work as a stepping-stone, may instead be of more importance (De Cuyper & De Witte, 2008). Others suggest that the preference for the job itself may be more decisive than contract preferences per se for outcomes such as general health, life satisfaction, and organizational commitment (Bernhard-Oettel et al., 2008). Despite mixed results, volition and preferences remain important factors in this field of research.

It should be noted that the association between contract type and outcomes may also depend on other factors than volition and preferences. Factors such as levels of perceived job insecurity and job characteristics such as job demands or job autonomy may be inherent to certain employment contracts and, in turn, influence the association between contract type and outcomes (e.g., Bernhard-Oettel et al., 2008; Wagenaar et al., 2012).

5 Implications

As evident from this brief review, there exist a number of different non-standard employment arrangements. While there are substantial differences between these, it is clear (although there are some non-standard arrangements which deviate from this general picture) that there are certain features that characterize individuals in such work arrangements. Most non-standard workers are young, with an overrepresentation of women, and tend to have lower education and a foreign background. In addition, they tend to be less unionized. It is also clear from the literature that non-standard work, on a general level, is associated with more negative work-related, safety-related, and health-related outcomes, although there again are inconsistencies to the overall picture. Moreover, factors related to motives for accepting non-standard work (including volition and preferences) and characteristics of the jobs of non-standard workers appear to be decisive in the contract–outcome associations. Taken together, the present review involves a number of implications for the individuals concerned, employers, policy-making, and unions, as well as for future research.

Turning first to the implications for individuals, it is clear that most types of non-standard work are associated with more negative work-related attitudes and

behavior, safety outcomes, and health and well-being. They are typically also characterized by poorer working conditions and a more vulnerable situation in the labor market. It is obvious that such features make it more difficult for the individual to flourish and satisfy basic psychological needs, thus resulting in a vulnerable position, most often also associated with limited opportunities for future career development and prospects of a more established position in the labor market (e.g., Bernhard-Oettel et al., 2017, De Cuyper & De Witte, 2008: Hipp et al., 2015; Spreitzer et al., 2017).

As concerns implications for organizations, it is obvious that a workforce having poorer working conditions and being characterized by more negative work-related, safety-related, and health-related outcomes are less likely to contribute to the growth and development of organizational activities (Sverke et al., 2004). While non-standard employment arrangements may provide the organization with increased flexibility (e.g., Atkinson, 1984; De Cuyper & De Witte, 2008; Reilly, 1998; Spreitzer et al., 2017), it has also been emphasized that organizations may benefit from employing a larger portion of their workforce based on permanent employment (Pfeffer, 1998).

When it comes to policy-making, many non-standard workers have poor working conditions, limited employment protection, and little job security and are at risk of poverty (Gunderson, 2020; Hipp et al., 2015; Spreitzer et al., 2017). In some countries, collective bargaining, to varying degrees, provides protection of the rights of non-standard workers. There is still, however, an urgent need to develop policies regarding how best to protect the interests and rights of more vulnerable types of non-standard workers, either through legislation or through collective agreements between employer organizations and unions (e.g., Gunderson, 2020; Näswall & Sverke, 2014). This is particularly important in the case of platform work, which continues to undermine the employer–employee relationship and where platform companies financially benefit from avoiding employer costs (Gunderson, 2020).

Regarding implications for unions, it has long been noted that unions face important challenges in protecting the rights of non-standard workers (Gunderson, 2020; Näswall & Sverke, 2014; Sverke et al., 2004; Visser, 2019). The prevalence of non-standard workers in the contemporary labor force, and the fact that they tend to be underrepresented in terms of union membership (Jansen & Lehr, 2019; OECD, 2019), implies that unions have to develop their ways of attracting workers with various types of non-standard employment arrangements and protecting the interests of these workers (Jansen & Lehr, 2019; Näswall & Sverke, 2014). Based on the contractual arrangements characteristic of the labor market, it is clear that new and more complex forms of non-standard employment are increasing, implying that if unions strive to represent the members of the future workforce, they must direct their efforts towards recruiting and protecting individuals in non-standard contracts.

Finally, the present review involves some immediate implications for future research on non-standard work. The heterogeneity of non-standard work is a clear indication that categorizing employment arrangements into standard versus non-standard is an insufficient approach to understanding how these are associated with various consequences. Future research should therefore address these different

employment arrangements taking into consideration the extent to which contract types differ from one another and the inherent qualities associated with certain contracts. It is of utmost urgency that future research distinguishes various types of non-standard work, rather than collapsing these types into general umbrella terms representing deviations from "standard" employment (e.g., Bernhard-Oettel et al., 2017; De Cuyper & De Witte, 2008; Spreitzer et al., 2017).

6 Conclusions

This chapter provides a complementary perspective on non-standard employment by expanding upon previous categorizations of these contractual arrangements, while integrating new ways of organizing work, some of which have only recently been addressed in the employment relations literature. First, we have described that there exist a variety of non-standard employment arrangements, and clarified that they can be characterized by the degree of continuity (permanent versus temporary contracts), but also described that the employment relation may involve two or more parties (the individual, the employer, and the client[s]). Furthermore, we have shown that there may be substantial differences between employment contracts in terms of demographic characteristics, working conditions, and motives associated with taking on a specific contract. Lastly, we have highlighted the work-related, safety-related, and health-related consequences of non-standard employment (where possible also by considering different types of non-standard work) as well as some factors that may exacerbate or mitigate such outcomes.

Our review indicates that there exist many different types of non-standard work arrangements. Most of these involve a temporary employment relation, for instance, as concerns project work, seasonal work, substitutes, and on-call work. However, there are also employment contracts that may be of either an open-ended permanent nature or temporary, such as in the case of part-time work, floats, and zero-hour contracts. While several of these contracts concern a traditional employer–employee relation, there are also other bipartite relations involving only the individual and one or more clients, such as in the case of (solo) self-employed individuals. Platform work represents a special case in this context, where an individual has a relationship with a platform organization without being officially employed, because the cheaper alternatives provided by these platforms are likely to reduce market shares from companies that provide better employment conditions for their employees, at the same time undermining the employment status and rights of the workers (Thelen, 2018). There are also tripartite relations involving the individual, an employer, and one or more client organizations, such as in the case of temporary agency work.

Combining all diverse contracts deviating from full-time permanent employment into one overall, umbrella term (such as "temporary," "flexible," "precarious," or "non-standard" work) presents a challenge when it comes to investigating the characteristics and outcomes related to these unique working arrangements. First, there are certain demographic and work-related factors characteristic of individuals in various

contract forms. Second, non-standard work generally appears to be associated with more negative consequences as compared to full-time permanent work. Third, the various types of consequences of non-standard work appear to differ based not only on the type of contracts but also on the motives for specific contractual arrangements and the characteristics associated with the job as such. Given the vast array of conceptualizations of non-standard employment in the literature, future research needs to acknowledge the specific type and characteristics of employment of various non-standard work when examining its characteristics and consequences.

Acknowledgments This research was carried out within the NOWSTARS research program, with financial support from the Swedish Research Council for Health, Working Life and Welfare (FORTE Grant No. 2019-01311).

References

Amuedo-Dorantes, C. (2002). Work safety in the context of temporary employment: The Spanish experience. *ILR Review, 55*(2), 262–287. https://doi.org/10.1177/001979390205500204

Aronsson, G. (1999). Contingent workers and health and safety. *Work, Employment & Society, 13*, 439–459. https://doi.org/10.1017/s0950017099000318

Aronsson, G., Gustafsson, K., & Dallner, M. (2002). Work environment and health in different types of temporary jobs. *European Journal of Work and Organizational Psychology, 11*(2), 151–175. https://doi.org/10.1080/13594320143000898

Atkinson, J. (1984). Manpower strategies for flexible organisations. *Personnel Management, 16*(8), 28–31.

Bardasi, E., & Francesconi, M. (2004). The impact of atypical employment on individual wellbeing: Evidence from a panel of British workers. *Social Science & Medicine, 58*(9), 1671–1688. https://doi.org/10.1016/s0277-9536(03)00400-3

Barley, S. R., Bechky, B. A., & Milliken, F. J. (2017). The changing nature of work: Careers, identities, and work lives in the 21st century. *Academy of Management Discoveries, 3*, 111–115. https://doi.org/10.5465/amd.2017.0034

Barling, J., & Gallagher, D. (1996). Part-time employment. In C. L. Cooper & I. T. Robertson (Eds.), *International review of industrial and organizational psychology* (Vol. 11, pp. 243–277). Wiley.

Benavides, F. G., Benach, J., Diez-Roux, A. V., & Roman, C. (2000). How do types of employment relate to health indicators? Findings from the Second European Survey on Working Conditions. *Journal of Epidemiology & Community Health, 54*(7), 494–501. https://doi.org/10.1136/jech.54.7.494

Bernhard-Oettel, C., De Cuyper, N., Berntson, E., & Isaksson, K. (2008). Well-being and organizational attitudes in alternative employment: The role of contract and job preferences. *International Journal of Stress Management, 15*(4), 345–363. https://doi.org/10.1037/a0013869

Bernhard-Oettel, C., De Cuyper, N., Murphy, M., & Connelly, C. E. (2017). How do we feel and behave when we're not permanent full-time employees? The case of the diverse forms of non-standard work. In N. Chmiel, F. Fraccaroli, & M. Sverke (Eds.), *An introduction to work and organizational psychology: An international perspective* (3rd ed., pp. 258–275). Wiley. https://doi.org/10.1002/9781119168058.ch14

Biggs, D., & Swailes, S. (2006). Relations, commitment and satisfaction in agency workers and permanent workers. *Employee Relations, 28*(2), 130–143. https://doi.org/10.1108/01425450610639365

Campbell, I., & Burgess, J. (2001). Casual employment in Australia and temporary employment in Europe: Developing a cross-national comparison. *Work, Employment & Society, 15*(1), 171–184. https://doi.org/10.1177/09500170122118823

Campos-Serna, J., Ronda-Pérez, E., Artazcoz, L., Moen, B. E., & Benavides, F. G. (2013). Gender inequalities in occupational health related to the unequal distribution of working and employment conditions: A systematic review. *International Journal for Equity in Health, 12*(1), 1–18. https://doi.org/10.1186/1475-9276-12-57

Chmiel, N., & Grote, G. (2017). Why do I put myself and others in danger or help increase safety? Person- and situation-related causes of safety behavior. In N. Chmiel, F. Fraccaroli, & M. Sverke (Eds.), *An introduction to work and organizational psychology: An international perspective* (3rd ed., pp. 388–409). Wiley. https://doi.org/10.1002/9781119168058.ch21

Connelly, C. E., & Gallagher, D. G. (2004). Emerging trends in contingent work research. *Journal of Management, 30*(6), 959–983. https://doi.org/10.1016/j.jm.2004.06.008

Conway, N., & Briner, R. B. (2002). Full-time versus part-time employees: Understanding the links between work status, the psychological contract, and attitudes. *Journal of Vocational Behavior, 61*(2), 279–301. https://doi.org/10.1006/jvbe.2001.1857

Coyle-Shapiro, J., & Kessler, I. (2000). Consequences of the psychological contract for the employment relationship: A large scale survey. *Journal of Management Studies, 37*(7), 903–930. https://doi.org/10.1111/1467-6486.00210

De Cuyper, N., de Jong, J., De Witte, H., Isaksson, K., & Schalk, R. (2008). Literature review of theory and research on the psychological impact of temporary employment: Towards a conceptual model. *International Journal of Management Reviews, 10*(1), 25–51. https://doi.org/10.1111/j.1468-2370.2007.00221.x

De Cuyper, N., & De Witte, H. (2008). Volition and reasons for accepting temporary employment: Associations with attitudes, well-being, and behavioural intentions. *European Journal of Work and Organizational Psychology, 17*(3), 363–387. https://doi.org/10.1080/13594320701810373

De Cuyper, N., Notelaers, G., & De Witte, H. (2009). Job insecurity and employability in fixed-term contractors, agency workers, and permanent workers: Associations with job satisfaction and affective organizational commitment. *Journal of Occupational Health Psychology, 14*(2), 193–205. https://doi.org/10.1037/a0014603

de Jong, J., & Schalk, R. (2010). Extrinsic motives as moderators in the relationship between fairness and work-related outcomes among temporary workers. *Journal of Business and Psychology, 25*(1), 175–189. https://doi.org/10.1007/s10869-009-9139-8

Dickey, H., Watson, V., & Zangelidis, A. (2011). Is it all about money? An examination of the motives behind moonlighting. *Applied Economics, 43*(26), 3767–3774. https://doi.org/10.1080/00036841003724403

Doeringer, P., & Piore, M. (1971). *Internal labor markets and manpower analysis*. Lexington.

Ellingson, J. E., Gruys, M. L., & Sackett, P. R. (1998). Factors related to the satisfaction and performance of temporary employees. *Journal of Applied Psychology, 83*(6), 913–921. https://doi.org/10.1037/0021-9010.83.6.913

Eurofound. (2020). *Labour market change: Trends and policy approaches towards flexibilisation (challenges and prospects in the EU)*. Luxembourg: Publications Office of the European Union. https://www.eurofound.europa.eu/publications/flagship-report/2020/labour-market-change-trends-and-policy-approaches-towards-flexibilisation

Eurostat. (2017, May 2). *Temporary employment in the EU*. https://ec.europa.eu/eurostat/en/web/products-eurostat-news/-/DDN-20170502-1

Feldman, D. C. (1990). Reconceptualizing the nature and consequences of part-time work. *Academy of Management Review, 15*(1), 103–112. https://doi.org/10.5465/amr.1990.4308279

Feldman, D. C., & Turnley, W. H. (2004). Contingent employment in academic careers: Relative deprivation among adjunct faculty. *Journal of Vocational Behavior, 64*(2), 284–307. https://doi.org/10.1016/j.jvb.2002.11.003

Gallagher, D. G., & Sverke, M. (2005). Contingent employment contracts: Are existing theories still relevant? *Economic and Industrial Democracy, 26*, 181–203. https://doi.org/10.1177/0143831x05051513

Goslinga, S., & Sverke, M. (2003). Atypical work and trade union membership: Union attitudes and union turnover intention among traditional versus atypically employed union members. *Economic and Industrial Democracy, 24*(2), 290–312. https://doi.org/10.1177/0143831x03024002007

Guarnaccia, C., Scrima, F., Civilleri, A., & Salerno, L. (2018). The role of occupational self-efficacy in mediating the effect of job insecurity on work engagement, satisfaction and general health. *Current Psychology, 37*(3), 488–497. https://doi.org/10.1007/s12144-016-9525-0

Gunderson, M. (2020). If nonstandard work is the new normal, what should we do about it? In D. Pohler (Ed.), *Reimagining the governance of work and employment* (Labor and Employment Relations Association Series) (pp. 11–40). Labor and Employment Relations Association.

Hipp, L., Bernhardt, J., & Allmendinger, J. (2015). Institutions and the prevalence of nonstandard employment. *Socio-Economic Review, 13*(2), 351–377. https://doi.org/10.1093/ser/mwv002

Hünefeld, L., Gerstenberg, S., & Hüffmeier, J. (2020). Job satisfaction and mental health of temporary agency workers in Europe: A systematic review and research agenda. *Work & Stress, 34*(1), 82–110. https://doi.org/10.1080/02678373.2019.1567619

ILO. (2016). *Non-standard employment around the world: Understanding challenges, shaping prospects*. International Labour Office. http://ilo.org/global/publications/books/WCMS_534326/lang%2D%2Den/index.htm

Jansen, G., & Lehr, A. (2019). On the outside looking in? A micro-level analysis of insiders' and outsiders' trade union membership. *Economic and Industrial Democracy* (online first). doi:https://doi.org/10.1177/0143831x19890130.

Kalleberg, A. L. (2000). Nonstandard employment relations: Part-time, temporary and contract work. *Annual Review of Sociology, 26*(1), 341–365. https://doi.org/10.1146/annurev.soc.26.1.341

Kauhanen, M., & Nätti, J. (2015). Involuntary temporary and part-time work, job quality and well-being at work. *Social Indicators Research, 120*(3), 783–799. https://doi.org/10.1007/s11205-014-0617-7

Kim, I. H., Muntaner, C., Shahidi, F. V., Vives, A., Vanroelen, C., & Benach, J. (2012). Welfare states, flexible employment, and health: A critical review. *Health Policy, 104*(2), 99–127. https://doi.org/10.1016/j.healthpol.2011.11.002

Klug, K. (2020). Young and at risk? Consequences of job insecurity for mental health and satisfaction among labor market entrants with different levels of education. *Economic and Industrial Democracy, 41*(3), 562–585. https://doi.org/10.1177/0143831x17731609

Knights, J. A., & Kennedy, B. J. (2005). Psychological contract violation: Impacts on job satisfaction and organizational commitment among Australian senior public servants. *Applied HRM Research, 10*(2), 57–72.

Kochan, T. A., Smith, M., Wells, J. C., & Rebitzer, J. B. (1994). Human resource strategies and contingent workers: The case of safety and health in the petrochemical industry. *Human Resource Management, 33*(1), 55–77. https://doi.org/10.1002/hrm.3930330105

Krausz, M., Brandwein, T., & Fox, S. (1995). Work attitudes and emotional responses of permanent, voluntary, and involuntary temporary-help employees: An exploratory study. *Applied Psychology, 44*(3), 217–232. https://doi.org/10.1111/j.1464-0597.1995.tb01077.x

Kuhn, K. M., & Maleki, A. (2017). Micro-entrepreneurs, dependent contractors, and instaserfs: Understanding online labor platform workforces. *Academy of Management Perspectives, 31*, 183–200. https://doi.org/10.5465/amp.2015.0111

Landsbergis, P. A., Grzywacz, J. G., & LaMontagne, A. D. (2014). Work organization, job insecurity, and occupational health disparities. *American Journal of Industrial Medicine, 57*(5), 495–515. https://doi.org/10.1002/ajim.22126

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer.

Lewchuk, W., de Wolf, A., King, A., & Polanyi, M. (2003). From job strain to employment strain: Health effects of precarious employment. *Just Labour, 3*(Fall), 23–35. https://doi.org/10.25071/1705-1436.165

Lindbeck, A., & Snower, D. J. (1989). *The insider-outsider theory of employment and unemployment*. MIT Press Books.

Luria, G., & Yagil, D. (2010). Safety perception referents of permanent and temporary employees: Safety climate boundaries in the industrial workplace. *Accident Analysis and Prevention, 42*, 1423–1430. https://doi.org/10.1016/j.aap.2009.02.016

Marshall, K. (1999). Seasonality in employment. *Perspectives on Labour and Income, 11*(1), 16–22.

McEwen, B. S. (1998). Protective and damaging effects of stress mediators. *New England Journal of Medicine, 338*(3), 171–179. https://doi.org/10.1056/nejm199801153380307

McLean Parks, J., Kidder, D. L., & Gallagher, D. G. (1998). Fitting square pegs into round holes: Mapping the domain of contingent work arrangements onto the psychological contract. *Journal of Organizational Behavior: The International Journal of Industrial, Occupational and Organizational Psychology and Behavior, 19*, 697–730. https://doi.org/10.1002/(sici)1099-1379(1998)19:1+<697::aid-job974>3.0.co;2-i

Miraglia, M., & Johns, G. (2016). Going to work ill: A meta-analysis of the correlates of presenteeism and a dual-path model. *Journal of Occupational Health Psychology, 21*(3), 261–283. https://doi.org/10.1037/ocp0000015

Näswall, K., & Sverke, M. (2014). Unions and changes in working life: New challenges – New opportunities. In A. Day, E. K. Kelloway, & J. Hurrell (Eds.), *Workplace well-being: How to build psychologically healthy workplaces* (pp. 245–263). Wiley.

OECD. (2014). *OECD employment outlook 2014*. OECD. https://doi.org/10.1787/empl_outlook-2014-en.

OECD. (2019). *OECD employment outlook 2019: The future of work*. OECD. https://doi.org/10.1787/9ee00155-en

Office of National Statistics. (2015). *Analysis of employment contracts that do not guarantee a minimum number of hours*. https://webarchive.nationalarchives.gov.uk/20160106105138/http://www.ons.gov.uk/ons/dcp171776_396885.pdf. Accessed: 13August 2020.

Park, M., & Kang, J. (2017). Job satisfaction of non-standard workers in Korea: Focusing on non-standard workers' internal and external heterogeneity. *Work, Employment and Society, 31*(4), 605–623. https://doi.org/10.1177/0950017016666209

Pfeffer, J. (1998). *The human equation: Building profits by putting people first*. Harvard University Press.

Pirani, E., & Salvini, S. (2015). Is temporary employment damaging to health? A longitudinal study on Italian workers. *Social Science & Medicine, 124*, 121–131. https://doi.org/10.1016/j.socscimed.2014.11.033

Probst, T. M., Petitta, L., Barbaranelli, C., & Lavaysse, L. M. (2018). Moderating effects of contingent work on the relationship between job insecurity and employee safety. *Safety Science, 106*, 285–293. https://doi.org/10.1016/j.ssci.2016.08.008

Quinlan, M., & Bohle, P. (2004). Contingent work and occupational safety. In J. Barling & M. R. Frone (Eds.), *The psychology of workplace safety* (pp. 81–106). American Psychological Association. https://doi.org/10.1037/10662-005

Reilly, P. A. (1998). Balancing flexibility: Meeting the interests of employer and employee. *European Journal of Work and Organizational Psychology, 7*(1), 7–22. https://doi.org/10.1080/135943298398934

Rousseau, D. (1995). *Psychological contract: Understanding of written and unwritten agreements*. Sage.

Russell, H., O'Connell, P. J., & McGinnity, F. (2009). The impact of flexible working arrangements on work-life conflict and work pressure in Ireland. *Gender, Work and Organization, 16*(1), 73–97. https://doi.org/10.1111/j.1468-0432.2008.00431.x

Schoukens, P., Barrio, A., & Montebovi, S. (2018). The EU social pillar: An answer to the challenge of the social protection of platform workers? *European Journal of Social Security, 20*(3), 219–241. https://doi.org/10.1177/1388262718798393

Schweder, P., Quinlan, M., Bohle, P., Lamm, F., & Ang, A. H. B. (2015). Injury rates and psychological wellbeing in temporary work: A study of seasonal workers in the New Zealand food processing industry. *New Zealand Journal of Employment Relations, 40*(2), 24–46.

Spreitzer, G. M., Cameron, L., & Garrett, L. (2017). Alternative work arrangements: Two images of the new world of work. *Annual Review of Organizational Psychology and Organizational Behavior, 4*(1), 473–499. https://doi.org/10.1146/annurev-orgpsych-032516-113332

Storey, J., Quintas, P., Taylor, P., & Fowle, W. (2002). Flexible employment contracts and their implications for product and process innovation. *The International Journal of Human Resource Management, 13*(1), 1–18. https://doi.org/10.1080/09585190110092758

Sverke, M., Gallagher, D. G., & Hellgren, J. (2000). Alternative work arrangements: Job stress, well-being and pro-organizational attitudes among employees with different employment contracts. In K. Isaksson, C. Hogstedt, C. Eriksson, & T. Theorell (Eds.), *Health effects of the new labour market* (pp. 145–167). Plenum.

Sverke, M., Hellgren, J., Näswall, K., Chirumbolo, A., De Witte, H., & Goslinga, S. (2004). *Job insecurity and union membership: European Unions in the wake of flexible production*. P.I.E.-Peter Lang.

Thelen, K. (2018). Regulating uber: The politics of the platform economy in Europe and the United States. *Perspectives on Politics, 16*(4), 938–953. https://doi.org/10.1017/s1537592718001081

Underhill, E., & Quinlan, M. (2011). How precarious employment affects health and safety at work: The case of temporary agency workers. *Industrial Relations, 66*, 397–421. https://doi.org/10.7202/1006345ar

Ursin, H., & Eriksen, H. R. (2004). The cognitive activation theory of stress. *Psychoneuroendocrinology, 29*(5), 567–592. https://doi.org/10.1016/s0306-4530(03)00091-x

Virtanen, M., Kivimäki, M., Joensuu, M., Virtanen, P., Elovainio, M., & Vahtera, J. (2005). Temporary employment and health: A review. *International Journal of Epidemiology, 34*(3), 610–622. https://doi.org/10.1093/ije/dyi024

Visser, J. (2019). *Trade unions in the balance: ILO ACTRAV working paper*. Bureau for Workers' Activities. https://www.ilo.org/wcmsp5/groups/public/%2D%2D-ed_dialogue/%2D%2D-actrav/documents/publication/wcms_722482.pdf

Wagenaar, A. F., Kompier, M. A., Houtman, I. L., van den Bossche, S., Smulders, P., & Taris, T. W. (2012). Can labour contract differences in health and work-related attitudes be explained by quality of working life and job insecurity? *International Archives of Occupational and Environmental Health, 85*(7), 763–773. https://doi.org/10.1007/s00420-011-0718-4

Wilkin, C. L. (2013). I can't get no job satisfaction: Meta-analysis comparing permanent and contingent workers. *Journal of Organizational Behavior, 34*(1), 47–64. https://doi.org/10.1002/job.1790

Wooden, M., & Warren, D. (2004). Non-standard employment and job satisfaction: Evidence from the HILDA survey. *The Journal of Industrial Relations, 46*(3), 275–297. https://doi.org/10.1111/j.0022-1856.2004.00142.x

Job Insecurity: Challenge or Hindrance Stressor? Review of the Evidence and Empirical Test on Entrepreneurs

Hans De Witte and Anahí Van Hootegem

1 Introduction

Flexibility comes in many forms. Previous studies distinguished a variety of types, like *temporal* flexibility (related to the amount of hours worked: overtime and part-time work, see, e.g., Spreitzer et al., 2017) versus *contractual* flexibility (related to the employment contract: temporary versus permanent; see, e.g., De Cuyper et al., 2018). Both temporal flexibility and contractual flexibility are examples of *numerical* flexibility, referring to the deployment of the labor force (and the hours they work) according to the requirements of the company. Numerical flexibility is contrasted with *functional* flexibility in Atkinson's (1984) model of the "flexible firm." The latter refers to the adaptation of the tasks of workers and the content of their jobs to the needs of the company, thus mobilizing their skills in a flexible way. Examples of functional flexibility are job rotation, task enlargement, and task enrichment.

This chapter focuses on *job insecurity*, a phenomenon that is closely related to contractual flexibility. Yet it is also distinct. Contractual flexibility refers to the "objective" employment contract, which is formally (and legally) agreed on between employer and employee. Job insecurity refers to a perception of the employee and can be defined as the perceived threat of job loss and the worries related to that threat (De Witte, 2005). Research shows that the employment contract correlates with perceptions of job insecurity (Keim et al., 2014; Klandermans et al., 2010):

H. De Witte (✉)
WOPP-O2L - KU Leuven, Leuven, Belgium

Optentia Research Unit - North-West University, Vanderbijlpark, South Africa
e-mail: Hans.DeWitte@kuleuven.be

A. Van Hootegem
WOPP-O2L - KU Leuven, Leuven, Belgium
e-mail: anahi.vanhootegem@kuleuven.be

C. Korunka (ed.), *Flexible Working Practices and Approaches*,
https://doi.org/10.1007/978-3-030-74128-0_11

workers with fixed term or temporary agency contracts generally perceive higher levels of job insecurity, as they might become unemployed when their contract expires. This association has inspired some authors to equate both phenomena. Pearce (1998), for instance, states that temporary work can be considered as an indicator or objective operationalization of job insecurity. Many economy and sociology scholars would probably agree with this stand. In this chapter, however, we take a psychological point of view. We align with scholars from (work and organizational) psychology who highlight the subjective nature of job insecurity. As such, one could consider *perceived* job insecurity as the "subjective translation" of the objective labor market position of the individual, as indicated by various objective characteristics, such as the employment contract and the (occupational) position of the worker in the social stratification (De Witte et al., 2015).

In the literature, job insecurity is often defined as the "perception of a potential threat to the continuity of the current job" (Heaney et al., 1994, p. 1431) or the "subjectively experienced anticipation of a fundamental and involuntary event related to job loss" (Sverke et al., 2002, p. 243). This subjective perception relates to an uncertain but feared event that might happen in the future: the anticipation of possible job loss. Reviews and meta-analyses show that perceived job insecurity is associated with a wide variety of negative consequences, like reduced health and well-being, and negative attitudes towards the organization and employer (De Witte et al., 2015, 2016; Jiang & Lavaysse, 2018; Lee et al., 2018; Shoss, 2017; Sverke et al., 2002).

Some authors, especially from management sciences, however, advocate that job insecurity could also have positive consequences (Repenning, 2000; Shoss, 2017). They suggest that job insecurity could energize and motivate workers. This mobilization of energy is sometimes even supposed to increase workers' creativity and innovativeness. As a consequence, these scholars often assume job insecurity to be associated with stronger performance among workers, as insecure workers will attempt to preserve their jobs by working harder ("job preservation motivation"; Shoss, 2017). In short, these scholars seem to presume that perceived job insecurity could act as a challenge rather than as a hindrance stressor. Employers would typically tend to agree with this view.

In this chapter, we will critically examine the empirical evidence related to this assumption. In doing so, we first of all highlight the theoretical framework of challenge versus hindrance stressors (or demands). Next, we summarize the available empirical evidence on both positive (motivation) and negative (strain) aspects of well-being and various kinds of performance. Additional to an overview of the literature, we report the results of an empirical test. We test the contrasting assumptions of job insecurity as a challenge versus hindrance stressor on a specific sample, which is critical to this issue: entrepreneurs. The resulting evidence is summarized and discussed in the concluding paragraph.

2 Distinguishing Challenge from Hindrance Stressors

In work psychology, the job demands-resources (further on: JD-R) model has gained prominence since the start of the new millennium (Demerouti et al., 2001; Schaufeli & Bakker, 2004). Its distinction between demands and resources is well known. Job demands are typically defined as aspects of the job that require sustained effort from the worker. Demands are stressors: continuous exposure costs energy and will ultimately lead to exhaustion and burnout. Job resources are aspects of the job that help achieving work goals, reduce demands and their costs, and stimulate growth, learning, and development. Job resources motivate workers. As a consequence, resources are associated with work engagement and at the same time also reduce burnout.

The category of stressors (or "demands") has, however, been further differentiated into job hindrances and job challenges (Cavanaugh et al., 2000; Podsakoff et al., 2007), and this distinction was integrated in the JD-R model (Crawford et al., 2010; Van den Broeck et al., 2010). Although individuals may differ to a certain degree in how they appraise stressors, meta-analyses and reviews have demonstrated that certain stressors tend to consistently be perceived as challenging or hindering (e.g., Lepine et al., 2005). Job hindrances tend to be perceived as threatening constraints and are prototypical "stressors". These are obstacles that are difficult to overcome and consequently deplete energy and exhaust workers. Typical for hindrances is that they pose an additional goal, next to the primary work related goal, which is experienced as a burden. Examples are mobbing at work and emotional demands, like taking care of dying patients. Challenge stressors are more ambivalent in nature. On the one hand, job challenges also tend to be perceived as stressful, and sustained exposure thus results in strain (and exhaustion). On the other hand, these job characteristics are obstacles that can be overcome. Dealing with them requires energy but at the same time also has the potential to stimulate growth. Challenge stressors add to goal achievement and are considered to be motivating. Typical examples are job complexity and responsibility at work.

When summarizing the well-being outcomes of both kinds of demands, we can conclude that the arising picture is a clear-cut one regarding hindrance stressors: they are associated with ill-health. Translated into the typical outcomes of the JD-R model, this means that they are associated with increased levels of burnout and reduced levels of work engagement. Their impact on well-being is univocal: exposure to hindrance stressors is "bad", making them prototypical "stressors". The picture is much more ambivalent and ambiguous regarding challenge stressors: they are partly "good" and partly "bad". Challenge stressors have the energy-depleting aspect in common with hindrances: they are also associated with elevated levels of strain and burnout. At the same time, however, they are also associated with higher levels of work engagement, as they equally energize and motivate workers. The associations with work engagement thus differentiate challenges from hindrances, as these associations go in the opposite direction. The associations of both kinds of demands with burnout are similarly positive.

When applied to performance, both kinds of stressors are supposed to have opposite effects (Piccoli et al., 2019; Spector, 2019). Hindrance stressors interfere with task accomplishment and reduce performance. Challenge stressors on the other hand are supposed to create opportunities for better work achievements and are expected to increase performance.

3 Reviewing the Evidence on Job Insecurity, Well-Being, and Performance: Challenge or Hindrance Stressor?

Perceived job insecurity has traditionally been framed as a hindrance stressor in the literature (De Witte et al., 2015). This view has, however, been "challenged" by scholars suggesting that job insecurity could (also) be a challenge stressor (Repenning, 2000; Shoss, 2017). The views presented above offer a good framework to critically and systematically assess the relationships of job insecurity with various aspects of well-being and performance. In reviewing the evidence, we oppose ill-being (the strain-related side, including exhaustion and burnout) to well-being (the positive side, including satisfaction and work engagement). The overview of ill-being and well-being outcomes will mainly be based on three recent meta-analyses and one systematic review, respectively (Jiang & Lavaysse, 2018; Llosa-Fernández et al., 2018; Rönnblad et al., 2019; Thomson & Michel, 2018), augmented with some additional information from reviews, when relevant. In addition to reviewing ill-being and well-being, we also highlight the association between job insecurity and performance. The meta-analyses and reviews considered individuals in the working population (i.e., excluding unemployed individuals or students) and include individuals with temporary and permanent contracts. In the meta-analyses and the systematic review, the samples were geographically spread out over several continents, but the largest number of included studies was concentrated in Europe, followed by the USA, Canada, Australia, and Asia. Cross-sectional studies were included in Jiang and Lavaysse (2018), Llosa-Fernández et al. (2018), and Thomson and Michel (2018), while Rönnblad et al. (2019) only considered longitudinal studies.

3.1 Associations Between Job Insecurity and Ill-Being

Several aspects of ill-being are relevant in this context. One could look at work related ill-being, by focusing on strains and (aspects of) burnout. Context-free aspects of ill-health relate to mental health impairments, such as depression, and the experience of negative emotions, such as anger and anxiety. The meta-analysis of Jiang and Lavaysse (2018) encompasses the largest amount of samples (n = 535) and outcomes. They report a significant meta-correlation of 0.24 of job insecurity

with strain and an identical correlation with burnout. Interesting is that they were able to distinguish emotional exhaustion from cynicism/depersonalization and found the meta-correlation of job insecurity with cynicism (0.45) to be stronger than its relationship with emotional exhaustion (0.30). This suggests that job insecurity is not only energy depleting, but even more so involves negative feelings towards others and the job performed. The review of Thomson and Michel (2018) reports a significant positive association of job insecurity and burnout of 0.19, which is close to the value reported by Jiang and Lavaysse (2018). Thomson and Michel (2018) also report associations of around 0.20 with mental health impairment, again close to the values reported for strain by Jiang and Lavaysse (2018).

Context-free aspects of ill-health are reported in three meta-analyses. Jiang and Lavaysse (2018) report a meta-correlation of 0.12 with anger, 0.26 with anxiety, and 0.30 with depression. Also Llosa-Fernández et al. (2018) report slightly higher values for depression (0.21) than for anxiety (0.17). The strength of the associations is reversed in the study of Rönnblad et al. (2019), who report odds ratios of 1.61 for depression and 1.77 for anxiety, suggesting much higher prevalence of both aspects of ill-being among those who perceive job insecurity. The findings that the values of depression are about as high as those of anxiety, and sometimes even surpass them, is interesting, as this suggests that job insecurity is not only associated with arousal (anxiety) but also with passivity (depression). This aligns with the finding that job insecurity is dominantly related with lack of activity and withdrawal behaviors (see, e.g., Vander Elst et al., 2016).

The results of these meta-analyses can be complemented with results from an overview of longitudinal studies on the association of job insecurity with aspects of ill-health (De Witte et al., 2016). This study suggests that job insecurity affects these outcomes, rather than the other way around, thus highlighting the causal impact of job insecurity in increasing strain, burnout, anxiety, and depression over time.

We can conclude that job insecurity is clearly associated with strain, exhaustion, and burnout. These findings, however, do not allow to determine whether job insecurity is a challenge or a hindrance, as both hindrance and challenge stressors are associated with strain.

3.2 Associations Between Job Insecurity and Well-Being

The critical test for the decision whether job insecurity is a challenge or a hindrance stressor lies with the association with aspects of well-being and especially aspects that represent a positive and energetic stand. Four aspects can be discussed: context-free well-being relates to mental/psychological health and life satisfaction; work-related aspects to job satisfaction and work engagement. Especially the latter seems critical for the assessment of a challenge stressor. Nevertheless, we also highlight the other aspects, to paint a broader and more encompassing picture.

Associations with well-being are analyzed in two studies and mirror the findings mentioned above when discussing impairment. Jiang and Lavaysse (2018) report a

meta-correlation of −0.30 between job insecurity and psychological health (i.e., emotional well-being and mental health) and Llosa-Fernández et al. (2018) of −0.21 between job insecurity and mental health (i.e., a combination of psychological well-being and satisfaction with life). The associations with life satisfaction are also negative: −0.22 in the study of Jiang and Lavaysse (2018) and −0.25 in that of Llosa-Fernández et al. (2018). Context-free well-being thus seems negatively affected by job insecurity, mirroring the positive associations with ill-health. Meta-analytic correlations with job satisfaction have already been reported before and were clearly negative (Sverke et al., 2002; Cheng & Chan, 2008). Based on more than 200 samples, Jiang and Lavaysse (2018) report a meta-correlation of −0.37. This association even increases to −0.51 when larger samples are added to the analysis. Interestingly, the meta-analysis of Jiang and Lavaysse (2018) is the first to report results on work engagement. The meta-correlation with job insecurity was −0.20, suggesting insecurity to be associated with lower levels of work engagement. The associations with the three dimensions of engagement were also reported and amounted to −0.24 for vigor, −0.16 for dedication, and − 0.15 for absorption. Here the association with the energy dimension (vigor) was stronger than that with the attitudinal component (dedication). This picture can be complemented by the meta-correlation with personal accomplishment (−0.28), as this dimension of burnout has been shown to be indicative of work engagement in previous research, rather than of burnout (Schaufeli et al., 2002).

Here again, an overview of longitudinal studies suggests that the negative associations are caused by job insecurity, rather than the other way around (De Witte et al., 2016). The evidence was strong regarding mental/psychological health. The evidence was however somewhat weaker regarding job satisfaction and work engagement, as not all studies showed a significant effect over time. Longitudinal studies on life satisfaction were surprisingly lacking.

The overview of positive aspects of well-being thus suggests job insecurity to be a hindrance stressor, rather than a challenge stressor, as no positive associations were found with aspects that relate to energy, such as work engagement.

3.3 Associations Between Job Insecurity and (Diverse Dimensions of) Job Performance

The idea that job insecurity could challenge workers, leading to increased performance, has often been proclaimed by employers and scholars (De Cuyper et al., 2020; Van Wyk & Pienaar, 2008). As an introduction to this part of the chapter, it seems relevant to start with a review of some of the most well-known studies that partly sparked this view. Interestingly, this overview shows that most scholars developed much more nuanced views on the issue, often highlighting both a challenge and a hindrance view. This nuanced picture is often lost in the literature, as

most papers refer to this issue in a one-sided manner, mainly highlighting the challenge view.

In a theoretical paper, Repenning (2000) develops a model in which he integrates two contrasting views in management theory: the "drive out fear" view, highlighting the importance of job security, and the "drive in fear" school, emphasizing that insecurity motivates employees to change. He argues that both could be relevant and can be reconciled. He, however, does not test this assumption. Probst (2002) was one of the first scholars to empirically test the challenge view in a laboratory experiment. A manipulation of the threat of layoffs was associated with an increase in quantity of outputs. Insecurity was however also associated with a decrease in quality of outputs and an increase in safety violations, suggesting that the result of the manipulation on performance was much more ambivalent. A further experimental study among students of Probst et al. (2007), replicated the positive association with quantitative outputs but added that creative problem solving also decreased.

The well-known study of Staufenbiel and König (2010); see also Staufenbiel et al., 2006) has often been referred to as evidence for the challenge stressor view on job insecurity. Yet, in their cross-sectional survey among non-managerial employees, these scholars find a dominant negative association between job insecurity and performance. After controlling for work attitudes (the combination of job satisfaction and organizational commitment), a smaller positive direct path emerges, suggesting that job insecurity can, at the same time, act as a hindrance stressor (dominant effect) and a challenge stressor (limited effect). A study among Italian and US workers could, however, not replicate the existence of a challenge effect of job insecurity (Piccoli et al., 2021). In this two country study, only evidence for negative and passive reactions to job insecurity were found. This is especially interesting as the challenge view often seems to be favored in writings of US scholars. The findings from the US sample, however, did not support this assumption in the study of Piccoli et al. (2021).

The study of Selenko et al. (2013) adds yet another aspect to the literature. In their large scale cross-sectional study among employees of Finnish universities, these scholars found the relationship of job insecurity with self-reported performance to be U-shaped, with the lowest levels of performance at moderate levels of job insecurity. The shape of the curve was, however, not symmetrical. Self-reported job performance at the highest levels of job insecurity was just slightly higher than at the moderate levels, whereas the strongest increase of performance was found at the lowest levels of insecurity. In other words, especially insecurity was associated with lower performance.

This short review suggests that even the renowned studies on this issue offer a more balanced picture than often advocated. This is further supported by some recent studies. In their theoretical paper on the association of job insecurity and performance over time, Debus et al. (2020) theoretically derive a typology of performance trajectories that may arise in response to job insecurity. The authors describe seven different job insecurity reactions, and assume that a positive association will only be present in some of these trajectories and only for a specific amount of time. Note that their paper only presents theoretical speculations on the

association of job insecurity with performance and no empirical evidence to substantiate this claim.

In a cross-sectional study on about 100 employees facing restructuring, Koen et al. (2020) showed that job insecurity is positively associated with performance among a very small specific subgroup that experienced low distributive justice, but not among the majority of the respondents. This effect was contrary to the hypothesis of the authors (they hypothesized a positive association when justice was high instead of low) and only appeared when they used a stronger differentiation of the groups than usually reported (+/−1.5 SD instead of +/−1 SD), which may point towards a sample or measurement artifact.

Taken together, the majority of findings from these studies thus suggest job insecurity to be a hindrance stressor, as it dominantly shows negative associations with performance. Exceptions are minority reactions or based either on theoretical assumptions only (without empirical proof) or on experimental evidence showing ambiguous results. These exceptions did, however, receive quite some attention in the literature and perhaps overly so. To get an overall picture, we will now turn to the results of meta-analyses on performance. Two such recent studies will be consulted: Jiang and Lavaysse (2018) and Sverke et al. (2019). Performance can of course take many forms. We need to look at in-role behaviors (often referred to as task performance, because one is "doing the job according to one's job description") and extra-role behaviors (often referred to as citizenship behaviors/contextual performance or "going the extra mile"). These are productive behaviors, as they are all conductive to reaching the goals of the organization. Productive behaviors are contrasted with counterproductive work behaviors that refer to behaviors that hinder reaching the goals of the organization, like deviance and theft. These various forms of performance can be self-assessed or measured through assessments by supervisors or colleagues.

The first meta-analysis on this issue reported a non-significant association between job insecurity and (a composite of) performance measures, perhaps due to the limited amount of studies analyzing this issue at the time (Sverke et al., 2002). Recent meta-analyses, however, consistently show a significant negative meta-correlation with task performance (−0.14 in Jiang and Lavaysse (2018) and −0.17 in Sverke et al. (2019)). The association with contextual performance (or OCBs) is somewhat larger: −0.18 in both meta-analyses. The meta-analysis of Sverke et al. (2019) suggests that these associations hold for both cross-sectional and longitudinal studies, as well as for self-assessed versus supervisor-rated measurements, adding to the robustness of the findings. For task performance, the researchers, however, found somewhat stronger associations in cross-sectional studies (compared to longitudinal ones) and for self-assessments (compared to supervisor ratings).

The picture that emerges regarding counterproductive behaviors mirrors the findings for productive behaviors: here both meta-analyses report a significant positive meta-correlation of 0.14. Job insecure respondents thus report more counterproductive behaviors. Jiang and Lavaysse (2018) complement this by reporting a significant negative meta-correlation of job insecurity with work motivation and effort of −0.24, an aspect of relevance to the challenge-hindrance debate. Sverke et al. (2019)

finally also report an association of −0.10 with creativity, an aspect of innovativeness. The confidence interval regarding the latter, however, included zero, perhaps due to the limited amount of studies in which creativity was analyzed.

The review of the meta-analytic evidence can be summarized as pointing towards job insecurity as a hindrance stressor, showing negative associations with aspects of productive behavior (such as in- and extra-role behaviors) and positive associations with counterproductive behaviors.

4 Does Insecurity Motivate Entrepreneurs?

The overview of the literature mentioned above thus points to the conclusion of job insecurity as a hindrance stressor, rather than a challenge stressor. Its associations are positive with strain and burnout and negative with work engagement and motivation. Additionally, the associations of job insecurity with various operationalizations of performance are in line with the hindrance stressor view as well. To round off this chapter, we will report an additional test of whether experiencing insecurity acts as a challenge or hindrance stressor. We will do so by focusing on a specific occupational category: entrepreneurs.

Entrepreneurs are perhaps a perfect test case for a competitive test of both views. Entrepreneurs are typically portrayed as workers who perceive demands as challenging, and who are motivated to take risks (Janney & Dess, 2006). The economic sphere is a competitive and challenging one, and being active on a competitive market also means that one has to mobilize energy to overcome the many demands that hinder the enterprise to become profitable. Entrepreneurs are also typically viewed as innovators that look for new ways to overcome problems. In addition to this view, the economic perspective argues that work and human activity in general is stimulated by insecurity: insecurity is supposed to motivate workers to overcome the problems they face by performing better than any competitor (Stiglitz & Weiss, 1983). In short: insecurity should be a challenge stressor in this view, and entrepreneurs should show more work engagement and more performance when confronted with insecurity.

Obviously, when analyzing "insecurity," the concept needs to be adapted to the situation of entrepreneurs. This category does not have "a job", since they are self-employed. In the following empirical test of the challenge versus hindrance view on insecurity, the concept of insecurity was therefore transformed into "business insecurity": the insecurity to lose/keep the business and to go bankrupt.

4.1 Sample and Procedure

The data were gathered among a representative sample of entrepreneurs (employers and self-employed) regarding gender, age, and industrial sector, surveyed online between June and September 2015.[1] In total, 954 entrepreneurs filled in our questionnaire. All were professionally active as self-employed or employer of a small- or medium-size organization. The study was a survey on health behaviors and various aspects of health and well-being at work. The sample consisted of 68.3% men and 31.7% women. Mean age was 49 years (SD = 3.79). The respondents were active in a large variety of branches, like construction (22%), retail/sales (20%), and services (19%), or were active as self-employed professionals or liberal professions (13%). About 63% employed staff and many firms were rather small (35% employed 1–4 employees; 12% 5–9 employees). A large majority of the respondents were married or cohabiting with a partner (84%). Most respondents (about 75%) were active as entrepreneurs for at least 10 years, suggesting that they were experienced and thus a suitable category for our competitive test.

4.2 Measures

All scales proved to be unidimensional after performing principal components analysis (with Varimax rotation). All items were scored on a 7-point scale ranging from "0" (never) to "6" (always), except when noted.

Business insecurity was measured with three items, adapted from the job insecurity scale of Vander Elst et al. (2014). The job insecurity scale was developed to measure insecurity about keeping the actual job (versus being dismissed) among employees. All items were adjusted to the situation of entrepreneurs, by referring to their business going bankrupt or being insecure about the future of their firm (example items: "Chances are, I will soon go bankrupt" and "I feel insecure about the future of my company"). The scale was reliable with a Cronbach's alpha of 0.85.

Burnout versus work engagement was operationalized with one core dimension each. Exhaustion (as core indicator of burnout) was measured with three items taken from the Utrecht Burnout Scale (UBOS; Schaufeli & Van Dierendonck, 2000), the Dutch adaptation of the Maslach Burnout Inventory (MBI). A sample item is: "I feel mentally exhausted from my work"; Cronbach's alpha = 0.91. Vitality (as core indicator of work engagement) was measured with three items from the Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2006). A sample item is: "At my work, I feel bursting with energy"; Cronbach's alpha = 0.91.

[1] The survey and sampling was carried out by *Unizo*, an organization that represents entrepreneurs (self-employed and employers) in Flanders (Belgium), in collaboration with *Brand New Health* and the first author of the chapter.

Several self-developed scales were used to additionally measure positive versus negative indicators of health and well-being. A first set of 11 items measured the experience of 3 kinds of complaints: psychosomatic complaints (3 items; Cronbach's alpha: 0.67, example items "headache" and "stomach and intestine complaints"), cognitive problems (4 items; Cronbach's alpha: 0.83, example items "problems in concentrating" and "being forgetful"), and psychological complaints (4 items; Cronbach's alpha: 0.89, example items "anxious" and "low-spirited"). Separate items will be used to measure the experience of strain regarding four life domains: work, personal situation (like family and social interactions), health, and the financial situation of the respondent. The respondents were also asked to indicate how many nights during a typical week they experienced a bad night's sleep (score between 0 and 7). Two positive aspects were also measured on a scale ranging from 0 to 10: feelings of happiness (single item) and satisfaction with being self-employed/entrepreneur (single item).

Performance was measured with a self-assessment, based on the scale of Abramis (1994). The five-item scale was reliable (Cronbach's alpha: 0.85) and focused on in-role behaviors. Respondents indicated how well they performed during the last week (example items: "performed without mistakes" and "made the right decisions").

Finally, three work characteristics were measured as control variables: autonomy, skill utilization, and workload. In doing so, we can assume that we control for most work-related additional variation. These three variables operationalize the core dimensions of Karasek's Job Demand-Control model (Karasek, 1979). Workload relates to the demand dimension and autonomy and skill utilization to the control dimension. All work characteristics were measured using adaptations of the respective SIMPH scales (Notelaers et al., 2007). Respondents indicated whether their job allowed them to or requires them to… (…aspect shown). Autonomy was measured with three items (example item: "…determine which activities to perform"); Cronbach's alpha 0.87. Skill utilization was measured with three items (example item: "…show what you can do"); Cronbach's alpha 0.81. Workload was also measured with three items (example item: "…work under time pressure"); Cronbach's alpha 0.91.

4.3 Analysis

All hypotheses will be tested using linear regression analysis in two steps. In the first step, the outcome is regressed on the three job characteristics, to control for core work-related antecedents of health, well-being, and performance. In the second step, business insecurity is added to the analysis. Standardized regression coefficients (β) are reported, as well as the change in R^2 to determine the statistical impact of insecurity on the outcome variables.

4.4 Results

4.4.1 Do Entrepreneurs Feel Insecure, Strained, or Unhappy?

Research on employees shows that job insecurity is only present among a minority of workers (De Witte et al., 2015). This also seems to be true for entrepreneurs, as they scored on average 1.19 (SD: 1.37) for business insecurity on a scale ranging from 0 (never) to 6 (always). Only 5.6% of the respondents agreed with the item "Chances are, I will soon go bankrupt".[2] Insecurity was somewhat more widespread with about 22% of the entrepreneurs stating that "I feel insecure about the future of my company."

Scores for health and well-being showed some ambivalence. The respondents scored on average 2.36 for exhaustion versus 3.91 for vitality (0–6 point scales), suggesting that they felt more vital than exhausted. Their score for exhaustion was however not that low, as witnessed by about 30% stating that they feel mentally exhausted by their work. Note however that about 70% also stated that they feel "very resilient, mentally" at their job.

These figures can be complemented with the scores for psychosomatic complaints (M = 1.65; SD = 1.44), cognitive problems (M = 1.77; SD = 1.34), and psychological complaints (M = 1.08; SD = 1.36) – all on 0–6 (never–always) point scales – suggesting that only a minority reported specific complaints. The mean scores for various strains were also rather low (same 0–6 point scale): 1.7 (SD: 1.73) regarding their personal situation, 1.64 (SD: 1.75) for health, and 1.73 (SD: 1.93) for their financial situation. Only the work domain resulted in a more ambivalent evaluation: 3.33 (SD: 1.93). The respondents experienced on average 2.58 (SD: 2.24) nights of bad sleep during a typical week, suggesting some level of strain. These scores are complemented with rather positive evaluations of their happiness (mean 7.09 on a scale ranging from 0 to 10, SD: 1.58) and satisfaction with being self-employed/entrepreneur (mean 6.97 on the same scale; SD: 1.61).

Regarding performance, the respondents scored rather high, with a mean of 4.5 (SD: 0.85) on a 0–6 point scale. So, on average, they indicated that they were productive, with 90.3% declaring that they showed effort and commitment during the last week and 75.9% that they did perform without mistakes.

4.4.2 Insecurity: Challenge or Hindrance for Entrepreneurs?

Table 1 contains the results of the regression analyses for exhaustion, vitality, and performance as outcome variables.

We tested two contrasting hypotheses: (1) if insecurity is a hindrance stressor, then the association with exhaustion is positive and the association with vitality negative. However, (2) if the association of insecurity with exhaustion as well as

[2] When respondents scored 4, 5, or 6 on the 0–6 point scale, their answer was recorded as "agree."

Table 1 Regression analysis of vitality, exhaustion, and performance (standardized beta's)

	Exhaustion		Vitality		Performance	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
Autonomy	−0.09**	−0.08*	0.06	0.06	0.03	0.02
Skill utilization	−0.24***	−0.20***	0.38***	0.36***	0.34***	0.32***
Workload	0.35***	0.33***	0.02	0.03	0.17***	0.18***
Insecurity	–	0.31***	–	−0.14***	–	−0.16***
R	0.44***	0.54***	0.41***	0.44***	0.42***	0.44***
(Change in) R^2	0.19***	0.10***	0.17***	0.03***	0.17***	0.02***

Note: *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$

vitality is positive, then insecurity can be considered to be a challenge stressor for entrepreneurs.

The results in Table 1 contradict the challenge stressor view and support the view that insecurity acts as a hindrance stressor. After controlling for core job characteristics, insecurity shows a positive beta (0.31***) with exhaustion, explaining an additional 10% of its variance. The association of insecurity with vitality (after controlling for core job characteristics) is negative (−0.14***), additionally explaining 3% of the variance in vitality. Insecurity about the continuation of the business thus reduces energy among entrepreneurs, rather than acting as a challenge that motivates them. As a consequence, the results of the regression of performance ("in role behaviors") do not come as a surprise. After controlling for core job characteristics, insecurity is negatively associated with performance (β: −0.16; additionally explaining 2% of the variance in performance). Insecurity is thus not associated with an increase in performance (as suggested by the challenge view), but rather with a decrease in in-role behaviors, as proposed by the hindrance view.

These findings can be complemented with the results of regressions in which various other health and well-being variables were used as dependent variable and core work characteristics as controls. Business insecurity was significantly positively associated with psychosomatic complaints (β: 0.22***; R^2 change: 0.05***), cognitive problems (β: 0.28***; R^2 change: 0.07***), and psychological complaints (β: 0.38***; R^2 change: 0.14***). The rather strong beta for the latter is noteworthy, suggesting that business insecurity was experienced as especially strainful regarding aspects of mental health. The results regarding strain further add to this (negative) picture, as business insecurity was also significantly positively associated with work strain (β: 0.26***; R^2 change: 0.07***) and strain regarding the personal situation (β: 0.15***; R^2 change: 0.02***), health (β: 0.24***; R^2 change: 0.06***), and finance (β: 0.56***; R^2 change: 0.30***). Insecurity was also positively associated with experiencing a bad night's sleep (β: 0.18***; R^2 change: 0.03***). Note the rather strong association of business insecurity with the experience of financial strain.

These findings are not complemented by positive associations with happiness or satisfaction, as suggested in the challenge view. The associations of business insecurity with happiness were negative (β: −0.30***; R^2 change: 0.09***), as were the

associations with satisfaction with entrepreneurship (β: −0.42***; R^2 change: 0.17***). The stronger association with entrepreneurial satisfaction is striking, suggesting that insecurity is clearly experienced as a strainful and hindering phenomenon.

5 Conclusion

This chapter summarized the literature on the association of job insecurity with various aspects of well-being and performance, in an attempt to clarify whether insecurity acts as a challenge or a hindrance stressor. In doing so, this review has two additional strengths. First of all, a much broader picture of the challenge versus hindrance stressor view was painted, by including aspects of (positive) well-being and motivation – in addition to performance. Second, the review was complemented with the results of an additional test among entrepreneurs, an occupational category which is deemed critical in this regard.

The results were univocal: job insecurity does not function as a challenge stressor. Instead, a clear picture emerges that closely corresponds to the hindrance stressor view. Job insecurity is first of all associated with ill-being, as it was linked to indicators of strain and burnout. Job insecurity, however, does correlate not only with anxiety (arousal) and cynicism but also with exhaustion and depression, suggesting deactivation and passivity. The results based on the entrepreneurs fit into this picture, as (business) insecurity showed strong associations with exhaustion and various aspects of strain. The associations with well-being also mirrored these findings, with negative associations with job and life satisfaction found both in meta-analyses and among entrepreneurs. Most importantly, the associations with work engagement were negative in the meta-analyses as well as in the study among entrepreneurs. The negative meta-correlation with work motivation in the study of Jiang and Lavaysse (2018) complements these findings and strengthens the conclusion that job insecurity is not associated with a mobilization of energy, but rather with a decrease of it.

Given these results, the associations with aspects of performance come as no surprise. Here again, job insecurity was associated with lower levels of in- and extra-role behaviors, both in meta-analyses and among entrepreneurs. The signs of the associations were reversed when looking at counterproductive behaviors in meta-analyses. Here, insecurity was associated with higher levels of counterproductive behaviors.

Based on meta-analyses and the additional empirical test among entrepreneurs, we can conclude that there is strong empirical evidence that demonstrates that job (and business) insecurity can be considered as hindrance stressors. Given these findings, one can wonder why many studies often start their manuscript by stating that "Research on the relationship between job insecurity and job performance has thus far yielded inconclusive results" (example: Debus et al., 2020, p. 325). The results

reported in this chapter are rather conclusive and could help bring the debate to an end in which it is often suggested that job insecurity challenges and motivates workers to perform more or better.

References

Abramis, D. (1994). Relationship of job stressors to job performance: Linear or an inverted-U? *Psychological Reports, 75*(1), 547–558.

Atkinson, J. (1984, August). Manpower strategies for flexible organizations. *Personnel Management*, pp. 28–31.

Cavanaugh, M. A., Boswell, W. R., Roehling, M. V., & Boudreau, J. W. (2000). An empirical examination of self-reported work stress among US managers. *Journal of Applied Psychology, 85*(1), 65–74. https://doi.org/10.1037/0021-9010.85.1.65

Cheng, G. H. L., & Chan, D. K. S. (2008). Who suffers more from job insecurity? A meta-analytic review. *Applied Psychology: An International Review, 57*(2), 272–303. https://doi.org/10.1111/j.1464-0597.2007.00312.x

Crawford, E. R., LePine, J. A., & Rich, B. L. (2010). Linking job demands and resources to employee engagement and burnout: A theoretical extension and meta-analytic test. *Journal of Applied Psychology, 95*(5), 834–848. https://doi.org/10.1037/a0019364

De Cuyper, N., Fontinha, R., & De Witte, H. (2018). Nontraditional employment: The careers of temporary workers. In U.-C. Klehe & E. van Hooft (Eds.), *The Oxford handbook of job loss and job search* (Vol. 1, Issue June, pp. 465–480). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199764921.013.016

De Cuyper, N., Schreurs, B., De Witte, H., & Selenko, E. (2020). Impact of job insecurity on job performance – Introduction. *Career Development International, 25*(3), 221–228. https://doi.org/10.1108/CDI-06-2020-332

De Witte, H. (2005). Job insecurity: Review of the international literature on definitions, prevalence, antecedents and consequences. *SA Journal of Industrial Psychology, 31*(4), 1–6. https://doi.org/10.4102/sajip.v31i4.200

De Witte, H., Pienaar, J., & De Cuyper, N. (2016). Review of 30 years of longitudinal studies on the association between job insecurity and health and well-being: Is there causal evidence? *Australian Psychologist, 51*(1), 18–31. https://doi.org/10.1111/ap.12176

De Witte, H., Vander Elst, T., & De Cuyper, N. (2015). Job insecurity, health and well-being. In J. Vuori, R. Blonk, & R. H. Price (Eds.), *Sustainable working lives: Managing work transitions and health throughout the life course* (pp. 109–128). Springer.

Debus, M. E., Unger, D., & König, C. J. (2020). Job insecurity and performance over time: The critical role of job insecurity duration. *Career Development International, 25*(3), 325–336. https://doi.org/10.1108/CDI-04-2018-0102

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology, 86*(3), 499–512. https://doi.org/10.1037/0021-9010.86.3.499

Heaney, C., Israel, B., & House, J. (1994). Chronic job insecurity among automobile workers: Effects on job satisfaction and health. *Social Science and Medicine, 38*(10), 1431–1437.

Janney, J. J., & Dess, G. G. (2006). The risk concept for entrepreneurs reconsidered: New challenges to the conventional wisdom. *Journal of Business Venturing, 21*(3), 385–400. https://doi.org/10.1016/j.jbusvent.2005.06.003

Jiang, L., & Lavaysse, L. M. (2018). Cognitive and affective job insecurity: A meta-analysis and a primary study. *Journal of Management, 44*(6), 2307–2342. https://doi.org/10.1177/0149206318773853

Karasek, R. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly, 24*, 285–308.

Keim, A. C., Landis, R. S., Pierce, C. A., & Earnest, D. R. (2014). Why do employees worry about their jobs? A meta-analytic review of predictors of job insecurity. *Journal of Occupational Health Psychology, 19*(3), 269–290. https://doi.org/10.1037/a0036743

Klandermans, B., Hesselink, J. K., & van Vuuren, T. (2010). Employment status and job insecurity: On the subjective appraisal of an objective status. *Economic and Industrial Democracy, 31*(4), 557–577. https://doi.org/10.1177/0143831X09358362

Koen, J., Low, J. T. H., & Van Vianen, A. (2020). Job preservation efforts: When does job insecurity prompt performance? *Career Development International, 25*(3), 287–305. https://doi.org/10.1108/CDI-04-2018-0099

Lee, C., Huang, G.-H., & Ashford, S. J. (2018). Job insecurity and the changing workplace: Recent developments and the future trends in job insecurity research. *Annual Review of Organizational Psychology and Organizational Behavior, 5*(1), 335–359. https://doi.org/10.1146/annurev-orgpsych-032117-104651

Lepine, J. A., Podsakoff, N. P., & LePine, M. A. (2005). A meta-analytic test of the challenge stressor-hindrance stressor framework: An explanation for inconsistent relationships among stressors and performance. *Academy of Management Journal, 48*(5), 764–775. https://doi.org/10.5465/AMJ.2005.18803921

Llosa-Fernández, J. A., Menéndez-Espina, S., Agulló-Tomás, E., & Rodríguez-Suárez, J. (2018). Job insecurity and mental health: A meta-analytical review of the consequences of precarious work in clinical disorders. *Anales de Psicología, 34*(2), 211. https://doi.org/10.6018/analesps.34.2.281651

Notelaers, G., De Witte, H., Van Veldhoven, M., & Vermunt, J. K. (2007). Construction and validation of the short inventory to monitor psychosocial hazards. *Médecine du travail & Ergonomie/Arbeids-gezondheidszorg & Ergonomie, XLIV*, 11–17.

Pearce, J. L. (1998). Job insecurity is important, but not for the reason you might think: The example of contingent workers. In C. L. Cooper & D. M. Rousseau (Eds.), *Trends in organizational behavior* (Vol. 5, pp. 31–46). Wiley.

Piccoli, B., Reisel, W. D., & De Witte, H. (2021). Understanding the relationship between job insecurity and performance: Hindrance or challenge effect? *Journal of Career Development*, *48*(2), 150-165. https://doi.org/10.1177/0894845319833189

Podsakoff, N. P., LePine, J. A., & LePine, M. A. (2007). Differential challenge stressor-hindrance stressor relationships with job attitudes, turnover intentions, turnover, and withdrawal behavior: A meta-analysis. *Journal of Applied Psychology, 92*(2), 438. https://doi.org/10.1037/0021-9010.92.2.438

Probst, T. M. (2002). Layoffs and tradeoffs: Production, quality, and safety demands under the threat of job loss. *Journal of Occupational Health Psychology, 7*(3), 211–220. https://doi.org/10.1037/1076-8998.7.3.211

Probst, T. M., Stewart, S. M., Gruys, M. L., & Tierney, B. W. (2007). Productivity, counterproductivity and creativity: The ups and downs of job insecurity. *Journal of Occupational and Organizational Psychology, 80*(3), 479–497. https://doi.org/10.1348/096317906X159103

Repenning, N. P. (2000). Drive out fear (unless you can drive it in): The role of agency and job security in process improvement. *Management Science, 46*(11), 1385–1396. https://doi.org/10.1287/mnsc.46.11.1385.12084

Rönnblad, T., Grönholm, E., Jonsson, J., Koranyi, I., Orellana, C., Kreshpaj, B., Chen, L., Stockfelt, L., & Bodin, T. (2019). Precarious employment and mental health: A systematic review and meta-analysis of longitudinal studies. *Scandinavian Journal of Work, Environment and Health, 45*(5), 429–443. https://doi.org/10.5271/sjweh.3797

Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of Organizational Behavior, 25*(3), 293–315. https://doi.org/10.1002/job.248

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. https://doi.org/10.1177/0013164405282471

Schaufeli, W. B., Salanova, M., González-Romá, V., & Bakker, A. B. (2002). The measurement of engagement and burnout: A two sample confirmatory factor analytic approach. *Journal of Happiness Studies, 3*(1), 71–92. https://doi.org/10.1111/j.1464-0597.2010.00428.x

Schaufeli, W. B., & Van Dierendonck, D. (2000) *Handleiding van de Utrechtse Burnout Schaal – UBOS* [Test manual: Utrecht Burnout Scale – UBOS]. Swets & Zeitlinger.

Selenko, E., Mäkikangas, A., Mauno, S., & Kinnunen, U. (2013). How does job insecurity relate to self-reported job performance? Analysing curvilinear associations in a longitudinal sample. *Journal of Occupational and Organizational Psychology, 86*(4), 522–542. https://doi.org/10.1111/joop.12020

Shoss, M. K. (2017). Job insecurity: An integrative review and agenda for future research. *Journal of Management, 43*(6), 1911–1939. https://doi.org/10.1177/0149206317691574

Spector, P. E. (2019). Introduction: The challenge-hindrance stressor model. *Journal of Organizational Behavior, 8*(40), 947–948. https://doi.org/10.1002/job.2404

Spreitzer, G. M., Cameron, L., & Garrett, L. (2017). Alternative work arrangements: Two images of the new world of work. *Annual Review of Organizational Psychology and Organizational Behavior, 4*, 473–499. https://doi.org/10.1146/annurev-orgpsych-032516-113332

Staufenbiel, T., & König, C. J. C. J. (2010). A model for the effects of job insecurity on performance, turnover intention and absenteeism. *Journal of Occupational and Organizational Psychology, 83*(1), 101–117. https://doi.org/10.1348/096317908X401912

Staufenbiel, T., Kroll, M., & König, C. J. (2006). Could job insecurity (also) be a motivator? In M. Braun & P. P. Mohler (Eds.), *Beyond the horizon of measurement: Festschrift in Honor of Ingwer Borg* (pp. 163–173). GESIS-ZUMA. https://nbn-resolving.org/urn:nbn:de:0168-ssoar-49176-7

Stiglitz, J. E., & Weiss, A. (1983). Incentive effects of terminations: Applications to the credit and labor markets. *The American Economic Review, 73*(5), 912–927. https://doi.org/10.2307/1814662

Sverke, M., Hellgren, J., & Näswall, K. (2002). No security: A meta-analysis and review of job insecurity and its consequences. *Journal of Occupational Health Psychology, 7*(3), 242–264. https://doi.org/10.1037/1076-8998.7.3.242

Sverke, M., Låstad, L., Hellgren, J., Richter, A., & Näswall, K. (2019). A meta-analysis of job insecurity and employee performance: Testing temporal aspects, rating source, welfare regime, and union density as moderators. *International Journal of Environmental Research and Public Health, 16*(14), 2536. https://doi.org/10.3390/ijerph16142536

Thomson, B., & Michel, A. (2018). Organizational change and health. In M. Vakola & P. Petrou (Eds.), *Organizational change. Psychological effects and strategies for coping* (pp. 142–162). Routledge.

Van den Broeck, A., De Cuyper, N., De Witte, H., & Vansteenkiste, M. (2010). Not all job demands are equal: Differentiating job hindrances and job challenges in the job demands–resources model. *European Journal of Work and Organizational Psychology, 19*(6), 735–759. https://doi.org/10.1080/13594320903223839

Van Wyk, M., & Pienaar, J. (2008). Towards a research agenda for job insecurity in South Africa. *Southern African Business Review, 12*(2), 49–86.

Vander Elst, T., De Cuyper, N., Baillien, E., Niesen, W., & De Witte, H. (2016). Perceived control and psychological contract breach as explanations of the relationships between job insecurity, job strain and coping reactions: Towards a theoretical integration. *Stress & Health, 36*(2), 100–116. https://doi.org/10.1002/smi.2584

Vander Elst, T., De Witte, H., & De Cuyper, N. (2014). The job insecurity scale: A psychometric evaluation across five European countries. *European Journal of Work and Organizational Psychology, 23*(3), 364–380. https://doi.org/10.1080/1359432X.2012.745989

Precarious Employment: An Overlooked Determinant of Workers' Health and Well-Being?

Christophe Vanroelen, Mireia Julià, and Karen Van Aerden

1 Introduction

In the past four decades, high-income countries have seen a thorough socioeconomic restructuring with important implications for the jobs of many workers. There has been an increasing polarization of "good" versus "bad" jobs (Kalleberg, 2011). "Bad jobs" are overproportionally taken by the least advantaged socioeconomic strata of the working population (Kalleberg, 2016). But what exactly constitutes a "bad" or a "good" job? This question brings us to the concept of "job quality." Many definitions of job quality exist, but there is a certain consensus that a basic conceptual distinction should be made between "work characteristics" (i.e., job features related to the "work task" itself) on one hand and the "terms and conditions of employment" on the other hand (Parker & Ohly, 2008; Warhurst et al., 2017). Both dimensions are related to each other, but it needs to be clear that similar tasks – say, those of a shop assistant (e.g., lifting goods, controlling stock, informing clients,

C. Vanroelen (✉)
Interface Demography, Vrije Universiteit Brussel, Brussel, Belgium

Research Group on Health Inequalities, Environment, and Employment Conditions (GREDS), Department of Political and Social Sciences, Universitat Pompeu Fabra, Barcelona, Spain
e-mail: cvroelen@vub.be

M. Julià
Research Group on Health Inequalities, Environment, and Employment Conditions (GREDS), Department of Political and Social Sciences, Universitat Pompeu Fabra, Barcelona, Spain
e-mail: mireia.julia@upf.edu

K. Van Aerden
Interface Demography, Vrije Universiteit Brussel, Brussel, Belgium
e-mail: Karen.Van.Aerden@vub.be

C. Korunka (ed.), *Flexible Working Practices and Approaches*,
https://doi.org/10.1007/978-3-030-74128-0_12

etc.) – can be performed under different terms and conditions of employment (e.g., type of contract, work schedule, package of pay and benefits). This chapter is concerned with those terms and conditions of employment. We propose a multidimensional concept of "precarious employment" to be used in empirical research among workers. Answers to the question on what defines "good" and "bad" jobs also depend on the considered outcome. Good or bad for what? In this chapter we will consider the broad domain of workers' health and well-being. In research on occupational health and safety (OHS), "employment-related" risk factors are, however, often forgotten. Historically, research on health and well-being at work has been very much oriented towards the consequences of work tasks and far less with the consequences of employment conditions (Benach et al., 2010). Due to the shift towards a service economy, it was assumed that the "old" harsh and dangerous "industrial working conditions" would gradually disappear and make work healthier (Toch et al., 2014). Since the last quarter of the twentieth century, however, it became clear – for example, in the landmark studies based on the Whitehall cohort (Bosma et al., 1997) – that new threats to the health and well-being of workers were gaining importance. These were the so-called "new," psychosocial risks: factors related to the design, intensity, and social context of work tasks. To date, convincing evidence shows that the most "strainful" and "disequilibrated" psychosocial work situations exert an important impact on various mental and physical health conditions (Marmot et al., 1999).

A third set of risk factors is related to the "quality of employment conditions and relations" (e.g., the stability and controllability of contracts, level and stability of wages, working hours flexibility, access to social rights, (collective) voice, vulnerability, and interindividual relations with members of the hierarchy). A job combining several adverse employment conditions and relations can be labelled as a "precarious job." The potentially negative consequences for workers' health of precarious employment situations are often overseen – certainly in policy terms (Benach et al., 2014). Empirical evidence on the adverse health effects of precarious employment is emerging. It is important to underscore that both precarious employment and its consequences for health and well-being are unevenly distributed across social groups (e.g., gender, age groups, occupations). As a consequence, precarious employment is an important social determinant of health in the twenty-first-century world of work (Benach et al., 2014).

In this chapter, we will first describe the political-economic roots of precarious employment. Then we will outline its conceptual underpinnings and different approaches towards empirically investigating precarious employment. Subsequently, an overview of empirical evidence on the unequal distribution of precarious employment among the working population, between countries, and on the relationship with health and well-being is given. In the conclusion we present a future research agenda and make a plea for a policy program aimed at reducing precarious employment and its harmful consequences.

2 The Political-Economic Roots of Precarious Employment

The way employment is organized has been heavily affected by specific macro-economic and policy changes. Almost all European countries have taken policy measures aimed at increasing employment rates, prolonging working careers, and cheapening the cost of labor (Kuttner, 2018). Related to that, there has been an increasing polarization of "good" versus "bad" jobs, involving the clustering of working conditions, contractual stability, flexibility, wage levels, and other features of a job (Kalleberg, 2011). This, in turn, has led to an increase of precarious employment at the "lower end" of the labor market. It is worth taking a closer look at these trends.

2.1 The Post-Second World War "Standard Employment Relationship"

In most of the literature on precarious, non-standard, or flexible employment, there is an explicit or implicit reference to a supposed "standard employment model". This so-called standard employment relationship (SER) took shape in the decades immediately after the Second World War. In that epoch, the SER emerged as a kind of "golden standard" of good employment, involving full-time, permanent employment, a family wage, social benefits, strong regulatory protection, regular working hours, and possibilities for career progression (Mückenberger, 1989). According to Standing (2011), the key term characterizing the SER-model was "security" – one could also say: "predictability." The SER-model did not remain hegemonial for a long time, was quite heterogeneous over countries and industries, and also excluded many workers (e.g., the female labor force) (Vidal, 2016). Nevertheless, it remained a strong normative model of how a "standard" job should look like.

The SER-model is tightly related to the Fordist production model and the historical compromise between labor and capital characterizing the post-war period. Kuttner (2018) called this short period of more equal distribution of power between labor and capital a "vulnerable miracle." It was indeed an extraordinary combination of factors – techno-organizational, macro-economic, (geo-)political, demographic, and ideological – that shaped the employment relations in this particular period. Many excellent analyses on this epoch have been published (e.g., Jessop, 2001), so it is not our intent to reproduce these detailed accounts. However, it might be useful to briefly highlight the most relevant issues.

First of all, there is the techno-organizational aspect. The early and mid-twentieth century was the time when the modern enterprise came to full maturity, including the separation of ownership and control and the growth of a professional managerial class (Weil, 2014). This trend led to the emergence of large corporations in the USA and later in Europe, as pursuing economies of scale was key to increase profitability (Chandler, 1990). This was facilitated – certainly in industry – by technologies of

mass production, leaning on a certain extent of standardization and thus increasing the predictability of the production process (Vidal, 2016). This organizational format compelled the need to rely on formal management procedures, also in the domain of human resources. Formalization in human resources was realized through the creation of internal labor markets, where employment relations were dominated by rules and procedures (Doeringer & Piore, 1971) and trade unions became formally integrated in the system of industrial relations (Streeck, 2005). An important precondition for this model was the "disciplining of capital" during the post-war period. The Great Recession of the 1930s and the Second World War paved the way for Keynesian macro-economic policies (Jessop, 1994). Part of this Keynesian program consisted of imposing restrictions on (speculative) capital, including strict limits upon the banking industry, negative real interest rates for rentier capital, and limitations to currency speculation and international movement of capital (the so-called Bretton Woods system) (Kuttner, 2018). This favored stable, long-term investments in the real economy. Moreover, also organized labor – for very specific reasons – gained a uniquely strong position of power in the history of capitalism. This power position is convincingly reflected by the historically high unionization rates and electoral support for left political parties in the interbellum and the 1945–1980 period (Korpi, 1983). At the same time, employers saw the advantages of building a stable employment regime backed by a strong welfare state (Swenson, 2004). Finally, also ideological factors played a role in the economic model of "embedded liberalism": the devastation of the Great Recession and the Second World War had profoundly discredited the basic premises of the laissez-faire liberal economic thought (Clift, 2014) at a moment when the capitalist model was seriously challenged by the Soviet Bloc (Offe, 1983).

2.2 The New Employment Model of Neoliberal Capitalism

As the above-discussed cocktail of factors was crucial for the emergence of the SER-model of employment, it was their unravelling that put the SER as an employment standard under pressure. The decline of this post-war constellation considerably weakened the bargaining position of labor and in particular those groups of workers who had to rely on their collective bargaining power (Korpi, 2006). Both the crisis of Fordism and its implications for employment conditions have been described with vigor by many authors (e.g., Vallas, 1999). Again, it is worthwhile to briefly address the most important issues.

First of all, the business model of the large bureaucratically organized corporation lost ground to a new form of corporation, that Weil (2014) labelled as the "fissured enterprise." Instead of organizing as much activities as possible in-house, this new type of "flexible firm" rather acts as "a star" in a small solar system with peripheral companies and a loosely bound workforce circling around it. As a consequence, corporations are driven towards dismantling their internal labor markets (Grimshaw et al., 2001). According to Weil, the main drivers behind the new

organizational model are the renewed power of capital that got rid of the constraints imposed by Keynesianism and new technological possibilities (Weil, 2014). Capital, in this case, can be considered a "push factor": the abandonment of the Bretton Woods Agreement and the throwing down of the barriers between investment banking and commercial banking unleashed massive amounts of cross-border investment capital (Kuttner, 2018). Private equity firms managing this capital increasingly pushed corporations in the "real economy" to optimize short-term profitability by cutting costs through shedding their less profitable activities (Weil, 2014). The resulting "fissured" corporate structure would not be possible without new technologies figuring as a "pull factor": mainly falling coordination costs through the widespread application of ICT and related inventions in logistics and retail (Blair & Lafontaine, 2005). Moreover, spurred by the neoliberal economic doctrine, governments – although to various extents – started to reform their labor markets in the pursuit of more employment flexibility, less stringent collective bargaining regulations, and cheaper wage costs for certain categories of the work force (Harvey, 2005). Along these lines a new employment model evolved, with important implications for many workers.

3 Conceptualizing Employment Quality and Precarious Employment

Job quality researchers have tried to impose structure to the sheer endless list of work-related risks and benefits of contemporary jobs. When considering the basic distinction between "intrinsic work-task characteristics (working conditions)" and the "conditions and relations of employment" (Warhurst et al., 2017), it can be noted that the first category received far more scholarly attention. Occupational stress models have emerged as strong "middle-range concepts" helping to make sense of the relation between (psychosocial) working conditions and workers' well-being (Siegrist & Theorell, 2006). Similar conceptual work concerning the conditions and relations of employment is less developed (Julià et al., 2017). In this paragraph, the employment quality model for studying precarious employment is proposed as a conceptual framework.

3.1 Traditional Research on the Quality of Employment Arrangements

Before delving into the conceptual dimensions of the model we propose, it is worthwhile considering the traditional approaches towards the consequences of employment arrangements. There have been two dominant approaches so far.

The first one is a "pragmatic risk factor approach", mostly oriented towards the study of various forms of non-standard or temporary employment contracts (e.g., temporary agency employment, short-term contracts, zero-hour contracts, bogus and dependent self-employment), of which evidence generally points towards harmful effects for workers' well-being (Kreshpaj et al., 2020). Other employment conditions and relations have also been studied as individual risk factors for workers' well-being: long (Bannai & Tamakoshi, 2014) and irregular or unpredictable working (Arlinghaus et al., 2019) hours, involuntary part-time work (De Moortel et al., 2018), a lack of participation and empowerment (Spreitzer, 2008), unjust or authoritarian treatment by management (Harms et al., 2017), and inadequate personal income (Cummins, 2000). Although these "single-indicator studies" have revealed important insights, they do not consider the common causes behind these specific unfavorable employment characteristics. This can be considered a limitation, because the clear patterning and clustering of employment conditions suggests there is a common underlying cause. The multidimensional approach of employment quality, in contrast, adopts a holistic approach towards workers' employment situation (Hofmans et al., 2020), highlighting the underlying condition of precariousness.

The second approach is based on the notion of "perceived job insecurity." This body of research has demonstrated consistent associations with various health outcomes, especially poor mental health (Harvey et al., 2017). The perceived job quality approach has furthermore been broadened up towards the fear of loss of other valued job features, i.e., so-called qualitative job insecurity (Hellgren et al., 1999). Again, this "subjective approach" has proven to be highly important for the field, as most insights on the harmful effects of sub-standard employment quality come from these studies. A focus on the perceptions of employment instability or loss of valued features, however, does not necessarily provide information on the underlying causes of these perceptions (Benach et al., 2014). Put differently: two workers under similar circumstances can evaluate their situation differently, and so – although this differential evaluation might be an important mechanism in explaining harmful effects of precarious employment – the underlying causes of this situation are not considered when assessing perceptions alone. This creates the risk that analyses of precarity get stuck in discussions around variation in individual preferences and personality characteristics – and with that an overly hedonic approach towards the reality of employment and wider living circumstances (Warhurst et al., 2017).

3.2 The Multidimensional Employment Quality Approach

The employment quality approach attaches to the "objectivist" or sociological strand in job quality research (Warhurst et al., 2017) and presents a theory-based, multidimensional, and holistic approach towards employment arrangements. This model has been proposed in previous contributions of which the most important are Benach et al. (2014) and Julià et al. (2017). Employment quality can be defined as:

"… a multi-dimensional construct, grasping into different features of the employment conditions and relations, including the stability and controllability of contracts, level and stability of wages, working hours (amount, timing, discretion), access to social rights, future employability, collective bargaining, and interindividual relations (with management)." Precarious employment should consequently be seen as a specific case of employment quality, where: "there is an accumulation of unfavorable 'employment quality characteristics' that is essentially due to the weak bargaining power of a worker."

In defining the dimensions of employment to be included in the employment quality model, the "old" Fordist SER serves as an explicit point of reference, a "golden standard" from which specific employment arrangements can deviate. In doing so, however, we do not necessarily mean to idealize the SER and each of its features. We do acknowledge that current labor markets have become far more diverse – in terms of activities and worker profiles – when compared to the post-war situation. In some situations, the SER-norm might prove unsatisfactory for all parties involved in an employment relationship. The point we want to make is that the SER-model is still deeply rooted in Western workers' minds as a "standard situation" and that, even in the early twenty-first century, issues like employment and income security, bearable working hours, or access to social protection and workers' rights are still top-of-the-bill priorities for many workers.

The concept of employment quality presented here refers to seven dimensions of employment that might or might not deviate from the SER-model. Phrased in a "negative way," these are the following: (1) temporariness (i.e., the duration of the formal contract), (2) disempowerment (i.e., representation and participation), (3) vulnerability (i.e., adverse interpersonal relations and administrative issues), (4) workplace rights (i.e., lack of access and lack of power to exercise rights), (5) economic unsustainability (i.e., low or unstable income), (6) undesirable working times (i.e., long, irregular, unpredictable, or at "unsocial" moments), and (7) low employability opportunities (i.e., training and internal labor market careers). These dimensions are further outlined in Table 1, and they have been justified in more detail in other publications (e.g., Julià et al., 2017).

It is important to note that there is some variation in the specification of employment quality/precarious employment concepts. Most of the approaches refer to one specific paper presented by Rodgers at a seminar organized by the *Université Libre de Bruxelles* in 1989 (Rodgers, 1989). Rodgers (1989) defined four dimensions of precariousness – "uncertainty of continuous employment," "lack of protection," "low control over working conditions," and "low income." Subsequent attempts to operationalize multidimensional accounts of precarious employment have varied within a certain range: some are broader, others are more restrictive. We will not present an overview of specific approaches in this chapter, but merely point the way to some excellent recent reviews, i.e., by Van Aerden (2018) and Kreshpaj et al. (2020). The scheme presented in Table 1 largely aligns with the employment quality approach, which is closely related to the Employment Precariousness Scale (EPRES), a measuring instrument for precarious employment that was constructed by a collective of researchers related to the Pompeu Fabra University in Barcelona

Table 1 Overview of the employment quality approach towards measuring precarious employment

Dimension	Subdimension	Description
1. Temporariness	Type of employment contract	Departures from "open-ended contracts" are considered as "more precarious"; a gradation can be made among "temporary contracts," with very short, agency, or informal agreements being considered the most precarious
	Temporariness in permanent employment	Contractual temporariness might be combined by other indicators, such as short tenure or restructuring/downsizing[a]
2. Disempowerment	Worker representation[b]	Access to an employee representative, being able to resolve issues through formal worker representation, regular meetings in which employees can express their views
	Participation in workplace issues	The extent of involvement in decisions on work schedules, involvement in work planning, setting of objectives, decisions on compensation schemes
3. Vulnerability[c]	Authoritarian treatment	Generally problematic relations with employer/management, including unfair, intimidating, or aggressive treatment, being treated as redundant or disposable
	Abusive treatment	Being subjected to psychological, verbal, or physical abuse
	Being cheated	Being subjected to (frequent) "cutting corners" by the employer or employment agency (e.g., errors in the disadvantage of the worker in paychecks, excess working hours, paid holidays)
	Being uninformed	Lacking information on important workplace issues (e.g., formal procedures, health and safety, etc.)
4. Workplace rights[c]	Lack of access to workplace rights	Lacking access to established workplace rights (e.g., paid holidays, paid sick leave, pensions, taking time off for important reasons, etc.)
	Lack of power to exercise workplace rights	Not being able to exercise the rights one is entitled to because of fear for problems with management
5. Economic unsustainability	Low income	Low hourly and monthly wages and/or covering basic needs
	Lack of non-wage benefits[b]	Being excluded from benefits typical in the country, sector, or profession one is employed in (e.g., company pension, compensation for lunch or commuting, company car, etc.)
	Underemployment[b]	Being involuntary part-time employed (wanting to work more hours than actually working)

(continued)

Table 1 (continued)

Dimension	Subdimension	Description
6. Undesirable working times[d]	Long working hours	Excessively long working hours (mostly defined at 48 h/week or more)
	Working times irregularity	Regular changes in the work schedule, high variation in the timing of work schedules, shift work
	Unpredictable working times	Changes in the work schedule at short notice, requirement for being "standby"
	Work at socially undesirable times	Having to work at times when most workers do not have to work (e.g., evening and night work, weekend work)
7. Low employability opportunities[b]	Lack of training opportunities	Being excluded from on-the-job training or formal training sessions during working hours and/or paid by the employer
	Lack of career opportunities	Death-end jobs, no possibilities for progress, departing from the notion of the "internal labor market career"

[a]Tenure is only included in the EPRES for Spain, Chile, and Sweden
[b]These subdimensions are included in several analyses using the EWCS 2005, 2010, and 2015 or US General Social Survey as sources of proxy-indicators. Employability is also included in the EPRES Belgium
[c]Dimensions included in studies using the EPRES, abusive treatment and lack of information, are also included in proxy-approaches based on the EWCS surveys
[d]This dimension is not included in the approaches using the EPRES, except for EPRES Belgium

(Julià et al., 2017). This approach assumes that specific jobs can resemble the dimensions of the SER-model to various extents. Moreover, patterns of employment features are not coincidental, but coincide with the types of employment that can be expected on theoretical grounds in different niches of the segmented labor market (Vanroelen, 2019).

The employment quality model has been operationalized in several empirical studies, mostly investigating its relationship with workers' health and well-being. Largely two approaches have been followed in doing so. In a number of studies (e.g., Padrosa et al., 2020), proxy indicators have been identified in order to use existing large-scale surveys for empirically demonstrating the hypotheses of the model. A second approach has been to use a purposefully constructed survey instrument, the Employment Precariousness Scale (EPRES), in order to investigate the consequences of (low) employment quality for the health and well-being of workers (e.g., Vives et al., 2010). This EPRES-model was originally developed in Spain, but is currently extended to a number of other countries, including Chile (Vives-Vergara et al., 2017), Sweden (Jonsson et al., 2019), and Belgium (Vandevenne, 2020). Moreover, there have been some attempts to expand the employment quality model to non-wage earning worker groups, like the informally employed (Vives-Vergara et al., 2017) and self-employed (Gevaert et al., 2020). A review of the evidence emerging from these studies is made in the next paragraph. At this point, it is important to mention that the diversity of research efforts has also generated some

inconsistencies in the number of dimensions of the employment quality model and its exact content (see Table 1 and its legend).

3.3 Continuous Versus Typological Approaches

A final aspect that needs to be outlined concerns two types of operationalization of the employment quality model – i.e., as a continuous summed score or rather as a typology.

While the importance of non-standard employment is growing, the more or less "standard" job remains dominant in most high-income countries. This creates segmented labor markets. A cleavage of primary importance is assumed to exist between the "established core" of the labor market, consisting of "insiders" who keep resembling to the SER-model, and a "secondary segment" of peripheral jobs that have been increasingly subjected to contractual flexibility, outsourcing, and other forms of de-standardization (Doeringer & Piore, 1971). This cleavage shapes the central underlying assumption of the "continuous approach" – i.e., that the accumulation of unfavorable employment characteristics from a certain threshold onwards, and independent of specific types of employment forms or contracts, creates a "precarious labor market segment." The validity of this approach has been demonstrated both with proxy-indicators derived from the EWCS surveys (Padrosa et al., 2020), as with purposefully collected data from the EPRES questionnaire (Vives et al., 2011).

The typological approach – in line with more complex accounts of segmented labor markets (Davidsson & Naczyk, 2009) – assumes that a continuous account of employment precariousness might hide some complexity. De-standardization of the SER-norm can take a "low road" or a "high road" (Bosch, 2004). The "high road" is reserved for higher-skilled workers in strategically important functions and implies increased versatility, place- and time-independent work, and overtime work but at the same time leaves opportunities for worker-induced flexibility, enhanced career prospects, and strong bargaining power on the basis of desired skill sets. The "high road" suggests an emerging group of "portfolio workers" with a "boundaryless" professional life, moving from one opportunity to another in an independent and flexible way (Van Aerden et al., 2014). The "low road" towards flexibility is reserved for lower-skilled and generally less strategically important workers and corresponds to the secondary labor market segment. The shift in the balance of power (away from organized labor) is felt hardest in this segment of the labor market, as these workers were unable to substitute collective bargaining power with individual bargaining power (Wilkinson, 2013). For these workers, "non-standard" equals contractual and temporal flexibility, including temporary work, (involuntary) part-time work, or socially undesirable and unpredictable working times. Of course, countries and sectors have combined different "low road solutions," blending contractual and temporal flexibility (Eichhorst & Marx, 2015). Combinations of types of "low road flexibility" are assumed to lead to different types of employment in the

lower segment of the labor market. More specifically, one type is predominantly characterized by part-time work, multiple job holdings, and even "working hours underemployment." This type of employment can be described as "unsustainable precarious employment," because it implies a high dependence on other income sources (e.g., the wage of a full-time employed partner). Another type is mainly characterized by a high level of exploitation that becomes apparent from very flexible and irregular working hours, sub-standard rights and social protection, contractual instability, and relatively low income and other rewards. This type can be described as an "intensive" form of precarious employment (Van Aerden et al., 2014). The latter group closely corresponds with the highest scores of the continuous precariousness scale, while the other de-standardized groups might remain unnoticed using the continuous approach (Van Aerden, 2018).

The typological perspective thus identifies "types of employment," of which some may be more precarious than others. Typologies know a long tradition in the social sciences. They provide a heuristic device that aims to summarize a social phenomenon's most essential features (Ritzer, 2007). Typologies offer a strong mental model helping to make sense of the reality of employment arrangements in a more holistic manner (Howard & Hoffman, 2018). The typological approach towards employment arrangements can be put into practice using "person-centered methods," like latent class cluster analysis (LCCA) (Hofmans et al., 2020). In our case, employees are rearranged into a limited number of categories in a probabilistic manner, based on their degree of similarity regarding indicators of employment quality. Van Aerden et al. (2014) showed that, applied to the entire EU-labor market, typically a five-category typology of employment arrangements emerges: "SER-like jobs," an "instrumental job type" (i.e., a lower-quality variant of the SER, involving limited rewards, lack of training opportunities, and poorer employment relations), "precarious unsustainable jobs," "precarious intensive jobs," and a "portfolio job type." As argued above, this constellation reveals "labor market segments" that can be assumed on a theoretical basis. Moreover, similar approaches, using different (sub-)datasets from a more restricted number of countries (Boot et al., 2019; Lukac et al., 2019; Van Aerden et al., 2017), incorporating the self-employed (Gevaert et al., 2020) or investigating the US labor market (Peckham et al., 2019), have come to fairly similar results, adding to the validity of the typological approach. Recently, the typological approach has also been used to determine a limited number of "typical employment" trajectories (Eisenberg-Guyot et al., 2020), also reflecting the above-discussed labor market setup.

4 Empirical Evidence from Multidimensional Approaches

Empirical research using multidimensional indicators of precarious employment shows a highly consistent picture in terms of demographic and socioeconomic characteristics and country distribution. Also, a consistent picture in terms of relations with occupational health risks and outcomes of workers' health and well-being

emerges. In this paragraph, we will outline the current state of empirical knowledge derived from multidimensional approaches towards employment quality and precarious employment.

4.1 Who Are the Precarious Workers and Where Do We Find Them?

Most multidimensional indicators point out that women are more exposed to precarious employment than men. This is certainly the case for the "scale indicators" (Bosmans, Van Aerden, & Vanroelen, 2016; Julià et al., 2017; Vives et al., 2011). The typological approaches, however, put some nuance to this picture, showing that small, part-time jobs (precarious unsustainable jobs) are overrepresented among women, but that precarious intensive jobs are more frequently seen in men (Van Aerden et al., 2014). Moreover, all studies that looked into the age distribution of precarious employment found it to be more prevalent among younger workers (e.g., Benach et al., 2015; Gevaert et al., 2020; Lukac et al., 2019). Also, all studies stratifying precariousness by immigrant status have found higher mean scores (Benach et al., 2015; Vives et al., 2011) or prevalence of high precariousness (Julià et al., 2017; Kretsos & Livanos, 2016) among immigrants and people with immigrant background – at least in Europe and North America (Eisenberg-Guyot et al., 2020). Finally, clear patterns of intersectionality emerge, with young immigrant, female workers (of manual occupational class) being the most exposed to precarious employment (Vives et al., 2011).

Precarious employment is higher among the lower educated (e.g., Bosmans, Van Aerden, & Vanroelen, 2016; Gevaert et al., 2020; Kretsos & Livanos, 2016). These differences can be huge: up to double the prevalence of precarious employment specified as a dichotomy when primary educated are compared to university educated (Sabillón Casco et al., 2018). Moreover, Eisenberg-Guyot et al. (2020) have shown that this lower educated status is also a characteristic of precarious employment careers. Gevaert et al. (2020) showed, in their typological analysis, that also the most precarious groups of self-employed (i.e., "insecure self-employed") are clearly lower educated compared to other groups of self-employed. Other studies have considered occupational class and found lower-skilled manual workers to be highly exposed to precarious work (Benach et al., 2015; Julià et al., 2017). Van Aerden et al. (2014) show that "precarious unsustainable jobs" are more common among low-skilled blue- and white-collar workers, while "precarious intensive jobs" are concentrated among low-skilled blue-collar workers. When applying the ISCO categorization, mostly elementary occupations, operators, service workers, construction workers, and workers in agriculture have high precariousness scores (Eurofound, 2013; Kretsos & Livanos, 2016).

Also at the level of the employing organizations, a clear patterning can be seen. First of all, alongside the lines of establishment size, micro- and small

organizations have the highest frequency of employees in precarious employment (Julià et al., 2017; Van Aerden et al., 2014). In a study among nurses and nursing assistants in the Spanish region of Catalunya, Fité-Serra et al. (2019) found that workers in private institutions were worse off in terms of employment precariousness, compared to their counterparts in public institutions. Van Aerden et al. (2014) find an over-representation of SER-like and portfolio jobs among public sector workers. Olsthoorn (2014) could not find differences alongside the public-private sector distinction in the Netherlands. Overall, sectors with typically high levels of precarious employment are the primary sector, construction, and specific segments of industry (e.g., assembly) and services (e.g., hospitality and retail) (Bosmans, Van Aerden, & Vanroelen, 2016; Eurofound, 2013).

From a country perspective, overall, there is a pattern of higher employment precariousness levels in Eastern and Southern European countries, compared to the Nordic and some Continental (e.g., Belgium, Luxembourg, Austria) European countries (Bosmans, Van Aerden, & Vanroelen, 2016; Eurofound, 2013). Again, the typological approach adds some nuance to this general story: countries tend to vary in their type of "bottom of the labor market flexibility": some countries (e.g., the Netherlands, the UK, or Norway) tend to have a relatively high number of precarious unsustainable jobs, while others (e.g., Turkey or Albania) have a lot of precarious intensive jobs and hardly any precarious unsustainable jobs (Van Aerden et al., 2014). A few studies have been able to assess evolutions over time. Van Aerden (2018) concluded that during the period 2005–2015 mainly the precarious unsustainable job type has been on the rise in the EU (and the instrumental job type declining). Two studies on Spain and Italy showed that – while on average employment precariousness (measured as a scale) remained more or less stable in the 2006–2015 period – there were important increases in precariousness among fixed term (Arranz et al., 2018) and "newly created jobs" (García-Pérez et al., 2020).

4.2 The Relationship Between Precarious Employment and Other Work-Related Risks

Clear relations between precarious employment and work characteristics have also been found.

First of all, precarious jobs are found to be "less rich" in terms of the variability and intellectual complexity of work tasks and – related – possibilities for personal development (Bosmans, Van Aerden, & Vanroelen, 2016; Van Aerden et al., 2014; Vives et al., 2010). Moreover, precarious workers have lower autonomy in executing their work (Eurofound, 2013) and find less opportunities to have influence at their work (Vives et al., 2010). Besides, also some clear relations with job demands are seen. More elevated demands for precarious workers are of both physical, e.g., ergonomic demands and harmful exposures (Bosmans, Van Aerden, & Vanroelen,

2016; Eurofound, 2013), and psychological, e.g., work speed, high job strain, and general quantitative demands (Eurofound, 2013; Vives et al., 2010).

Regarding their social relations at work, workers in precarious employment report less support from co-workers and superiors (Eurofound, 2013; Vives et al., 2010). In contrast, they tend to be exposed more often to "unwanted" social interactions, such as violence, harassment, or unwanted sexual attention (Eurofound, 2013; Van Aerden et al., 2014). Precarious workers also report generally less frequent contact with other people at the work floor (Bosmans, Van Aerden, & Vanroelen, 2016).

Finally, a number of self-perceived work-related outcomes tend to be less positive. First and foremost it concerns issues of job insecurity and perceived employability (Julià et al., 2017; Van Aerden et al., 2015; Vives et al., 2010). Job satisfaction is negatively related to precarious employment (Van Aerden et al., 2015; Vives et al., 2010). Also subjective income deprivation (e.g., difficulties to make ends meet) and work-private conflict are found to be higher among workers with high employment precariousness scores (Vandevenne, 2020).

4.3 Health and Well-Being Correlates of Precarious Employment

Most of the empirical studies discussed in this paragraph were designed to investigate the relationship between precarious employment and health. Mental health outcomes are the most frequently studied. The majority of current research designs is cross-sectional, although – certainly for mental health – some longitudinal studies have been published recently.

There is convincing cross-sectional evidence for a strong negative association between precarious employment and mental health (Peckham et al., 2019; Van Aerden et al., 2016; Vives et al., 2011). The same holds for "precarious self-employment" (Gevaert et al., 2020). Different indicators of mental well-being have been included – e.g., SF-36, WHO5, GHQ12, and CES-D – all showing similar patterns. Julia et al. (2017) moreover showed that the multidimensional EPRES-scale for precarious employment was more strongly associated with adverse mental health than indicators of temporary employment. For mental health also some first longitudinal studies have been published, showing precarious employment causing a deterioration in the mental health status of respondents (Canivet et al., 2016).

The second most investigated indicator is self-rated health. Here too, quite consistent associations between high scores of precarious employment or membership of a "precarious employment type" and adverse health have been found (Van Aerden et al., 2016; Vives et al., 2010). This finding can also be extended to "precarious self-employed" workers (Gevaert et al., 2020). However, in one study – exclusively among Belgian workers – a nonsignificant association was reported (Bosmans, Van Aerden, & Vanroelen, 2016). Also for an aggregated list of physical complaints, a

positive association with precarious employment has been documented (Eurofound, 2013). Peckham et al. (2019) reported a higher frequency of workplace injuries in precarious types of employment among workers in the USA. Van Aerden et al. (2015) have reported a similar association with "bad safety climate" in a cross-European sample of wage earners.

4.4 What Are the Mechanisms Explaining the Link Between Precarious Employment and Workers' Health and Well-Being?

It is still not completely clear what the underlying mechanisms are linking precarious employment to these outcomes. We nevertheless assume – in part based on insights from qualitative research – that precarious employment relates to health and well-being largely via three main pathways: (1) through direct psychological effects such as uncertainty and feelings of unfairness and powerlessness associated with instable and sub-optimal employment conditions; (2) through the higher exposure to detrimental physical and psychosocial working conditions, weaker occupational health and safety measures, and low-quality social relations at the shop floor; and finally, (3) low income and under-protection from social risks such as unemployment, disability, and, later in life, retirement may create another leap towards material deprivation and its associated health consequences (Julià et al., 2017) (Fig. 1).

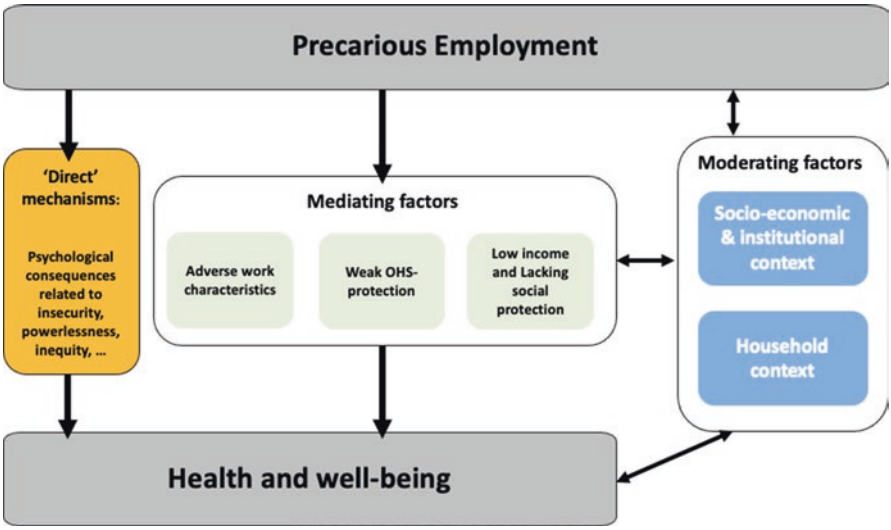


Fig. 1 Assumed mechanisms explaining the relation between precarious employment and workers' health and well-being

A first, direct, pathway concerns the psychosocial experiences related to the inherent characteristics of precarious employment. Precarious employment conditions (e.g., a temporary contract, an irregular income, an irregular working schedule) can make people feel uncertain concerning further employment, about the income they may expect next month, or regarding their working times in the days and weeks to come (Bosmans, Hardonk, et al., 2016). Also issues such as a lack of rights and benefits, limited employability opportunities, or unfavorable social relations on the shop floor (e.g., discrimination, harassment, stigmatization) can evoke psychosocial reactions with a negative impact on mental well-being (Bosmans et al., 2015). Nevertheless, our findings show that next to experiences of strain, some particular employment situations (e.g., short temporary assignments) that would commonly be qualified as "precarious" can also lead to positive experiences for some groups of workers (Bosmans et al., 2017). Some workers like temporary contracts because they enjoy the flexibility and variation in their work. Such experiences of "activation" are more often present in workers who deliberately choose for their employment situation, because they prefer an adventurous lifestyle, for example (Bosmans et al., 2017). In most cases these workers experience a high level of control over their careers and lives.

The two other pathways are of a more indirect nature. The second pathway concerns the exposure of precarious workers to low-quality working conditions and a poor job content. Job insecurity, competition for work, price competition, and underbidding of contracts (in case of subcontracting) can contribute to a range of hazardous practices including work intensification, working when ill or injured and accepting hazardous tasks (Julià et al., 2017). Another physical health risk for precarious workers concerns poor occupational health and safety prevention, including less qualitative protective gear, lack of training about occupational health and safety risks, unfamiliarity with the hazards of a work site, and a lack of precautions to decrease risks (Underhill & Quinlan, 2011). Moreover, precarious workers are often aware of the fact that it is their "precarious employment situation" that is exposing them and making them more vulnerable to harmful or less interesting work characteristics (Bosmans, Hardonk, et al., 2016).

The third pathway is situated outside the labor process and refers to the fact that precarious employment also affects social and material living conditions, such as household composition, the financial situation, or the employment situation of other household members. Not only do precarious workers have a higher chance of being confronted with social and material deprivation (Kretsos & Livanos, 2016), this situation often coincides with or even emerges from the precarious employment of one or more family members (Grotti & Scherer, 2014). For example, an insufficient or uncertain income can in turn lead to poverty, inadequate access to social protection, poor living conditions, and adverse lifestyles such as poor nutrition. This involves a number of potentially harmful effects for the health of precarious workers. Of course, social and material deprivation can also evoke psychosocial reactions, such as frustration, uncertainty, and feelings of powerlessness, impacting on mental well-being. For instance, doing temporary jobs can hamper the life planning of workers in the long run, since they have the feeling that they are not able to make

important steps in their life (Bosmans, Hardonk, et al., 2016). Furthermore, being criticized because of not finding a stable job or not being able to participate in social activities due to financial uncertainty can bring precarious workers in a stigmatized, isolated social position (Bosmans, Hardonk, et al., 2016).

5 Conclusion

In this chapter, the theoretical and conceptual underpinnings of a multidimensional concept of precarious employment conceived for health and well-being research are discussed. The empirical results so far underline the usefulness of this approach in studies involving the mental and physical health of workers as well as their wider well-being. Most studies using multidimensional concepts of precarious employment to date are only of a cross-sectional nature. However, also the first evidence for causality is emerging, showing that it is precarious employment that affects (mental) health, downplaying the sometimes-assumed selection effects (i.e., mental health affecting the labor market situation of workers). Specific attention is paid to the possible causal pathways linking precarious employment to health and well-being. All in all, the studies commented in this chapter show that precarious employment needs to be considered an important social determinant of health. There surely is a need for further in-depth research. However, with the current knowledge already a policy agenda aimed at improving employment quality and reducing precarious employment at the "bottom" of the labor market seems more than justified.

5.1 Research Agenda on the Health and Well-Being Consequences of Precarious Employment

Further investigation into the nature of causality and the mechanisms explaining the relation between employment quality and adverse health is needed. First of all, consensus should be reached about the crucial dimensions and cutoffs for considering employment precariousness among different worker populations. More consensus on a clear multidimensional definition of precarious employment might be a first important step (Bodin et al., 2019). Subsequently, measuring instruments can be further refined and standardized. While current research efforts have been concentrated mostly on salaried workers, measuring instruments should also be adapted to the emerging "gray zones" of employment: the informal sectors of our economy, bogus self-employment, or the emerging platform economy. Furthermore, a future research agenda should aim for better measurement of employment quality/precarious employment in large-scale survey projects like the European Working Conditions Survey or the Labour Force Survey. There is also a need for more and better longitudinal data. Panel studies aimed at further probing into explanatory mechanisms

need to be set in place but also the potential of exploring register data in an interesting pathway for further research (Bodin et al., 2019).

Also more explanatory research incorporating the wider context of precariousness is needed. This refers in the first place to national or regional policy and social contexts, which may be key modifying (or moderating) factors that influence the nature of precarious employment, as well as the precarious employment-health relationship (Bodin et al., 2019). Well-designed and detailed cross-national institutional analyses seem to be the way forward here. Second, context also refers to the interrelationship between precarious employment situations and household or wider socioeconomic living situations. Certainly for these issues, more qualitative research shedding a light on the complex mental processes associated with employment experiences and wider social precarity is needed.

Apart from the improvement of conceptual and empirical accounts in fundamental academic research, precarious employment should also be better incorporated in work floor OHS screenings. Precarious employment remains an "overlooked occupational risk factor" mainly because it is difficult to grasp in the day-to-day professional practice of OHS specialists. Therefore, a short and easy-to-use assessment instrument should be developed and tested. More routine risk screening can also inform better Europe-wide monitoring data of employment quality/precariousness (Benach et al., 2016).

5.2 A Policy Agenda Aimed at Reducing the Exposure to Precarious Employment and Attenuating Its Negative Consequences

For the time being, our conclusions are strong enough to warrant policymakers for the potentially harmful effects on workers' health and well-being of precarious employment and uncontrolled labor market flexibility. National and European policymakers with the ambition of realizing "inclusive growth" should make efforts to establish secure, properly rewarding, and equitable employment conditions for all workers.

The COVID-19 pandemic and the measures of confinement taken by our governments have put the negative consequences of precarious employment situations sharper than ever. Occupational sides have been main sources for spreading the coronavirus (RIVM, 2020) – and research and media reports in the weeks and months after the outbreak have clearly demonstrated occupational inequalities in the risk of infection. A recent review of the literature makes it clear that factors like human contact, physical proximity to infected spaces, access to protective gear, and hygiene measures are only one part of the story; the other part of the story directly relates to the conditions and relations of employment (Purkayastha et al., 2021). To put it differently: precarious employment clearly played a reinforcing role in spreading COVID-19 in occupational settings. Major factors in explaining this link are the

lack of access to social protection and job insecurity (Heymann et al., 2020), which made precarious workers come to work even when feeling ill and which caused poverty and worsening living conditions for those unable to work (Adams-Prassl, 2020). Another factor is the lack of bargaining power of precarious workers: out of fear of job loss, these workers were reluctant to ask for safer working conditions during the epidemic (Counil & Khlat, 2020). Ironically, many of the so-called "frontline" or "key" occupations (e.g., cashiers, delivery people, domestic and sanitation workers) during the months of lockdown were overproportionally populated with workers in a precarious employment status.

This situation gave rise to many white papers in journals and newspapers around the world during the COVID-19 crisis. Suddenly the negative consequences of adverse employment conditions were widely recognized. Researchers in the field of precarious employment have been pointing to them already for many years (Quinlan et al., 2001) and have also highlighted that increasing work de-standardization, flexibility, and precariousness are not natural phenomena, but the result of deliberate policy choices. This involves that the solutions also lay with policies aiding to counter tendencies towards uncontrolled labor market flexibilization and deregulation. As research shows it is predominantly – although not exclusively – the contingent sector (e.g., temporary work agencies, solo self-employment regimes, short- and very-short-term contracts, small part-time, and zero-hour employment, platform work, etc.) where the highest levels of employment precariousness are seen (Arranz et al., 2018). Therefore, there is an urgent need for "(re-)regulating" these labor market sectors: including and enforcing "equal pay for equal work clauses" (Gevaert et al., 2018), adapting OHS regulations and surveillance to non-standard forms of employment (Koranyi et al., 2018), generalizing basic social protection (including replacement incomes when out of work – possibly but not necessarily related to ideas of basic income) (International Labour Office, 2015), and tightening allowable criteria for permitting contractual and temporal flexibility (McKay et al., 2012). As a general rule, the "wage cost" argument should cease being a valid reason for accepting deviations from the standard norm of employment. Regulation should be set in place to make sure that non-standard employment remains limited to those circumstances where it is needed because of the nature of the activity (e.g., care settings, hospitality, opening hours of shops and services) and is being properly compensated.

Of course, even in the case agreement is reached on these general principles, in practice these are arbitrary and politically charged decisions. Therefore it is of utmost importance that workers' bargaining power becomes strengthened. We know from earlier research that collective voice in the form of trade union presence (or alternative forms of worker representation) is the best guarantee for protecting the basic rights and employment conditions of workers (European Commission, 2016). This was demonstrated again during the COVID-19 crisis, where it was shown that unionized workplaces were able to create safer conditions compared to non-unionized sites (Block et al., 2020). Therefore, we believe that the EU should actively stimulate the development of trade union activities in countries and sectors where trade unions have a weak power position (Gevaert et al., 2018). Also

providing "high-quality alternatives" for workers at the bottom of the labor market might be a valid strategy for strengthening workers' bargaining position. In that regard, investments in alternative economic models including the social economy, worker cooperatives, or more sustainable business models (e.g., the economy of the common good[1]) might be a way forward (Borzaga et al., 2019). Finally, also the individual labor market position of workers who are more "susceptible" to precarious employment can be strengthened by better-designed policies. For instance, more efforts can be done in terms of training facilities and making employers provide training for their "peripheral workforce," as it is known that the least skilled and most vulnerable worker groups receive the least training facilities (Eurofound, 2016). The same holds for development and career opportunities: labor market entry in peripheral jobs should result into a stepping-stone towards more stable employment, instead of being a trap (Mousaid et al., 2017).

In sum, we believe that the time is right to conclude a new social contract for the reconstruction of post-COVID-19 society. In such a social contract, more secure, socially protected employment for every worker, leading to a sustainable income, seems to be an indispensable ingredient.

References

Adams-Prassl, A. (2020). *Inequality in the impact of the Coronavirus shock: Evidence from real time surveys*. Working Paper 2020/18.

Arlinghaus, A., Bohle, P., Iskra-Golec, I., Jansen, N., Jay, S., & Rotenberg, L. (2019). Working time society consensus statements: Evidence-based effects of shift work and non-standard working hours on workers, family and community. *Industrial Health, 57*(2), 184–200.

Arranz, J. M., García-Serrano, C., & Hernanz, V. (2018). Employment quality: Are there differences by types of contract? *Social Indicators Research, 137*(1), 203–230.

Bannai, A., & Tamakoshi, A. (2014). The association between long working hours and health: A systematic review of epidemiological evidence. *Scandinavian Journal of Work, Environment & Health, 40*(1), 5–18.

Benach, J., Julià, M., Tarafa, G., Mir, J., Molinero, E., & Vives, A. (2015). Multidimensional measurement of precarious employment: Social distribution and its association with health in Catalonia (Spain). *Gaceta Sanitaria, 29*(5), 375–378.

Benach, J., Solar, O., Vergara, M., Vanroelen, C., Santana, V., Castedo, A., Ramos, J., & Muntaner, C. (2010). Six employment conditions and health inequalities: A descriptive overview. *International Journal of Health Services: Planning, Administration, Evaluation, 40*(2), 269–280.

Benach, J., Vives, A., Amable, M., Vanroelen, C., Tarafa, G., & Muntaner, C. (2014). Precarious employment: Understanding an emerging social determinant of health. *Annual Review of Public Health, 35*(1), 229–253.

Benach, J., Vives, A., Tarafa, G., Delclos, C., & Muntaner, C. (2016). What should we know about precarious employment and health in 2025? Framing the agenda for the next decade of research. *International Journal of Epidemiology, 45*(1), 232–238.

Blair, R. D., & Lafontaine, F. (2005). *The economics of franchising*. Cambridge University Press.

[1] For more information on the economy of the common good: https://www.ecogood.org

Block, S., Kahn, S., Rogers, B., & Sachs, B. I. (2020). *How and why to empower workers in the COVID-19*. Roosevelt Institute.

Bodin, T., Çağlayan, Ç., Garde, A. H., Gnesi, M., Jonsson, J., Kiran, S., Kreshpaj, B., Leinonen, T., Mehlum, I. S., Nena, E., Orellana, C., Peckham, T., Seixas, N., Vanroelen, C., & Julià, M. (2019). Precarious employment in occupational health – An OMEGA-NET working group position paper. *Scandinavian Journal of Work, Environment & Health, 46*(3), 321–329.

Boot, R. L., Van Der, A. J., Id, S. B., & Geuskens, G. A. (2019). Health differences between multiple and single job holders in precarious employment in the Netherlands4: A cross-sectional study among Dutch workers. *PLoS One, 14*(9), 1–14.

Borzaga, C., Salvatori, G., & Bodini, R. (2019). Social and solidarity economy and the future of work. *Journal of Entrepreneurship and Innovation in Emerging Economies, 5*(1), 37–57. This paper draws on a work that was previously published by the ILO and is available at: http://www.ilo.org/wcmsp5/groups/public/—ed_emp/—emp_ent/—coop/documents/publication/wcms_573160.pdf (Copyright)

Bosch, G. (2004). Towards a new standard employment relationship in Western Europe. *British Journal of Industrial Relations, 42*(4), 617–636.

Bosma, H., Marmot, M. G., Hemingway, H., Nicholson, A. C., Brunner, E., & Stansfeld, S. A. (1997). Low job control and risk of coronary heart disease in Whitehall II (prospective cohort) study. *British Medical Journal, 314*(7080), 558–565.

Bosmans, K., De Cuyper, N., Hardonk, S., & Vanroelen, C. (2015). Temporary agency workers as outsiders: An application of the established-outsider theory on the social relations between temporary agency and permanent workers. *Society, Health and Vulnerability, 6*(1), 1–23.

Bosmans, K., Hardonk, S., De Cuyper, N., & Vanroelen, C. (2016). Explaining the relation between precarious employment and mental well-being. A qualitative study among temporary agency workers. *Work, 53*(2), 249–264.

Bosmans, K., Lewchuk, W., De Cuyper, N., Hardonk, S., Van Aerden, K., & Vanroelen, C. (2017). The experience of employment strain and activation among temporary agency workers in Canada. *Society, Health & Vulnerability, 8*(1), 1–15.

Bosmans, K., Van Aerden, K., & Vanroelen, C. (2016). Precaire arbeid in België. In M. Lamberts et al. (Eds.), *Jobkwaliteit in België in 2015. Analyse aan de hand van de European Working Conditions Survey EWCS 2015 (Eurofound)* (pp. 247–270). HIVA-KU Leuven.

Canivet, C., Bodin, T., Emmelin, M., Toivanen, S., Moghaddassi, M., & Östergren, P.-O. (2016). Precarious employment is a risk factor for poor mental health in young individuals in Sweden: A cohort study with multiple follow-ups. *BMC Public Health, 16*(1), 687.

Chandler, A. D. (1990). *Scale and scope: The dynamics of industrial capitalism*. Harvard University Press.

Clift, B. (2014). *Comparative political economy: States, markets and global capitalism*. Red Globe Press.

Counil, E., & Khlat, M. (2020, May 18). Covid-19: Les classes populaires paient-elles le plus lourd tribut au coronavirus en France? *The Conversation*.

Cummins, R. (2000). Personal income and subjective well-being: A review. *Journal of Happiness Studies, 1*(2), 133–158.

Davidsson, J., & Naczyk, M. (2009). *The ins and outs of dualisation: A literature review*. REC-WP Working Paper No. 02/2009.

De Moortel, D., Dragano, N., Vanroelen, C., & Wahrendorf, M. (2018). Underemployment, overemployment and deterioration of mental health: The role of job rewards. *International Archives of Occupational and Environmental Health, 91*(8), 1031–1039.

Doeringer, P. B., & Piore, J. M. (1971). *Internal labour markets and manpower analysis*. D.C. Heath.

Eichhorst, W., & Marx, P. (2015). *Non-standard employment in post-industrial labour markets: An occupational perspective*. Edward Elgar.

Eisenberg-Guyot, J., Peckham, T., Andrea, S. B., Oddo, V., Seixas, N., & Hajat, A. (2020). Life-course trajectories of employment quality and health in the U.S.: A multichannel sequence analysis. *Social Science & Medicine, 264*, 113327.

Eurofound. (2013). *Quality of employment conditions and employment relations in Europe*. Eurofound.

Eurofound. (2016). *Sixth European Working Conditions Survey – Overview report*. Publications Office of the European Union.

European Commission. (2016, March 16). *New start for social dialogue – One year on: MEMO/16/823*. European Commission.

Fité-Serra, A. M., Gea-Sánchez, M., Alconada-Romero, Á., Mateos, J. T., Blanco-Blanco, J., Barallat-Gimeno, E., Roca-Llobet, J., & Muntaner, C. (2019). Occupational precariousness of nursing staff in Catalonia's public and private nursing homes. *International Journal of Environmental Research and Public Health, 16*(24), 4921.

García-Pérez, C., Prieto-Alaiz, M., & Simón, H. (2020). Multidimensional measurement of precarious employment using hedonic weights: Evidence from Spain. *Journal of Business Research, 113*, 348–359.

Gevaert, J., De Moortel, D., & Vanroelen, C. (2018). *Employment status and job quality – Technical report*. Interface Demography.

Gevaert, J., Van Aerden, K., De Moortel, D., & Vanroelen, C. (2020). Employment quality as a health determinant: Empirical evidence for the waged and self-employed. *Work and Occupations, 44*(1), 1–38.

Grimshaw, J., Ward, K. G., Rubery, J., & Beynon, H. (2001). Organisations and the transformation of the internal labour market. *Work Employment and Society, 15*, 25–54.

Grotti, R., & Scherer, S. (2014). Accumulation of employment instability among partners-evidence from six EU countries. *European Sociological Review, 30*(5), 627–639.

Harms, P. D., Credé, M., Tynan, M., Leon, M., & Jeung, W. (2017). Leadership and stress: A meta-analytic review. *The Leadership Quarterly, 28*(1), 178–194.

Harvey, D. (2005). *A brief history of neoliberalism*. Oxford University Press.

Harvey, S. B., Modini, M., Joyce, S., Milligan-Saville, J. S., Tan, L., Mykletun, A., Bryant, R. A., Christensen, H., & Mitchell, P. B. (2017). Can work make you mentally ill? A systematic meta-review of work-related risk factors for common mental health problems. *Occupational and Environmental Medicine, 74*(4), 301–310.

Hellgren, J., Sverke, M., & Isaksson, K. (1999). A two-dimensional approach to job insecurity: Consequences for employee attitudes and well-being. *European Journal of Work and Organizational Psychology, 8*(2), 179–195.

Heymann, J., Raub, A., Waisath, W., McCormack, M., Weistroffer, R., Moreno, G., Wong, E., & Earle, A. (2020). Protecting health during COVID-19 and beyond: A global examination of paid sick leave design in 193 countries. *Global Public Health, 15*(7), 925–934.

Hofmans, J., Wille, B., & Schreurs, B. (2020). Person-centered methods in vocational research. *Journal of Vocational Behavior, 118*, 103398.

Howard, M. C., & Hoffman, M. E. (2018). Variable-centered, person-centered, and person-specific approaches. *Organizational Research Methods, 21*(4), 846–876.

International Labour Office. (2015). *Conclusions of the meeting of experts on non-standard forms of employment*. International Labour Office.

Jessop, B. (1994). The transition to post-Fordism and the Schumpeterian workfare state. In R. Burrows & B. Loader (Eds.), *Towards a post-Fordist welfare state?* (pp. 15–37). Routledge.

Jessop, B. (2001). *Regulationist perspectives on Fordism and post Fordism*. Edward Elgar.

Jonsson, J., Vives, A., Benach, J., Kjellberg, K., Selander, J., Johansson, G., & Bodin, T. (2019). Measuring precarious employment in Sweden: Translation, adaptation and psychometric properties of the Employment Precariousness Scale (EPRES). *BMJ Open, 9*(9), e029577.

Julià, M., Vanroelen, C., Bosmans, K., Van Aerden, K., & Benach, J. (2017). Precarious employment and quality of employment in relation to health and well-being in Europe. *International Journal of Health Services, 47*(3), 389–409.

Julia, M., Vanroelen, C., Van Aerden, K., Bosmans, K., & Benach, J. (2017). Precarious employment and quality of employment in relation to health and well-being in Europe. *International Journal of Health Services, 47*(3), 389–409.

Julià, M., Vives, A., Tarafa, G., & Benach, J. (2017). Changing the way we understand precarious employment and health: Precarisation affects the entire salaried population. *Safety Science, 100*, 66–73.

Kalleberg, A. (2016). Good jobs, bad jobs. In S. Edgell, H. Gottfried, & E. Granter (Eds.), *The Sage handbook of the sociology of work and employment* (pp. 129–147). Sage.

Kalleberg, A. L. (2011). *Good jobs, bad jobs: The rise of polarized and precarious employment systems in the United States, 1970s to 2000s*. Russell Sage Foundation.

Koranyi, I., Jonsson, J., Rönnblad, T., Stockfelt, L., & Bodin, T. (2018). Precarious employment and occupational accidents and injuries – A systematic review. *Scandinavian Journal of Work, Environment & Health, 44*(4), 341–350.

Korpi, W. (1983). *The democratic class struggle*. Routledge and Keagan Paul.

Korpi, W. (2006). Power resources and employer-centered approaches in explanations of welfare states and varieties of capitalism: Protagonists, consenters, and antagonists. *World Politics, 58*(02), 167–206.

Kreshpaj, B., Orellana, C., Burström, B., Davis, L., Hemmingsson, T., Johansson, G., Kjellberg, K., Jonsson, J., Wegman, D. H., & Bodin, T. (2020). What is precarious employment? A systematic review of definitions and operationalizations from quantitative and qualitative studies. *Scandinavian Journal of Work, Environment & Health, 46*(3), 235–247.

Kretsos, L., & Livanos, I. (2016). The extent and determinants of precarious employment in Europe. *International Journal of Manpower, 37*(1), 25–43.

Kuttner, R. (2018). *Can democracy survive global capitalism?* Norton.

Lukac, M., Doerflinger, N., & Pulignano, V. (2019). Developing a cross-national comparative framework for studying labour market segmentation: Measurement equivalence with latent class analysis. *Social Indicators Research*. https://doi.org/10.1007/s11205-019-02101-3

Marmot, M., Siegrist, J., Theorell, T., & Feeney, A. (1999). Health and the psychosocial environment at work. In M. Marmot & R. G. Wilkinson (Eds.), *Social determinants of health* (pp. 105–131). Oxford University Press.

McKay, J., Jeffereys, S., Paraksevopoulou, A., & Keles, J. (2012). *Study on precarious work and social rights*. Working Lives Research Institute, London Metropolitan University.

Mousaid, S., Huegaerts, K., Bosmans, K., Julia, M., Benach, J., & Vanroelen, C. (2017). The quality of work in the Belgian Service Voucher System. *International Journal of Health Services, 47*(1), 40–60.

Mückenberger, U. (1989). Non-standard forms of employment in the Federal Republic of Germany: The role and effectiveness of the state. In G. Rodgers & J. Rodgers (Eds.), *Precarious jobs in labour market regulation. The growth of atypical employment in Western Europe* (pp. 176–186). ILO.

Offe, C. (1983). Competitive party democracy and the Keynesian welfare state: Factors of stability and disorganization. *Policy Sciences, 15*(3), 225–246.

Olsthoorn, M. (2014). Measuring precarious employment: A proposal for two indicators of precarious employment based on set-theory and tested with Dutch labor market-data. *Social Indicators Research, 119*(1), 421–441.

Padrosa, E., Belvis, F., Benach, J., & Julià, M. (2020). Measuring precarious employment in the European Working Conditions Survey: Psychometric properties and construct validity in Spain. *Quality & Quantity*. https://doi.org/10.1007/s11135-020-01017-2

Parker, S. K., & Ohly, S. (2008). Designing motivating jobs: An expanded framework for linking work characteristics and motivation. In R. Kanfer, G. Chen, & R. Pritchard (Eds.), *Work motivation: Past, present, and future* (SIOP frontiers series). Laurence Erlbaum Associates.

Peckham, T., Fujishiro, K., Hajat, A., Flaherty, B. P., & Seixas, N. (2019). Evaluating employment quality as a determinant of health in a changing labor market. *RSF: The Russell Sage Foundation Journal of the Social Sciences, 5*(4), 258.

Purkayastha, D., Vanroelen, C., Bircan, T., Vantyghem, M. A., & Adsera, C. G. (2021). Work, health and Covid-19: a literature review. Report 2021.03. Brussels.

Quinlan, M., Mayhew, C., & Bohle, P. (2001). The global expansion of precarious employment, work disorganization, and consequences for occupational health: Placing the debate in a comparative historical context. *International Journal of Health Services, 31*(3), 507–536. Retrieved from isi:000170743900005.

Ritzer, G. (Ed.). (2007). *The Blackwell encyclopedia of sociology*. Wiley.

RIVM. (2020, Augustus 11). *Epidemiologische situatie COVID-19 in Nederland.* RIVM.

Rodgers, G. (1989). Precarious work in Western Europe: The state of the debate. In G. Rodgers & J. Rodgers (Eds.), *Precarious jobs in labour market regulation: The growth of atypical employment in Western Europe*. ILO.

Sabillón Casco, J., Aragón Benavides, A., & López Bonilla, I. (2018). Multidimensional measurement of labor precariousness in Central America. *Revista de Ciencias Sociales, 2018*(162), 117–129.

Siegrist, J., & Theorell, T. (2006). Socio-economic position and health. The role of work and employment. In J. Siegrist & M. Marmot (Eds.), *Social inequalities in health. New evidence and policy implications* (pp. 73–100). Oxford University Press.

Spreitzer, G. M. (2008). Taking stock: A review of more than twenty years of research on empowerment at work. In J. Barling & C. L. Cooper (Eds.), *The SAGE handbook of organizational behavior: Volume I. Micro approaches* (pp. 54–73). Sage.

Standing, G. (2011). *The precariat. The new dangerous class*. Bloomsbury Academic.

Streeck, W. (2005). The sociology of labor markets and trade unions. In N. J. Smelser & R. Swedberg (Eds.), *The handbook of economic sociology* (pp. 254–283). Princeton University Press.

Swenson, P. A. (2004). Varieties of capitalist interests: Power, institutions, and the regulatory welfare state in the United States and Sweden. *Studies in American Political Development, 18*(1), 1–29.

Toch, M., Bambra, C., Lunau, T., van der Wel, K. A., Witvliet, M. I., Dragano, N., & Eikemo, T. A. (2014). All part of the job? The contribution of the psychosocial and physical work environment to health inequalities in Europe and the European Health Divide. *International Journal of Health Services, 44*(2), 285–305.

Underhill, E., & Quinlan, M. (2011). How precarious employment affects health and safety at work: The case of temporary agency workers. *Relations Industrielles-Industrial Relations, 66*(3), 397–421.

Vallas, S. P. (1999). Rethinking post-Fordism: The meaning of workplace flexibility. *Sociological Theory, 17*(1), 68–101.

Van Aerden, K. (2018). *Contemporary employment arrangements in Europe and their relation with workers' well-being*. Vrije Universiteit Brussel.

Van Aerden, K., Gadeyne, S., & Vanroelen, C. (2017). Is any job better than no job at all? Studying the relations between employment types, unemployment and subjective health in Belgium. *Archives of Public Health, 75*(1), 55.

Van Aerden, K., Moors, G., Levecque, K., & Vanroelen, C. (2014). Measuring employment arrangements in the European Labour Force: A typological approach. *Social Indicators Research, 116*(3), 771–791.

Van Aerden, K., Moors, G., Levecque, K., & Vanroelen, C. (2015). The relationship between employment quality and work-related well-being in the European Labor Force. *Journal of Vocational Behavior, 86*, 66–76.

Van Aerden, K., Puig-Barrachina, V., Bosmans, K., & Vanroelen, C. (2016). How does employment quality relate to health and job satisfaction in Europe? A typological approach. *Social Science & Medicine, 158*, 132–140.

Vandevenne, E. (2020). *Precaire tewerkstelling en welzijn. De rol van het huishoudinkomen en de werk-privé balans. Bachelorpaper*. Vrije Universiteit Brussel.

Vanroelen, C. (2019). Employment quality: An overlooked determinant of workers' health and well-being? *Annals of Work Exposures and Health, 63*(6), 619–623.

Vidal, M. (2016). Fordism and the golden age of Atlantic capitalism. In S. Edgell, H. Gottfried, & E. Granter (Eds.), *The Sage handbook of the sociology of work and employment* (pp. 283–305). Sage.

Vives, A., Amable, M., Ferrer, M., Moncada, S., Llorens, C., Gimeno, X., Muntaner, C., Benavides, F. G., & Benach, J. (2010). Validity of a new Employment Precariousness Scale for the assessment of health in epidemiological studies. *Occupational and Environmental Medicine, 67*(8), 548–555.

Vives, A., Vanroelen, C., Amable, M., Ferrer, M., Moncada, S., Llorens, C., Muntaner, C., Benavides, F. G., & Benach, J. (2011). Employment precariousness (EPRES) in Spain: Prevalence, social patterning and population attributable risk of poor mental health. *International Journal of Health Services, 41*(4), 625–646.

Vives-Vergara, A., González-López, F., Solar, O., Bernales-Baksai, P., González, M. J., & Benach, J. (2017). Precarious employment in Chile: Psychometric properties of the Chilean version of Employment Precariousness Scale in private sector workers. *Cadernos de Saúde Pública, 33*(3), e00156215.

Warhurst, C., Wright, S., & Lyonette, C. (2017). *Understanding and measuring job quality*. Chartered Institute of Personnel and Development.

Weil, D. (2014). *The fissured workplace. Why work became so bad for so many and what can be done to improve it?* Harvard University Press.

Wilkinson, F. (2013). *The dynamics of labour market segmentation*. Academic Press.

Labor Law and Technological Challenges

Adrián Todolí-Signes

1 Introduction

The origin of labor law is inherent in technology. Indeed, the emergence of the steam engine and the factory led to the emergence of large masses of uniform workers who required legal protection from the state. Today, however, technology is bringing about a new paradigm shift in employment, in particular with regard to the possibilities of worker control.

Indeed, technology is changing the way in which workers are controlled. From video cameras to GPS, these technologies allow for constant monitoring of workers' activities (Ajunwa et al., 2017; De Stefano, 2018; Moore, 2018a, b), and recently a new form of control has emerged consisting in giving customers a controlling role over workers' performance. Smartphones and apps have played a huge role in making it easier for a customer to give his/her opinion, not only on the degree of satisfaction with the firm but with the performance of the specific worker who provided the service.

Additionally, in the information age, much of the work done by specialists in human resources consists in gathering as much information about the worker as possible in order to improve decision-making (recruitment, promotion, dismissals, increased working hours, geographical mobility, payment of wage bonuses, etc.) (Grensing-Pophal, 2009, p. 42; Sameen & Cornelius, 2013). In this sense, it is crucial for the company to gather and compile as much information as possible in order to gain a thorough understanding of the worker's skills, knowledge, aptitudes, attitudes, etc. so as to be able to make the decisions that best suit the company's interests (Jackson, 2016).

A. Todolí-Signes (✉)
University of Valencia, Valencia, Spain
e-mail: adrian.todoli@uv.es

C. Korunka (ed.), *Flexible Working Practices and Approaches*,
https://doi.org/10.1007/978-3-030-74128-0_13

In the same way that a company wants to know as much as possible about consumers in order to know what product to offer them or what exact advertisement will convince them to buy its products, employers want to gather as much information as they can about their employees in order to know whether they will be productive, how well they will fit into the company's environment, or what in particular will motivate them to stay or to work harder (Ajunwa et al., 2017; De Stefano, 2018; Moore, 2018a, b).

The common denominator of these situations is the collection of information (by means of online reputation, wearables, video cameras, etc.). This activity – gathering information to make better decisions – has always existed.[1] Indeed, for years, companies have been using interviews in the selection process, group dynamics, performance evaluations, etc. to make these work-related decisions. In recent years, however, human resources experts have specialized in gathering information by using the new technologies (Facebook, LinkedIn, and now online reputation) (Wolf et al., 2014; Ouridi et al., 2016, pp. 240–9). It is of course true that technology has potentially allowed companies to access a larger volume of data in a very economical way (Daws, 2016), yet the human resources manager continued to be the person who, once that information had been gathered, had to process it and make the decision. This meant that despite increasing the amount of information available, there was a natural limit to using that information, namely, the human capacity to process such data.

Nevertheless, the latest technologies are also changing this. Thanks to algorithms, big data, and artificial intelligence, not only is there a reduction in the cost of access to information (that which until now was available thanks to Facebook and LinkedIn and other public data), but there is also an unprecedented reduction in the cost of processing this information so as to make it useful, while also facilitating decision-making based on this information (automated decisions).

This chapter aims to discuss the risks that these new technologies are posing to workers and what challenges labor law is facing. The chapter is divided as follows. The second part will address the risks to workers' rights associated with the use of the digital reputation of workers. The third and fourth will address the risks of the use of algorithms for automatic decision-making that affect workers. The third will explain the risk of discrimination when an algorithm makes decisions legally binding for the worker, while the fourth will expose the risks to workers' health when an algorithm directs the work. The chapter ends with some conclusions about the challenges of labor law.

[1] For the history of worker surveillance and monitoring methods from the beginning of industrialization to the present, see Ajunwa et al., (2017, pp. 107–8).

2 Challenges to Worker Control by Customers Through Digital Reputation Systems

For some time now, customers have been enjoying this power in the field of customer services through surveys carried out, among other ways, over the phone. However, technology has radically enhanced and boosted customers' monitoring and control capabilities. These monitoring surveys can be presented in a generic way, by asking the customer for a general overview of the performance of the worker, which he/she has to rate from 1 to 5 (e.g., Uber asks every passenger to rate the driver with from 1 to 5 stars, and then Uber "deactivates" every driver from the app who has an average of less than 4.6). Another option would be to pose questions on specific areas of the worker's performance. Additionally, there is also the possibility of allowing the customer to express his/her opinion freely about the areas considered as being the most relevant and worthy of comment (e.g., after contracting a freelancer on Fiverr, the client can leave a public message in the freelancer profile about his/her performance – or whatever the client wishes to comment on).

By using these means, firms endow customers with the power to assess the performance of their workers with a twofold aim: on the one hand, to increase customer satisfaction (Hoffman et al., 2009, p. 2) and to allow them to set their own preferences for the future and, on the other, to obtain information about workers' performance at a lower cost (Thierer et al., 2015, pp. 4–9).

Furthermore, some firms have decided to publish the results of their monitoring activities on the Internet, which is known as online reputation. This means, first of all, that the current/potential customer can know past customers' degree of satisfaction with a particular worker. Secondly, as evaluations are public, the worker is fully aware that poor results for underperforming will be used not only by the firm itself but also by the rest of the customers and potential future employers (Thierer et al., 2015, p. 16).

Moreover, and taking advantage of these new monitoring formulae, novel business models have popped up consisting of businesses aimed at matching the demand and supply of workforce (usually temporary and short-term work) through webpages and apps[2] that give employers the ability to assess workers and post the information on request by other employers or potential employers that are using the platform, either through the web or via a smartphone app.

The assessment of workers by customers as a tool for control and monitoring, and later publishing the information gained, poses several challenges for the legal system. Specifically, it has been argued that the degree and intensity of monitoring borne by workers under this type of monitoring system carried out by customers is

[2] See, for instance, worktoday.com and jobtoday.com. The *Job Today* website is a business that intermediates and puts workers in the services sector – waiters, cooks, cleaners, etc. – in contact with businesses for temporary contracts (1 day, 1 week, 1 month, etc.). The website also enables the firm to assess the worker after termination of the temporary employment contract. This evaluation is made public to all other firms that register in the application.

greater than that endured by traditional workers. The reason for this is that, from a customer perspective, performance can be assessed at any time (Sprage, 2015, p. 18) and costs are close to zero for the employer. In fact, in traditional production structures, middle-level management is very costly for the employer, who then opts for an optimal rather than a total monitoring system.

Reputation systems, as a way to restore or increase confidence in a market, may pose several disadvantages. Understandably, the assessment is carried out from personal experience and, at the same time, applies subjective parameters that might or might not match those of other customers. Any customer or employer assessment will be biased by his/her own emotions and particular preferences, which rarely allow for an objective analysis of the worker's performance. At the same time, workers' performance might not always be easy to distinguish from subjective perceptions. This may give rise to specific discriminatory practices in the assessment of performance (Thierer et al., 2015, p. 41), in which specific types of workers are rated lower on the grounds of historical stereotypes.[3] Likewise, these assessments give rise to several biases that may unfairly harm the worker, such as the self-selection bias (Kramer, 2007, p. 255) or retaliation in reciprocal evaluation systems (Slee, 2013, pp. 6–7).

Moreover, those assessments might infringe the worker's right to privacy and his/her good name. The ability to post in public any type of information concerning workers that can be reached by future employers and customers may put the exercise of those rights at risk. Workers who may want to exercise a right that clashes with the employer's interests have to overcome a double obstacle, since they run the risk of being fired and, moreover, information might be spread among future employers, which can now be done far more easily than in the past (double punishment).

Empirical studies have shown the risks of psychological harm that appear in the case of workers who feel constantly under surveillance and judged by others.[4] The subjective sense of harm is justified in light of the power granted to customers who are given the power to monitor and evaluate performance without the proper training to fulfill that role (Feps, 2017). While daily interactions between supervisor and worker create a bond of mutual interdependence and empathy (Ajunwa et al., 2017, p. 112), this is lacking in the relationship between worker and customer, whose interaction is only occasional and has little chance of being repeated.

To sum up, a reputation system can be a threat to workers' rights. First, it can affect their privacy, as they may be subject to discriminatory assessments from the customer. Second, there is a risk of psychological harm, as workers can feel constantly under surveillance and judged by others. Third, it may impinge on their right to work because if an employer can publish that a worker is in a union or that he/she asked for paternity/maternity leave, the worker could face problems when it comes

[3] Studies show that, in leases, white people earn 12% more than non-white lessors for renting rooms with similar characteristics; see Edelman et al. (2016, p. 1).

[4] Mainly stress due to being under constant surveillance; Moore et al. (2018) and De Stefano (2018)

to finding a job in the future. Last, it can have an effect on their right to access to justice, because if workers are afraid that if they sue an employer and that information ends up in their online reputation, they may prefer not to sue in court to get their lawful right.

3 Challenges to Labor Law Arising from Automated Decision-Making on Workers

3.1 Using Big Data to Take Automated Decisions

Currently, the introduction of new technologies into the procedure of assessing and monitoring workers has modified these processes in three fundamental variables: (i) how information is collected and from which sources; (ii) how that information is processed; and (iii) how decisions are made.

(i) *Increase in the volume of information available*: Technologies such as video-surveillance, GPS, and wearables, e.g., bracelets that monitor the worker's heart rate and his or her attention and activity status, lead to an increase in the amount of information available.

Likewise, digital reputation systems (customer ratings) make it possible to obtain information about employees' behavior in a much cheaper way (Thierer et al., 2015, p. 7). Employers are even beginning to measure workers' emotions (Moore et al., 2018, p. 18).

(ii) *Increase in the capacity to process that information*: Secondly, such information needs to be processed. And, in this field, new technologies have represented an important step forward in the capacity to carry out this action. In the case of video-surveillance, for example, until now it was necessary for a person to view the hours of video-surveillance footage to see if the worker had committed any kind of irregularity. However, face and shape recognition systems allow automated signaling of any irregularity, reporting in the exact moment in which it occurs and a lowering of the cost of monitoring workers.

In the case of wearables, having someone from human resources monitoring the heart rate of all the workers (or their location if done by means of GPS) could be excessively expensive and, therefore, impracticable. However, by means of automated systems (and algorithms) it is possible, and economically very inexpensive, to set up alarms that inform the human resources manager of the existence of a worker undergoing long periods of inactivity. In this way, there is no need for a human resources manager to monitor the information or carry out surveillance tasks, but instead the manager will simply be "alerted" automatically when the situation warrants observation.

Some companies in the USA are developing devices fitted with microphones, not with the intention of recording workers' conversations, but to know the worker's

mood according to his or her tone of voice. This device can also be used to measure the worker's interactions with colleagues in order to know which of them they interact with and for how long (the Week Staff, 2015).[5]

By the same token, in the case of online reputation, analyzing and systematizing information and evaluations collected about customers can be excessively costly, but the computerized rating system allows information to be categorized and averages and alerts to be obtained when a worker's behavior deviates from the acceptable standards. Reducing the need for the interaction of the human resources manager obviously gives rise to more economical methods of monitoring.

(iii) *Capacity for automated decision-making*: This is the last step in obtaining maximum efficiency in the monitoring of workers and consists in the absence of any need for human intervention. Thus, artificial intelligence becomes a substitute for the human resources tasks even in decision-making. There are several levels: one that is simplified and another that is more complete.

The simplified level basically consists in automating the process in question (promotion, bonus payments, or dismissals) by establishing a command in a computer process (if X happens, react with Y). Hence, it would be possible to develop an automated process such that if the activity of the worker (measured by heart rate) decreases for more than 3 h, an email is automatically sent with a letter of dismissal.[6] According to the inspection report of the Labour Inspectorate of Valencia, in the company Deliveroo, if a driver is not in motion (detected by GPS), he or she automatically receives a warning message about the fact and is told to get moving again[7] as a "mental whip" (Moore, 2018a, b, p. 23). Or, for example, if the worker's average online reputation – costumers' evaluation – drops below 4.6 out of 5, the worker is "automatically" disconnected from the platform[8] (or prevented from entering the workplace by automatically deactivating his or her credentials).

The complex system would imply using artificial intelligence. Despite that AI would be conditioned by the programming decided on by the firm itself, true

[5] More examples in Ajunwa et al., (2017).

[6] It can also be performed by time control. In Amazon's logistic centers, the time it takes a warehouse assistant to transport packages from one place to another is controlled by means of a wearable, and if it takes him or her longer than stipulated, a notification is sent to warn the assistant: https://www.thesun.co.uk/news/6055021/rushed-amazon-warehouse-staff-time-wasting/

[7] In accordance with the message "sabemos que has recogido el pedido, pero vemos que no te mueves, ponte en movimiento" [we know that you have picked up the order, but we can see that you are not moving, so get going], Spanish Labour Inspection Report No. 460016685/17/sms, dated 05/12/2017. A summary can be found at: https://adriantodoli.com/2017/12/18/comentario-a-la-resolucion-de-la-inspeccion-de-trabajosobre-delivero-son-laborales-y-no-autonomos/

[8] For example, the transport company Lyft establishes rules whereby if a driver has an average below 4.6 (out of 5) he or she is automatically deactivated. Other decisions are also made; for example, if a user rates a driver with less than a 3, the algorithm will prevent that driver from providing that customer with a service again. In this respect, see "We go the extra mile for safety," www.lyft.com/safety accessed on 17/04/2018.

artificial intelligence could, of course, take many more factors into account when making the decision to promote, dismiss, etc. one of the company's employees.

In short, the lowering of the cost of these three levels in the evaluation could allow the companies to easily increase the monitoring of workers. That is to say, the cheaper it is to carry out the monitoring, the more measures the employer will put in place to protect his or her legitimate business interests. At present, European labor legislation grants the employer the power to choose the forms of surveillance and monitoring of the worker that he or she deems appropriate. However, these regulations were enacted at a time when surveillance and monitoring were limited by their very nature – in short, because they were expensive.

3.2 The Risks of Automated Processing: Big Data and Discrimination

1. Big data not only consists in the accumulation of data and information but also refers to the set of tools and computer systems (algorithms, machine learning) that analyzes these data in search of recurrent patterns and correlations in order to be able to make predictions (Goñi Sein, 2017, pp. 16–9 and Garriga Domínguez, 2018, p. 112). Indeed, the objective is to profile citizens or workers in order to classify them using parameters introduced within the algorithm itself. The main problem is the possibility of such profiles classifying workers, either directly or indirectly, according to discriminatory categories (Bodie, et al., 2017; Hildebrandt, 2012). According to many experts, there is an extremely high risk of this occurring.
2. Technology seems capable of inferring certain personal characteristics on the basis of other data. In other words, even if collecting data on trade union membership, religion, gender, sexual orientation, or disability is forbidden, algorithms are capable of obtaining this information through other data (Crawford & Schultz, 2014). For example, religion or race can be statistically very closely related to the postcode or the district where the person lives. Thus, making decisions based on housing location will ultimately result in a decision based on race, or it is even possible to predict political or trade union affiliation according to the time spent reading certain news items on Facebook or Google, and not others. In fact, in many cases, the capabilities of an algorithm to make statistical inferences are unknown ("the black box problem"), which means that it is "impossible" to know whether the algorithm itself is making decisions based on discriminatory information or not (Hardt, 2014).
3. In addition, the very construction of the algorithm requires data that are biased by discriminatory parameters. The algorithm takes reality as a learning factor when processing data, which means that the results obtained from these data will perpetuate existing biases in our society. For example, since today 7 out of 10

Fortune 500 company directors are white men,[9] an algorithm will understand that a white man is "more likely" to fit in better as a director in one of these companies – because this is statistically "confirmed" by the data it possesses[10].

4. When an algorithm is in command, in general, minorities will always be at a disadvantage. The science of statistics itself grants more value to decisions made with more available information. This means that in minorities (race, religion, sexual orientation, etc.), there will be less data available, which will lead the algorithm to understand that making a decision in favor of a minority group is riskier than making one in favor of a majority group (Hardt, 2014). In other words, to select a candidate from a minority group the algorithm will demand (by default) more qualities, aptitudes, knowledge, etc. than if it has to do the same but with one from a majority group, simply due to the fact that it is easier to predict (statistically) the behavior of a candidate belonging to the latter group than to the former.[11]

In short, automated data processing increases exponentially the chances of workers' rights being violated.[12] Regardless of whether a decision is ultimately made by the human resources manager or not, the fact that he or she does so based on automated data processing (e.g., profiling of workers or establishment of evaluations by the algorithm) will lead to an increased likelihood that the decision made will be discriminatory.[13]

The greater likelihood of discrimination arising from big data, algorithms, and AI technology is not exclusive to the employment relationship. In fact, the European legislator (concerned about the impact that the automated processing of data may have in the lives of citizens and consumers) has included some specific protections (Art. 22) in the General Data Protection Regulation (EU) 2016/679 (hereinafter "GDPR"). Thus, despite GDPR lakes of special provisions or protections towards workers/employees, it appears that the data protection regulation applies to the employment relationship (Goodman & Flaxman, 2016, pp. 83–8).

[9] http://fortune.com/2017/06/09/white-men-senior-executives-fortune-500-companies-diversity-data/. In Spain 9 of 10 company directors of Ibex 35 are men. https://www.elperiodico.com/es/economia/20170204/espana-mujeres-consejos-administracion-ibex35-2016-5784962

[10] Bear in mind that in this case it is irrelevant whether the correlation is true or not, that is, although statistically there is a correlation between the male sex and the success of running an Ibex 35 company, this correlation is socially and politically reprehensible; see Edwards and Veale (2017, p. 28).

[11] The same happens if the decision is not made by the algorithm but when the algorithm simply classifies workers and the final decision is made by the human resources manager.

[12] Thus, it will be said that the Internet implies "the risk of a multiplier effect of attacks against rights, goods and legal interests"; see Perez (2006, p. 93) and Garriga Domínguez (2018), p. 109).

[13] As has been pointed out by Ippolita (2012, p. 106), "statistics know everything without proving anything, they are apparently scientific evidence of highly ideological assumptions." Specifically, in the case of selection processes that use this technology, a number of studies have shown that historical stereotypes such as sex, race, religion, sexual orientation, and even sexual attractiveness lower the likelihood of being called for a job interview; see Caers and Castelyns (2011, p. 439).

However, it seems appropriate to point out that these protections of European origin are insufficient in view of the possibilities that today's technology offers to invade workers' private lives and to make discriminatory decisions.

4 Artificial Intelligence as a Boss: Health and Occupational Risks

4.1 Work Directed by a Machine

The use of digitalized methods of human resources management is increasing rapidly. Currently, a multitude of sensors (wearables) are used to keep track of employees' productivity, mood, and emotional state and even to predict their personality as a way of complementing labor management (see Ajunwa et al., 2017; De Stefano, 2018; Moore, 2018b). The information collected allows the creation of worker profiles and the use of *people analytics* (the science of applying big data to human resources management) to optimize processes in companies (see Alexander & Tippett, 2017; Cherry, 2017; Dagnino & Armaroli, 2020; Moore, 2017).

Yet, the amount of information accumulated thanks to the new devices and sensors available today makes it unlikely that such data will subsequently be processed by a human resources manager for the purpose of making management decisions for the company. For this reason, companies entrust algorithms or artificial intelligence with that processing and subsequent use of information to make decisions regarding workers. Thus, these algorithms are used to distribute tasks among workers, schedule activities, evaluate work, or even hire or dismiss employees (EU-OSHA, 2018, p. 55; Moore, 2018a; Ponce, 2020).

In this sense, automated work management is the last step in obtaining maximum efficiency in the management and control of workers and consists precisely in removing all human intervention. In this way, artificial intelligence becomes a substitute for the person in charge of human resources and for middle managers, even in decision-making (e.g., selecting workers in the hiring process – Kuncel et al., 2014).

One of the greatest uses of this type of algorithm for human resources management today is in the selection and hiring of workers. It is difficult for one person to analyze the huge amount of information about a candidate which exists on the Internet, but algorithms can track this information down and build a digital profile that can later be compared with the rest of the candidates and the company's needs. This can lead to the creation of a shortlist of candidates (by rejecting applications) who will finally be selected by the head of human resources or directly by the algorithm (on the legal issues that this poses, see Todolí Signes, 2018).

Additionally, algorithms are used to coordinate work and establish workers' schedules, assign tasks to the available workers, monitor and supervise the quality

of the work done, and indicate the need to carry out improvements in work, among other things (Pega & Marketforce, 2017, p. 11).

The same can be done in the case of monitoring work time. In Amazon's logistics centers, wearables are used to keep track of the time it takes a warehouse assistant to transport packages from one place to another, and if it takes longer than stipulated by the company, they receive an automated warning notice (Jorge, 2018). Hotels and cleaning companies have used these devices to measure the time it takes each worker to clean a lavatory (Moore, 2018a, p. 142). This is what the doctrine has called "the digital whip" (Moore, 2018b, p. 23). In fact, these messages serve as "reminders" that workers are always being observed and pressure them to work faster and faster and comply with the company's wishes.[14]

In short, algorithms currently seem to be replacing middle managers and supervisors, through digital work management, which implies that workers do not get any instructions or feedback about their work from another human being but instead an automated response in accordance with predefined parameters.[15] This is something that could imply specific health risks for workers as AI might not be prepared to minimize these risks.[16]

Many studies have described the risks for workers associated to the digitalization of work (Ajunwa et al., 2017; Akhtar & Moore, 2016; Dembe et al., 2005; Derks & Bakker, 2014; Domeinski et al., 2007; EU-OSHA, 2013, 2017; Fernández Avilés, 2017; Horton et al., 2018; Hung et al., 2011; Lindsay, 2015; Moore, 2018a, b; Pérez-Zapata, 2015; Roldán, 2018; Schumacher, 2011; UTS, 2019; Van Jaarsveld & Poster, 2013), although systematization is lacking in most of them. Most of these studies focus on just one aspect of the risks without adopting a global perspective or dealing with the specific occupational risks that workers are facing when an AI manages them. In addition, this new reality needs a response by the law in order to protect workers, and this is an aspect that has not been addressed adequately.

[14] It should be noted that these systems "learn" (machine learning), and so they could adapt to each worker and demand the maximum that each of them is able to give. That is to say, with productivity systems there has traditionally been an equal rule for all workers. Yet, without requiring more resources, artificial intelligence could "discover" (through trial and error) the maximum that is achievable by each worker (Moore, 2018a, p. 3), depending on their own personal characteristics, and use this type of technique (digital whip) to demand it.

[15] For example, according to the Spanish Labour Inspection Report No. 460016685/17/sms, dated 5 December 2017, if a Deliveroo rider is not in motion (detected by GPS), he or she automatically receives a warning message telling them to get moving again. The transport company Lyft has a rule whereby drivers with an average rating below 4.6 (out of 5) are automatically deactivated. As another example, if a user rates a driver with less than a 3, the algorithm will prevent that driver from providing the same customer with a service again. In this respect, see "We go the extra mile for safety" available at: www.lyft.com/safety (accessed 29 April 2020).

[16] All this must be combined with workers' rejection (at least for the time being) of the idea of being directed by an artificial intelligence. In fact, a survey conducted by Pega and Marketforce (2017, p. 11) states that while 88% of the workers surveyed were comfortable working with robots, 80% were not comfortable with artificial intelligence as a supervisor or manager.

4.2 Occupational Risk Factors Derived from Algorithmic Work Management

From the studies published in the literature to date, it can be seen that there are multiple occupational risk factors derived from having an AI/algorithm managing work. In order to analyze these elements, we need to take into account two things. First, some of these factors could also exist when a human supervisor is in command. Nevertheless, the use of an AI could increase the risk factor because of its omnipresent capabilities or its lack of empathy.[17] As Prassal (2020) highlighted "machine learning fundamentally differs from traditional management structures." Additionally, due to the novelty of AI as middle manager it seems convenient to acknowledge the existence of these risks factors in this particular context. In the same vain, the AI decision-making could cause a diffusion of responsibility in protecting the worker which would lead to more accidents. Second, automatic systems could also improve the occupational risk prevention (e.g., monitoring the heart rate to avoid extenuation). In fact, AI can be considered a dual technology as the good or bad results would not depend on the technology but on its use (Berg, 2020). However, as this paper aims to propose a regulation to reduce the bad uses of the AI, the paper will be focused on the risks the AI could pose. I have classified them in six groups, as detailed below. In each group, the main consequences for the health of the worker are discussed.

4.2.1 Constant Monitoring

The ability to process data automatically in a very efficient way encourages companies to collect as much data as possible about the worker and the work done. In addition to this, there is the fact that new technologies (wearables and Internet of Things) are allowing them to use a sensor that measures and counts "everything" (EU-OSHA, 2017, p. 1). There are sensors based on:

- Audio: capable of knowing the worker's mood (cheerful, depressed, anxious, happy, bored, etc.) and even transcribing conversations or simply monitoring the number and frequency of calls made. By the tone of voice, they can also know the energy levels of each worker and the interpersonal influence in teamwork (leadership, submission, etc.) (on this matter, see Lindsay, 2015)
- Biological signs: steps, heart rate (resting or active), brain function distinguishing by parts (creative, attentive), and so on
- Cameras: including recognition of faces and facial expressions
- GPS: movement, activity, etc.

[17] As pointed out by Adler-Bell and Miller (2018), "data-driven software and algorithmic decision-making (…) act as a force-multiplier for the power held by firms, with no balancing agent on the side of workers."

- Based on interaction: movement of the mouse, keyboard, websites visited, even measuring levels of happiness or making predictions about the type of personality of each worker (Young et al., 2017)

Not surprisingly, in a survey conducted by Price Waterhouse Cooper, 82% of workers were concerned about the amount of personal data companies collected about them (Spicer & Cederstrom, 2015). Undoubtedly, the sensation of being observed at all times (*big brother as stressor*) is a risk factor in itself (Fernández Avilés, 2017, p. 83). Indeed, invasive technological control and lack of privacy can have repercussions on various psychosocial risks (techno-stress, techno-anxiety, techno-fatigue, or burnout).

On the other hand, constant and permanent observation of the worker may cause the worker to behave in ways that are not natural for a human being (always smiling or always being active), to have to achieve goals that require great physical or psychological effort or to be unable to interact socially with colleagues or to take breaks. Thus, constant monitoring can lead to stress and anxiety particularly if combined with a lack of control over the management of one's own time (HSE, 2017) or in conjunction with constant reminders of such observation aimed at enforcing modifications in the worker's behavior. Such monitoring can be especially damaging if combined with the threat of dismissal or, in general, a feeling of insecurity in the workplace. As has been noted, in digital platforms, monitoring is linked to the use of this information in order to make decisions about the "deactivation" of the platform worker.

For instance, a study conducted in Australia on delivery people working for platforms found that workers felt they were under pressure to continue working in extreme climatic conditions as a result of the surveillance to which they are subjected (UTS, 2019, p. 3).

In turn, this constant observation may step up demands for the worker to carry out "emotional work." There is an abundance of literature (Van Jaarsveld & Poster, 2013) that analyzes the difficulties encountered by workers who must always be smiling and happy regardless of their true feelings. With increased monitoring of workers, these unhealthy demands will undoubtedly increase. Constant observation may entail the need for workers to continually suppress their own personality, preferences, and feelings (Korczynski & Evans, 2013).

The lack of context (and empathy) in data collection and decision-making can lead to discrimination or injustice against workers who, being aware of this possibility, may find their anxiety increases (EU-OSHA, 2018, p. 16). In the same way, the fact that it is impossible to answer or contest the decision made by the algorithm can lead to anxiety and frustration (Adams, 2018, p. 357). In addition, when workers are informed of their performance compared to that of others, it can lead to increased pressure, stress, anxiety, and low self-esteem (EU-OSHA, 2018, p. 55), especially if such information is presented as objective and neutral even though it is not (Pérez-Zapata et al., 2019, p. 9).

With algorithms there is a real risk that workers will be treated as mere fungible assets at the service of machines (or evaluated as just another cost) and not as human

beings (Bodie et al., 2017, p. 1037). Relying solely on data and metrics to empower the algorithm to decide the fate of the worker can potentially dehumanize workers by reducing them to behave like yet another machine within the production process (Moore, 2018a, b, p. 149).

4.2.2 The Intensification of Work

The intensification of work refers to an increase in the intensity of effort and, therefore, wear in the workplace, which is related to the "tempo" of the work, regardless of its duration (Pérez-Zapata et al., 2019, p. 5). In fact, the European Agency for Safety and Health at Work has indicated that the main source of stress identified by workers is the hours they have to work and the workload (EU-OSHA, 2013). In this sense, some authors suggest that work intensity has become the most relevant risk (together with ergonomic problems) for the health of workers (Pérez-Zapata, 2015).

Indeed, workers subjected to automated or algorithmic management of their work may see an increase in the intensification of their work. As soon as the algorithm distributes the tasks and sets the deadlines for doing them, workers may be subject to the need to increase the speed with which they work in order to meet the pace established by the algorithm. Note that the algorithm can even make the task "disappear" from the work screen and move on to the next one at the appointed time without workers having any chance of going back later to finish the task or organize their own working time (as in Amazon Mechanical Turk; see Felstiner, 2011). This pressure can lead to stress and anxiety, even discouragement, depression, and, in the most extreme stage, burnout syndrome if the deadlines set by the machine cannot be reached (EU-OSHA, 2017). It can also lead to other types of risk because the worker may assume unnecessary physical risks in order to meet the deadlines set, such as jumping traffic lights, etc.

Additionally, there is also the possibility of adapting what is required to each worker. In work directed by a machine, there is no goal that is the same for everyone. Instead, the algorithm can establish individual requirements for each worker and perhaps modify them as the worker meets the deadlines – even without the worker noticing the change in the requirements or level of demand. Think, for example, of the time needed to take an order from one side of the city to the other by bicycle. The algorithm could be establishing tighter time margins without the workers themselves being aware that it is demanding faster and faster delivery times (as reported by Amazon warehouse workers in Selby, 2017).

Once again, depersonalization and the lack of empathy inherent in machines may entail greater demands on the workers, as well as these workers' frustration and discouragement, when they do not see any possibility to explain or justify themselves or any chance of negotiating or reaching an agreement on reasonable goals. In this sense, the use of algorithms as supervisors can cause a mismatch between the physical or cognitive abilities of the workers and the requirement established by the algorithm (EU-OSHA, 2018, p. 56), as the literature establishes this could cause tiredness, chronic fatigue, reduced endurance, mood swings, increased risk of heart

disease, neurological effects, depression, or burnout (Popma, 2013, p. 15). In addition to psychological problems, it should be noted that intensification can also lead to the aggravation of other common risks such as road accidents while attempting to arrive on time (Dembe et al., 2005; López Rodríguez, 2019, p. 8), among other things.

4.2.3 Lack of Autonomy

Control and supervision by an omnipresent and almost omnipotent body implies that there are few possibilities for the worker to make autonomous decisions. The algorithm, by the very definition of its functions, decides which, according to its data and configurations, is the best way (i.e., the most productive for the company) to carry out a task and to organize a job, and this "best way" will be the one demanded of the worker. Indeed, precisely what is expected of algorithms is that they are capable of optimizing work management, thereby maximizing work productivity. Thus, once the best way to work has been optimized, it will be imposed upon the worker. This will entail a reduction in the employees' possibilities of organizing their own work autonomously and deciding how to carry out their own jobs. In short, the implementation of algorithmic management will lead to great opportunities for the micro-management of work with its corresponding reduction in job satisfaction, increased stress, reduction in mutual trust between the parties, and a worsening of the working environment (Schumacher, 2011).

This lack of autonomy could specifically cause *techno-necessity*.[18] Especially in the case of algorithms as decision-makers, workers may, over time, be unable to make their own decisions as regards management and self-organization due to a lack of practice. Just as the new generations do not remember mobile phone numbers because they are all stored in the artificial memory of their phones, in the future workers may lose the ability (or not feel the need) to make their own decisions, self-organize, prioritize, or manage their own time.

At least two factors that increase the risk of this occurring are considered here. On the one hand, there is convenience. Indeed, making decisions is not always a simple job, so it is possible to think that the convenience of having a machine that takes them by itself eventually makes us addicted to using it, and thus, with time, we lose our own ability to do it correctly. On the other hand, if the decisions made by the algorithms are given a higher value in social terms because they are deemed to be economically more efficient, this can give rise to some kind of worship of the algorithms as "gods" to be followed without questioning their mandates (Harari, 2016).

This phenomenon has been analyzed before. Without replacing supervisors or middle management, there are already many automatic systems that assist in

[18] *Techno-addiction* was conceptualized by Popma (2013, p. 15) as the uncontrollable need to constantly and obsessively use new technologies as a lack of self-control on the worker's side. On the contrary, *techno-necessity* implies the lack of ability to perform a task without the help of the machine – ability that the worker has lost due to a lack of practice.

decision-making (e.g., emergency alarms in flight control systems in aircraft). In the interaction of these systems, it has been proved that humans end up taking for granted the response given by the automatic system without carrying out their own analysis of the situation. Three factors lead to this state of affairs.

First, the human tendency to choose the path that requires the least cognitive effort (Wicken & Hollands, 2000). Indeed, it is easier to accept as valid the decision taken by the automated system than to carry out one's own comprehensive analysis with all the available information.

The second factor that fosters the consideration of automated decisions as being equivalent to human decisions even when the human being has the last word is the trust placed in these automated systems as powerful agents that have superior capabilities (Lee & See, 2004). In an experiment conducted by Dzindolet et al. (2002), the participants, without having extensive knowledge of the automated system, invariably bet that the automated system would offer a greater number of hits compared to another human. That is, the participants in the experiment trusted the machine more than another human being without possessing enough information about the capabilities of either of them.

Moreover, when one chooses to follow the automated decision, the responsibility of the human being is diluted. So, just as there is a reduction in effort when responsibility is placed on two or more humans (Karau & Williams, 1993), the same occurs with automatic systems (Domeinski et al., 2007).

To sum up, there is also a possibility that algorithms will end up reducing the ability of human beings to make their own decisions even in cases where the automated system is not the final decision-maker, but instead a system for warning or assisting humans.

In short, algorithmic labor management can cause a stronger alienation from work. As with the measurement of times and movements of Taylorism, workers can become parts of a production chain whose aim is to reproduce the movements determined by the algorithm. However, the greater capacity of the algorithm compared to traditional supervisors may increase the classic risks of alienation and excessive specialization. This confronts us with the real possibility of the algorithm ending up capturing the body, soul, and mind of workers in order to increase productivity (Moore, 2018a, p. 65).

In general, loss of autonomy at work, together with a lack of participation and self-management, can harm workers' health, leading to the absence of motivation, discouragement, low self-esteem, and depression (Karasek & Theorell, 1990).

4.3 Legal Challenges

From the legal point of view, according to Article 5.1 of the European Directive No. 89/391/EEC, "The employer shall have the duty to ensure the safety and health of the workers in every aspect related to the work." In order to do so, the companies have the obligation to carry out a risk assessment of the occupational risk (Art. 6.1

and Art. 6.3 of Directive 1989/391/EEC). A risk assessment is the process of evaluating risks to workers' safety and health from workplace hazards. It is a systematic examination of all aspects of work that considers what could cause injury or harm and whether the hazards could be eliminated and, if not, what preventive or protective measures are, or should be, in place to control the risks and which resulted from the Framework Directive 89/391/EEC (European Commission, 1996).

The problem here is that, in order to make it compulsory to prevent harm to workers' health, it is necessary that these risks have to be predictable or at least known –assessed. As algorithmic management is new, most of the specific risks are unknown, so the law does not seem capable to prevent them. This poses a challenge to labor law about how to prevent the harm which is still unacknowledged.

5 Conclusions: Labor Law Challenges

Digital reputation can be used to empower consumers, to increase consumer satisfaction, and to make businesses more efficient, although the publication of customers' assessments of workers on the Internet can also make it impossible for the worker to find a job in the future. This may make workers more obedient to the customer, thereby affecting their dignity, and, in the case of employers' assessments published online, these can prevent them from demanding their labor rights, e.g., a vacation, for fear not only of dismissal but also of not finding a job in the future.

As is common, reality always runs ahead of the Law. The GDPR is one of the most advanced – and recent – data protection regulations in the world, yet it seems that it does not resolve the problem of the digital reputation of workers. New technology (smartphones, apps, etc.) provides a new way of controlling workers, and the GDPR does not engage specifically with this new way of doing things. That does not mean that the GDPR is not applicable to customers' assessments, but the dictates of the GDPR do not offer a well-tailored solution. I think the policymaker should address reputation systems with a specific regulation and not through a general data protection directive.

Furthermore, as seen in this paper, as technology allows more forms of data and information processing, the data protection regulation provides an increasing number of guarantees. Experts warn of the possible ways in which big data and machine learning can discriminate against the subjects concerned when such technologies are used to make decisions that produce legal effects. This concern appears to be sufficiently justified by the possibilities of technology to infer certain sensitive information (which may give rise to blacklists of workers) on the basis of other information. That is to say, today, technology is capable of obtaining reserved information (trade union membership, political opinions) from other information that until now had been harmless. The risks for fundamental rights are obvious.

Previous legislation in this area had as its primary objective the protection of the individuals' privacy. Currently, however, the new regulations need to not only protect the capacity of the person concerned to control the extent to which they want

their personal information to be made known but also protect the right to equality and non-discrimination. As technology now allows not only the processing of data but also the capacity to process them in order to create profiles of individuals and even for decisions to be made by the algorithm itself instead of by human beings, there is growing concern that such profiling and automated decisions may affect citizens' fundamental rights.

New labor laws therefore need to place greater emphasis not only on data protection but also on ensuring that what is done with these data (the profiles created and the decisions taken) is fair and non-discriminatory.

The existence of a "right to an explanation" is crucial to achieve this protection. Given that today's technology is capable of inferring sensitive (discriminatory) information through other harmless information and of making automatic decisions in accordance with that information, it is necessary for the employer to explain how a certain decision has been reached and why. The aim is clear: it is understood that increased transparency in decision-making is necessary in a world where technology affords a wider range of cases in which discrimination may occur. In addition, a full explanation of the grounds used by technology to take a particular decision is deemed necessary in order to avoid the defenselessness of the person concerned and for that person to be able to oppose that decision (or plead whatever he or she considers appropriate).

Especially in the world of work, where business decisions affect the very physical and physiological health of the worker (Jahoda, 2016), such decisions need to be transparent in order to prevent arbitrariness and discrimination. In fact, the importance of this transparency is such that it could be argued that individual rights are not sufficient. This article proposes the collective governance of data protection within the company. Trade unions are in a privileged position to prevent technology from being used to discriminate, or to introduce unwanted bias into our society, and this fact should be highlighted.

The current Regulation (GDPR) requires the data controller to ensure, by establishing safeguards, that fair, transparent, and non-discriminatory use is made of the information. At the same time, it allows those involved to lodge a complaint ex post if the data controller does not comply. However, in my opinion, it would make more sense, in the field of labor relations, if those safeguards were not chosen unilaterally by the employer but jointly – through negotiations – with the unions; in this way, not only would there be an ex post monitoring, but also data protection would be established from the outset.

Acknowledgments Research funded by Proyecto I + D + i del Ministerio Ciencia e Innovación sobre "Derechos y garantías frente a las decisiones automatizadas en entornos de inteligencia artificial, IoT, big data y robótica" PID2019-108710RB-I00 and Generalitat Valenciana Research Project "Mi jefe es un algoritmo," number GV/2019/164.

References

Adams, A. (2018). Technology and the labour market: The assessment. *Oxford Review of Economic Policy, 3*, 349–369.

Adler-Bell, S., & Miller, M. (2018). *The datafication of employment: How surveillance and capitalism are shaping workers' futures without their knowledge*. The Century Foundation. Available at https://tcf.org/content/report/datafication-employment-surveillance-capitalism-shaping-workers-futures-without-knowledge/?agreed=1. Accessed 29 Aug 2020.

Ajunwa, I., et al. (2017). Limitless worker surveillance. *California Law Review, 105*(3), 102–142.

Akhtar, P., & Moore, P. (2016). The psycho-social impacts of technological change in contemporary workplaces and trade union responses. *International Journal of Labour Research, 8*(1–2), 102–131.

Alexander, C. S., & Tippett, E. (2017). The hacking of employment law. *Missouri Law Review, 82*(4), 973–1022.

Berg, J. (2020). Protecting workers in the digital age: Technology, outsourcing and the growing precariousness of work. *Comparative Labor Law & Policy Journal, 41*(1), 1–21. Available at SSRN: https://ssrn.com/abstract=3413740 or https://doi.org/10.2139/ssrn.3413740.

Bodie, M., et al. (2017). The law and policy of people analytics. *88 U. Colo. L. Rev. 961* , 962–1018.

Caers, R., & Castelyns, V. (2011). LinkedIn and Facebook in Belgium: The influences and biases of social network sites in recruitment and selection procedures. *Social Science Computer Review, 29*(4), 437–448.

Cherry, M. A. (2017). People analytics and invisible labor. *St. Louis University Law Journal, 61*(1), 1–17. Available at https://scholarship.law.slu.edu/faculty/10/. Accessed 29 Aug 2020

Crawford, K., & Schultz, J. (2014). Big data and due process: Towards a framework to redress predictive privacy harms. *Boston College Law Review, 55*(1), 23–55.

Dagnino, E., & Armaroli, I. (2020). A seat at the table: Negotiating data processing in the workplace. A national case study and comparative insights. *Comparative Labor Law & Policy Journal, 41*(1), 1–23. Available at SSRN: https://ssrn.com/abstract=3403729 or https://doi.org/10.2139/ssrn.3403729.

Daws, R. (2016). *Adopting fitness trackers in businesses saves $1000 per employee*. http://www.wearabletechnology-news.com/news/2016/oct/19/adopting-fitness-trackers-businesses-saves-1000-employee/. Accessed 25 Mar 2019.

De Stefano, V. (2018). Negotiating the algorithm: Automation, artificial intelligence and labour protection. *Comparative Labor Law & Policy Journal*. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3178233. Accessed 28 May 2020

Dembe, A. E., et al. (2005). The impact of overtime and long work hours on occupational injuries and illnesses: New evidence from the United States. *Occupational and Environmental Medicine, 62*(9), 588–597.

Derks, D., & Bakker, A. B. (2014). Smartphone use, work-home interference and burnout: A diary study on the role of recovery. *Applied Psychology, 63*(3), 643–688.

Domeinski, J., Wagner, R., Schöbel, M., & Manzey, D. (2007, October). Human redundancy in automation monitoring: Effects of social loafing and social compensation. In *Proceedings of the human factors and ergonomics society annual meeting* (Vol. 51, No. 10, pp. 587–591). SAGE.

Dzindolet, M. T., Pierce, L. G., Beck, H. P., & Dawe, L. A. (2002). The perceived utility of human and automated aids in a visual detection task. *Human Factors, 44*(1), 79–94.

Edelman, B., Luca, M., & Svirsky, D. (2016). *Racial discrimination in the sharing economy: Evidence from a field experiment*. Working paper. http://www.benedelman.org/publications/airbnb-guest-discrimination-2016-01-06.pdf. Accessed 28 May 2020.

Edwards, L., & Veale, M. (2017). Slave to the algorithm? Why a 'right to an explanation' is probably not the remedy you are looking for. *Duke Law & Technology Review, 16*(1), 101–127.

EU-OSHA. (2013). *Second European Survey of Enterprises on New and Emerging Risks (ESENER-2). Overview report: Managing safety and health at work*. Available at https://osha.

europa.eu/en/tools-and-publications/publications/second-european-survey-enterprises-new-and-emerging-risks-esener. Accessed 29 Aug 2019.
EU-OSHA. (2017). *Monitoring technology: The 21st century's pursuit of well-being?* Available at https://osha.europa.eu/en/tools-and-publications/publications/monitoring-technology-workplace/view. Accessed 29 Aug 2019.
EU-OSHA. (2018). *Foresight on new and emerging occupational safety and health risks associated with digitalisation by 2025*. Available at https://osha.europa.eu/en/tools-and-publications/publications/foresight-new-and-emerging-occupational-safety-and-health-risks/view. Accessed 29 Aug 2020.
European Commission. (1996). *Guidance on risk assessment at work, Luxemburg, 1996*. Available at https://osha.europa.eu/en/legislation/guidelines/guidance-on-risk-assessment-at-work.pdf. Accessed 29 Apr 2020.
Felstiner, A. (2011). Working the crowd: Employment and labor law in the crowdsourcing industry. *Berkeley Journal of Employment and Labor Law, 32*(1), 44–69.
FEPS. (2017). *Work in the European gig economy – Employment in the era of online platforms*. Available at http://www.feps-europe.eu/en/publications/details/579. Accessed 28 May 2020.
Fernández Avilés, J. A. (2017). NTIC y riesgos psicosociales en el trabajo: estado de situación y propuestas de mejora. *DSL, 2*, 12–36.
Garriga Domínguez, A. (2018). La elaboración de perfiles y su impacto en los DDFF. Una primera aproximación a su regulación en el RGUE. *Derechos y Libertades, 38*, 34–61.
Goñi Sein, J. L. (2017). Nuevas tecnologías digitales, poderes empresariales y derechos de los trabajadores: Análisis desde la perspectiva del Reglamento Europeo de Protección de Datos de 2016. *RDS, 78*, 23–45.
Goodman, B., & Flaxman, S. (2016). European Union regulations on algorithmic decision-making and a right to explanation. *Arxiv.* Available at https://arxiv.org/abs/1606.08813
Grensing-Pophal, L. (2009, November 1). Recruiting 2.0. *Credit Union Management Magazine*.
Harari, N. (2016). *Homo Deus: Breve historia del mañang*. Debate.
Hardt, M. (2014). How big data is unfair. *Medium*. Available at https://medium.com/@mrtz/how-big-data-is-unfair-9aa544d739de. Accessed 29 Aug 2020.
Hildebrandt, M. (2012). The dawn of a critical transparency right for the profiling era. *Digital Enlightenment Yearbook, 2012*, 41–56.
Hoffman, K., Zage, D., & Nita-Rotaru, C. (2009). A survey of attack and defense techniques for reputation systems. *ACM Computing Survey, 42*, 1–31.
Horton, J., Cameron, A., Devaraj, D., Hanson, R. T., & Hajkowicz, S. A. (2018). *Workplace safety futures: The impact of emerging technologies and platforms on work health and safety and workers' compensation over the next 20 years'*. CSIRO.
HSE. (2017). *Tackling work-related stress using the management*. Health and Safety Executive.
Hung, W. H., Chang, L. M., & Lin, C. H. (2011, July). Managing the risk of overusing Mobile phones in the working environment: A study of ubiquitous technostress. In *PACIS*, p. 81.
Ippolita. (2012). *En el acuario de Facebook. El irresistible ascenso del anarco-capitalismo*. Enclave de libros.
Jackson, L. P. C. (2016). *Employee monitoring and workplace privacy law*. American Bar Association, national symposium on technology in labour & employment law.
Jahoda, M. (2016). Employment and Unemployment: A Social-Psychological Analysis. Cambridge University Press.
Jorge, M. (2018). *Los empleados de almacén en Amazon Reino Unido tienen tanto miedo de ir al baño que orinan en botellas*. Gizmodo. Available at https://es.gizmodo.com/los-empleados-de-almacen-en-amazon-reino-unido-tienen-t-1825291024. Accessed 29 Aug 2020.
Karasek, R. A., & Theorell, T. (1990). *Healthy work*. Basic Books.
Karau, S. J., & Williams, K. D. (1993). Social loafing: A meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology, 65*(4), 681–706.
Korczynski, M., & Evans, C. (2013). Customer abuse to service workers: An analysis of its social creation within the service economy. *Work, Employment and Society, 27*(5), 768–784.

Kramer, M. (2007). Self-selection bias in reputation systems. *International Federation for Information Processing, 238*, 55–268.

Kuncel, N. R., Klieger, D. M., & Ones, D. S. (2014). In hiring, algorithms beat instinct. *Harvard Business Review, 92*(5), 32–32. Available at https://hbr.org/2014/05/in-hiring-algorithms-beat-instinct. Accessed 29 Apr 2020

Lee, J., & See, J. (2004). Trust in automation and technology: Designing for appropriate reliance. *Human Factor, 46*, 50–80.

Lindsay, G. (2015). *We spent two weeks wearing employee trackers: Here's what we learned*. Fact Coexist. Available at https://www.fastcompany.com/3051324/we-spent-two-weeks-wearing-employee-trackers-heres-what-we-learned. Accessed 16 Sept 2019.

López Rodríguez, J. (2019). La prevención de riesgos laborales en el trabajo a demanda vía aplicaciones digitales. *Lan Harremanak, 41*, 50–76.

Moore, P. V. (2017). *Work and the GDPR: The future for algorithms and people analytics* Available at https://staffblogs.le.ac.uk/management/2018/09/20/work-and-the-gdpr-the-future-for-algorithms-and-people-analytics/

Moore, P. V. (2018a). The quantified self in precarity. In *Work, technology and what counts*. Routledge.

Moore, P. V. (2018b). *Humans and machines at work: Monitoring, surveillance and automation in contemporary capitalism*. Palgrave Macmillan.

Moore, P. V., Akhtar, P., & Upchurch, M. (2018). Digitalisation of work and resistance. In *Humans and machines at work* (pp. 17–44). Palgrave Macmillan.

Ouridi, M. et al, (2016), Technology adoption in employee recruitment: The case of social media in Central and Eastern Europe, Computers in Human Behavior, 57, 240–249.

Pega and Marketforce. (2017). *The future of work: A report from marketforce and pegasystems*. Available at https://www.pega.com/system/files/resources/2018-12/Future-of-Work-Report.pdf. Accessed 29 Aug 2019.

Perez. (2006). *La tercera generación de derechos humanos*. Thomson Aranzadi.

Pérez-Zapata, O. (2015). *Trabajo sin límites, salud insostenible: La intensificación del trabajo del conocimiento* (E-prints, Universidad Complutense de Madrid).

Pérez-Zapata, O., Hernández, G. Á., & Castro, J. C. R. (2019). *Digitalización, intensificación del trabajo y salud de los trabajadores españoles*. (Electronic version available at https://www.ccoo.es/24c0e370fa4b4d1f3682b1780854af9c000001.pdf. Accessed 29 Aug 2019).

Ponce, A. (2020). *Labour in the age of AI: Why regulation is needed to protect workers*. ETUI research paper-foresight brief.

Popma, J. (2013). *The Janus face of the new ways of work, rise, risks and regulation of nomadic work*. Working paper ETUI, Brussels.

Prassal, J. (2020). What if your boss was an algorithm? The rise of artificial intelligence at work. *Comparative Labor Law & Policy Journal, 41*(1), 123–153. Available at SSRN: https://ssrn.com/abstract=3661151

Roldán, V. R. R. (2018). Los retos para la prevención de riesgos laborales ante la tecnificación del trabajo. In C. Namora et al. (Eds.), *Health at work, ageing and environmental effects on future social security and labour law systems* (pp. 71–93). Scholars Publishing.

Sameen, S., & Cornelius, S. (2013). Social networking sites and hiring: How social media profiles influence hiring decisions. *Journal of Business Studies Quarterly, 4*, 466–489.

Schumacher, S. (2011). What employees should know about electronic performance monitoring. *ESSAI, 8*(28), 138–144.

Selby, A. (2017). *Timed toilet breaks, impossible targets and workers falling asleep on feet: Brutal life working in Amazon warehouse*. Mirror. Available at https://www.mirror.co.uk/news/uk-news/timed-toilet-breaks-impossible-targets-11587888. Accessed 29 Apr 2020.

Slee, T. (2013). Some obvious things about internet reputation systems. Available at http://tomslee.net/wordpress/wp-content/uploads/2013/09/2013-09-23_reputation_systems.pdf. Accessed 28 May 2018.

Spicer, A., & Cederstrom, C. (2015). What companies should ask before embracing wearables. *Harvard Business Review*, 2–5. https://hbr.org/2015/05/what-companies-should-ask-before-embracing-wearables. Accessed 16 Sept 2019

Sprage, R. (2015). Worker (mis)classification in the sharing economy: Square pegs trying to fit in round holes. *A.B.A. Journal of Labor & Employment Law, 31*, 1–23.

The Week Staff. (2015, July 5). The rise of workplace spying. *WEEK*. http://theweek.com/articles/564263/rise-workplacespying. Accessed 23 May 2018.

Thierer, A., Koopman, C., Hobson, A., & Kuiper, C. (2015). *How the internet, the sharing economy, and reputational feedback mechanisms solve the "lemons problem"*. Mercatus working paper. Available at https://www.mercatus.org/system/files/Thierer-Lemons-Problem.pdf. Accessed 17 Apr 2018.

Todolí Signes, A. (2018). Algorithms, artificial intelligence and automated decisions concerning workers and the risks of discrimination: The necessary collective governance of data protection. *Transfer European Review of Labour and Research, 25*(4), 465–481.

UTS. (2019). *Heat stress and on-demand work: The experience of food delivery and courier cyclists*. Climate Justice Centre. Available at https://opus.lib.uts.edu.au/bitstream/10453/134736/1/On%20Demand%20cyclists%20UTS%20final.pdf. Accessed 29 Aug 2020.

Van Jaarsveld, D., & Poster, W. R. (2013). Emotional labour over the phone. In A. Grandey et al. (Eds.), *Emotional labour in the 21st century: Diverse perspectives on emotion regulation at work* (pp. 153–174). Routledge.

Wicken, C., & Hollands, K. (2000). *Engineering psychology and human performance*. Prentice Hall.

Wolf, M. V., Sims, J, And Ynag H., (2014). Social media utilization in human resource management, in Web based communities and social Media 2014 conference, Lisbon.

Young, S., Braddy, P. W., & Fleenor, J. W. (2017). The impact of new technology on the leadership development industry. *Training Industry Magazine*. Available at https://trainingindustry.com/magazine/nov-dec-2016/the-impact-of-new-technology-on-the-leadership-development-industry/. Accessed 16 Sept 2020

Correction to: Cognitive Demands of Flexible Work

Bettina Kubicek, Roman Prem, Vera Baumgartner, Lars Uhlig, Sabina Hodzic, and Christian Korunka

Correction to:
Chapter 2 in: C. Korunka (ed.), *Flexible Working Practices and Approaches*, https://doi.org/10.1007/978-3-030-74128-0_2

This book was inadvertently published without one of the co-editor's name.

This has now been amended throughout the book (COP, TOC) to the inclusion of editor Sabina Hodzic.

The updated version of this chapter can be found at
https://doi.org/10.1007/978-3-030-74128-0_2

C. Korunka (ed.), *Flexible Working Practices and Approaches*,
https://doi.org/10.1007/978-3-030-74128-0_14

Index

C. Korunka (ed.), *Flexible Working Practices and Approaches*,
https://doi.org/10.1007/978-3-030-74128-0