
Article:
Hill, N.S., Axtell, C. orcid.org/0000-0002-4125-6534, Raghuram, S. et al. (1 more author) (2024) Unpacking virtual work's dual effects on employee well-being: an integrative review and future research agenda. Journal of Management, 50 (2). pp. 752-792. ISSN 0149-2063

https://doi.org/10.1177/01492063221131535

Unpacking Virtual Work's Dual Effects on Employee Well-Being: An Integrative Review and Future Research Agenda

(in press at Journal of Management)

N. Sharon Hill
Department of Management
George Washington University School of
Business 315F Funger Hall
2201 G Street, NW
Washington, DC,
20052 nshill@gwu.edu

Carolyn Axtell
Institute of WorkPsychology
Sheffield University Management School
Conduit Road, Sheffield S10 IFL
UK
c.m.axtell@sheffield.ac.uk

Sumita Raghuram
Lucas College of Business
San Jose State University
1 Washington Square
San Jose, CA, 95192
sumita.raghuram@sjsu.
edu

Niina Nurmi
Department of Industrial Engineering and
Management Aalto University, School of Science
Maarintie 8, 02150 Espoo
Finland
niina.nurmi@aalto.fi

Acknowledgements: We thank Matthew M. Piszczek for his valuable feedback on an early draft of this manuscript. We also thank our associate editor, Devasheesh Bhave, and the anonymous reviewers for their helpful guidance and highly constructive feedback that greatly improved our manuscript.

Corresponding author contact information:
N. Sharon Hill, 315F Funger Hall
2201 G Street, NW
Washington, DC, 20052
Phone: 202-994-1314 Email: nshill@gwu.edu

Supplemental material for this article is available at http://xxx.sagepub.com/supplemental

ABSTRACT

Virtual work arrangements whereby dispersed employees interact with each other using technology-mediated communication can both positively and negatively impact their psychological well-being. Yet, research on these dual effects in different virtual work research domains (e.g., telecommuting, virtual teams, and computer-mediated work) is not well-integrated, which limits insights into how their findings overlap and inform each other. Using a work design theoretical lens to synthesize findings from 115 empirical articles, we develop an integrative framework that advances understanding of how virtual work both helps and harms well-being. The framework explicates different pathways linking subdimensions of technology dependence and dispersion—two core dimensions underlying different types of virtual work—to well-being through employees' perceived work characteristics. We identify four technology dependence and three dispersion subdimensions that differ in their degree of positive versus negative impact on hedonic and eudaimonic well-being outcomes as well as in the work characteristics that explain these effects. These findings suggest that employees' well-being experiences in virtual work depend on the subdimensions involved. Our analysis also shows that the same subdimension can influence well-being both positively and negatively. Across the subdimensions, a dominant set of work characteristics in four categories (task, knowledge, social, and work context) explain these opposing effects moderated by contingencies related to the individual, team, organization, and external context. These multilevel contingencies point to potential interventions for enhancing the benefits and mitigating the downsides of virtual work for employee well-being. Based on these insights, we develop a future research agenda and discuss practical implications.

Keywords: virtual teams, telecommuting, computer-mediated work, well-being, work design

UNPACKING VIRTUAL WORK'S DUAL EFFECTS ON EMPLOYEE WELL-BEING: AN INTEGRATIVE REVIEW AND FUTURE RESEARCH AGENDA

Over the last two decades, there has been explosive growth in virtual work (Makarius & Larson, 2017; Raghuram, Hill, Gibbs, & Maruping, 2019) whereby dispersed employees interact with each other using technology-mediated communication (TMC). Virtual work arrangements include telecommuting/mobile work (i.e., working from home/any preferred location), virtual teamwork (i.e., collaborating across distance using TMC) and computer-mediated work (i.e., using communication technologies to facilitate interactions). The COVID-19 pandemic further accelerated this growth trend, and many organizations plan to continue some degree of virtual work after the pandemic because of its significant benefits (Levy, 2020; Zeidner, 2020), which include administrative and real estate cost savings as well as productivity gains (Haag, 2020; Rue, 2020). Employees, too, appreciate the increased flexibility, reduced travel, and time savings virtual work can provide. As a result, the shift to virtual work has been identified as one of the biggest business trends in the coming years (Agovino, 2020; Robinson, 2022).

Despite these benefits, research suggests that virtual work can significantly change the characteristics of employees' work (Bliese, Edwards, & Sonnentag, 2017; Gajendran & Harrison, 2007; Wang, Liu, Qian, & Parker, 2021) with both negative and positive implications for their psychological well-being, defined as "feeling good and/or experiencing fulfillment and purpose" (Sonnentag, 2015: 262). For example, using mobile technologies to connect to work anytime and from anywhere may extend employees' work hours, increasing emotional exhaustion (e.g., Lanaj, Johnson, Barnes, 2014) but may also increase work-family balance by providing flexibility to attend to work and family demands (e.g., Derks, Bakker, Peters, & van Wingerden, 2016). In addition, less interaction with coworkers in distant locations may increase

social isolation, which in turn results in psychological strain and decreased job satisfaction (Bentley, Teo, McLeod, Tan, Bosua, & Gloet, 2016). Conversely, it may reduce strain by providing an escape from negative work relationships (Collins, Hislop, & Cartwright, 2016). Given these dual effects and the growth in virtual work, it is critical to understand how and when such arrangements may help or harm employee well-being.

We currently lack a comprehensive understanding of well-being in virtual work because this research has occurred in siloes (Raghuram et al., 2019; Wang et al., 2020) and related to different virtual work domains (e.g., telecommuting, virtual teams, mobile work, computer-mediated work), making it difficult to understand how their findings overlap and inform each other. For example, computer-mediated work research has revealed that TMC both positively and negatively impacts well-being (Adisa, Gbadamosi, & Osabutey, 2017; ter Hoeven, van Zoonen, & Fonner, 2016). Yet although these findings are relevant for understanding well-being in other domains, virtual team scholars mostly focus on TMC's harmful effects (Ayoko, Konrad, & Boyle, 2012; Johnson, Bettenhausen, & Gibbons, 2009) and telecommuting studies seldom include characteristics of the technologies used to work from home (Raghuram et al., 2019).

To make sense of these mixed findings and identify future research needs, we conducted a comprehensive review of 115 quantitative and qualitative studies focused on employees' psychological well-being in virtual work. Our review shows that virtual work influences well-being by changing employees' perceptions of their work characteristics (i.e., the design of work). Thus, we apply a work design theoretical lens (Hackman & Oldham, 1976; Morgeson, Garza & Campion, 2012; Parker, 2014) to develop an integrative framework for understanding how virtual work both helps and harms well-being by influencing perceived work characteristics.

Our framework integrates the siloes in virtual work research by following Raghuram et al.'s (2019) guidance to examine the effects of two core dimensions (and their subdimensions)

that underlie different configurations of virtual work: technology dependence (i.e., the use of technology tools for work interactions) and dispersion (i.e., distance in virtual work) (e.g., Kirkman & Mathieu, 2005; O'Leary & Cummings, 2007). Focusing on these underlying virtual work dimensions facilitates analysis of how different virtual work arrangements enabled by different communication technologies affect well-being. By unpacking the pathways whereby subdimensions of technology dependence and dispersion positively and negatively influence different types of hedonic (related to feeling good) and eudaimonic (related to experiencing fulfilment and purpose) well-being outcomes through different work characteristics, our framework makes three important research contributions.

First, it integrates the fragmented empirical research on well-being in different virtual work arrangements by explicating the effects of four subdimensions of technology dependence (communication leanness, asynchronicity, technical complexity, and flexible connectivity) and three subdimensions of dispersion (spatial distance, temporal distance, and out-of-office context). These subdimensions draw on and extend those already defined in the literature (e.g., Kirkman & Mathieu, 2005; O'Leary & Cummings, 2007; Schweitzer & Duxbury, 2010) to capture additional aspects of technology dependence and dispersion that are relevant to well-being. To our knowledge, this is the first *individual-level* multidimensional conceptualization of virtual work that can be used across different virtual work arrangements as a means for more nuanced theorizing and testing of their effects on well-being. Our finding that these virtual work subdimensions have differential effects on well-being suggests that employee well-being in virtual work depends on the specific subdimensions involved.

Second, our framework addresses calls to extend work design theorizing to reflect the contemporary workplace (e.g., Morgeson et al., 2012; Parker, Morgeson, & Johns, 2017). We draw on Morgeson et al.'s (2012) integrated work design framework (IWDF), which integrates

major work design theories. However, these theories assume in-person, face-to-face work that is separated by a clear boundary from employees' nonwork context (Oldham & Hackman, 2010). Thus, we contextualize the IWDF for virtual work settings by examining how the technology dependence and dispersion subdimensions shape well-being outcomes through their influence on employees' perceived work characteristics. Across the subdimensions, the framework identifies mediating work characteristics in four categories: task, knowledge, social, and work context. These include work characteristics that are not specified within IWDF but are germane to virtual work—for example, those related to how employees control their work-nonwork boundaries.

Finally, our framework shows that the same subdimension can influence well-being both positively and negatively, highlighting the importance of understanding factors that determine the strength of these opposing effects. Thus, we identify contingencies at different levels (individual, team, organization, and external context) that point to potential interventions for enhancing virtual work's benefits for employees' well-being and mitigating its downsides. Based on insights from our review, we offer a future research agenda and discuss practical implications.

LITERATURE REVIEW

Past Reviews Related to Well-Being in Virtual Work

A search for past reviews related to psychological well-being in virtual work yielded broad integrative reviews of virtual work research without a specific focus on well-being outcomes (e.g., Makarius & Larson, 2017; Raghuram et al., 2019). Other reviews targeted specific types of virtual work, including the use of information and communication technologies (Wang et al., 2020), virtual teams (e.g., Kirkman, Gibson, & Kim, 2012; Gilson, Maynard, Young, Vartiainen, & Hakonen, 2015), telecommuting (Gajendran & Harrison, 2007), and mobile work (Hughes & Silver, 2020). However, these were general reviews examining only one or two well-being outcomes along with other outcomes, such as turnover intentions and

performance (e.g., Gajendran & Harrison; Kirkman et al., 2012; Wang et al., 2020), or they narrowly focused on specific well-being outcomes such as those related to work-family dynamics (Hughes & Silver, 2020). Given the recent growth in research examining virtual work's effects on well-being, our review includes significantly more studies on this topic than in past reviews and is the first to explicate the differential impacts of virtual work subdimensions on different types of well-being outcomes and the pathways through which these effects occur.

Literature Search

We searched Web of Science for empirical studies of virtual work that examined well-being outcomes in management, psychology, communication, business, and information systems journals. We included articles dating back to 1995 (through 2022) when virtual work research activity began to increase (Raghuram et al., 2019). To be as inclusive as possible, we used an extensive list of search terms combining our conceptualizations of virtual work and well-being.

Virtual work. We utilized Makarius and Larson's (2017: 160) definition of virtual work at the individual level as "any work interaction with others that is not conducted in person (face-to-face) and that uses technology tools to transfer thoughts and ideas." This definition points to two core dimensions of virtual work that are common to different virtual work arrangements: technology dependence and dispersion (Raghuram et al., 2019). Technology dependence is the extent to which work interactions are mediated by technology (e.g., email, and videoconference) rather than occurring in-person, face-to-face (e.g., Hill, Kang, & Seo 2014; Kirkman & Mathieu, 2005; Maynard, Mathieu, Rapp & Gilson, 2012). Research related to this dimension has also considered the properties of the communication media used, conceptualizing work interactions as more virtual when they make more frequent use of communication media whose characteristics deviate from in-person face-to-face interaction (Kirkman and Mathieu, 2005). For example, communications using leaner, text-based media such as email are considered more virtual than

those using richer media such as videoconferencing that transfer nonverbal cues. Dispersion refers to the degree to which virtual work occurs at a distance from different locations (Raghuram et al. 2019; O'Leary & Cummings, 2007). Researchers have conceptualized distance in different ways, including: (a) spatial (i.e., geographic) distance, (b) temporal (i.e., time-related such as different time zones) distance (O'Leary & Cummings), and the extent to which work occurs in a location away from a main office (e.g., at home; Gajendran & Harrison, 2007).

Our conceptualization of virtual work makes two key assumptions. First, the degree of virtuality in a job lies on a continuum from low to high, with most jobs involving some amount of virtual work (e.g., an office-based worker making phone calls to a service provider). However, research on well-being in virtual work mostly focuses on arrangements such as telecommuting or virtual teams that involve a significant amount of virtual work (Makarius & Larson, 2017). Second, technology dependence and dispersion are two distinct dimensions. For example, as noted by Kirkman and Mathieu (2005), employees may work in the same building (low dispersion) but interact primarily via electronic media (high technology dependence). Thus, it is important to examine the dimensions' separate effects.

Employee well-being. We focus on psychological well-being, which is the type of well-being most commonly examined with regard to work. Psychological well-being represents 'optimal experience and functioning' (Ryan & Deci, 2001: 141) and has been defined as "feeling good and/or experiencing fulfillment and purpose" (Sonnentag, 2015: 262). This definition draws from two well-established philosophical perspectives on well-being: *hedonic* well-being, which focuses on pleasure attainment and pain avoidance; and *eudaimonic* well-being, focused on the pursuit of meaning, authenticity and self-realization (Ryan & Deci, 2001; Waterman, 1993). Hedonia and eudaimonia are widely accepted as overarching categories for grouping different facets of psychological well-being (Huta, 2015). We therefore sought to understand

virtual work's impact on both these types of well-being outcomes that are important and complementary for optimal psychological well-being.

Employee well-being research has often focused on *hedonic* concepts (Sonnentag, 2015), including positive affective experiences such as job satisfaction and the absence of negative affective experiences such as exhaustion and stress (Huta, 2015; Russell, 1980; Tellegen, Watson, & Clark, 1999). There is also growing interest in *eudaimonic* well-being, which includes constructs reflecting experiences such as thriving and work engagement as well as effective functioning in life such as work-life balance and high-quality relationships (Huta, 2015; Sonnentag, 2015). Examples of poor eudaimonic functioning are work-family conflict and loneliness. Some well-being outcomes may include *both* hedonic and eudaimonic elements, depending on their conceptualization and measurement. For instance, job satisfaction is usually conceptualized and measured to reflect fulfilment of emotional needs, which is hedonic in nature, but life satisfaction relates to meaning and the accomplishment of life goals, making it more eudaimonic (Huta, 2015). We therefore carefully reviewed the operationalization of well-being outcomes in our review to categorize them appropriately.

Search terms. The virtual work search terms based on the conceptualization of virtual work, include: (a) adjectives related to technology dependence and distance (virtual, distance, distributed, dispersed, remote, technology-mediat*, computer-mediat*, global) combined with work, group, and team*; (b) other types of virtual work arrangements (telework*, telecommut*, mobile work, m-work, e-work); (c) specific technologies commonly used in virtual work (email, smartphone, video conferenc*, digital technolog*, mobile technolog*, virtual technolog*); and (d) other terms commonly used in relation to virtual work (future of work, new ways of working, after-hours connectivity, 24/7, always on). The search terms for well-being include: the term "well-being" as well as terms specifically associated with hedonic (e.g., satisfaction, burnout,

stress*, strain, affect) and eudaimonic (e.g., engage*, thriving, work-family*) well-being.

We manually reviewed the publication abstracts from our initial search and retained studies that: (a) were empirical (reviews and theoretical articles were excluded); (b) related to a work setting (e.g., studies related to children, consumer-behavior, online dating, online learning, and personal social media use were excluded); (c) aligned with our conceptualization of virtual work (e.g., studies focused on cultural diversity and expatriates were excluded); and (d) examined an individual-level well-being outcome. To ensure we focused on the most rigorous research studies, we only included papers in journals listed in Thomson Reuters' Journal Citation Reports. This yielded a final list of 115 publications.

Overview of studies in the review. Our review shows a steady growth in publications in this area since 1995 with roughly equal attention to well-being related to technology dependence and to dispersion. The number of studies published since 2010 (86 studies, including 22 since the start of the COVID-19 pandemic) is nearly triple the number published between 1995 and 2010 (29 studies). The dominant virtual work arrangement studied was telecommuting/mobile work (53% of the studies in our review), followed by studies involving specific technologies such as email and smartphones (34%), then virtual teams (13%). The Appendix summarizes the methodological approaches used in the studies and shows that approximately one-quarter of the studies included a qualitative component. In addition, 87% used single-source data involving mostly organizational samples plus a limited number of crowdsourcing samples with working adults. The most common quantitative methodology was surveys (69% at a single point in time and 15% time lagged). Longitudinal studies and experience sampling were less common and examined effects on well-being over a short period (i.e., two weeks or less). Thus, there is a lack of evidence regarding the short- vs. long-term effects of well-being.

REVIEW METHODOLOGY: A WORK DESIGN PERSPECTIVE

In both the quantitative and qualitative studies in our review, scholars either explicitly or implicitly examined how different aspects of virtual work environments influence work characteristics and the implications for employees' well-being. This aligns with the work design theoretical perspective (e.g., Morgeson, et al., 2012; Parker, 2014), which considers how employees' perceptions of their work characteristics—including "the content and organization of one's work tasks, activities, relationships, and responsibilities" (Parker, 2014: 662) influence work outcomes, including well-being. As virtual work involves a different organization of individual tasks, activities, and relationships than in-person office work (Wang et al., 2020), it may influence employees' perceptions of their work characteristics. Thus, we applied a work design perspective to synthesize findings from our review.

Individual studies in our review applied different work design theories to examine a narrow set of work characteristics related to specific well-being outcomes. To synthesize existing research on well-being in virtual work and capture the breadth of work characteristics and well-being outcomes examined, we selected Morgeson et al.'s (2012) IWDF. This is a general framework that integrates major work design models—e.g., the job characteristics model (Hackman & Oldham, 1976), the job demands-control model (Karasek, 1979), and the job demands-resources model (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001)—that on their own include narrower sets of work characteristics. The IWDF therefore addresses a more comprehensive range of work characteristics that have been linked to a wide array of well-being outcomes (for meta-analyses, see Humphrey, Nahrgang, & Morgeson, 2007; Fried & Ferris, 1987). Unlike other integrative models focused on different elements of work design, such as contextual influences and antecedents of work characteristics (Parker, Wall, & Cordery, 2001; Parker, Van den Broeck, & Holman, 2017), one important focus in IWDF is to organize work

characteristics from major work design models into four categories (task, knowledge, social, and work context). Our preliminary examination of the work characteristics in the articles in our review confirmed the presence of these four categories.

Given our focus on virtual work, it is important to note that the work design models incorporated into the IWDF were developed based on in-person settings. However, the IWDF suggests that "structural influences" related to the broader work setting—including technological and physical elements—may shape employees' perceived work characteristics. Based on this, Morgeson et al. (2012) proposed that virtual work settings may influence work characteristics, but they stopped short of specifying the pertinent aspects of virtual work and called for more research in this area. Thus, in this review, we contextualize the IWDF for a virtual work setting by identifying subdimensions of technology dependence and dispersion that impact well-being through their influence on employees' work characteristics in the four categories mentioned. We also remained open to uncovering work characteristics that are particularly germane to virtual work but not yet specified in the IWDF or in other existing work design models.

We systematically coded the quantitative and qualitative findings to identify: (a) subdimension(s) of technology dependence and dispersion theorized to influence well-being, (b) related well-being outcome(s), and (c) work characteristics that explain these relationships. Our analysis also revealed contingencies at different levels (individual, team, organization, and external context) that moderated the relationships between the virtual work subdimensions and work characteristics; so, we expanded our coding to capture these multilevel contingencies. Two authors independently coded the findings from the review articles and discussed any discrepancies to reach agreement. The remaining two authors reviewed the results, and when necessary, the entire team discussed differences to ensure consensus.

Based on this synthesis of existing research findings, we developed the integrative

framework shown in Figure 1, which unpacks the pathways through which virtual work has been shown to influence psychological well-being. Before discussing these findings in more detail, we describe the subdimensions of technology dependence and dispersion related to well-being in existing research and the work characteristics that explain their effects.

Insert Figure 1 about here

Technology Dependence and Dispersion Subdimensions Related to Well-Being

To integrate the siloed research related to different virtual work arrangements, we identified the subdimension(s) of technology dependence and dispersion explicitly or implicitly examined, regardless of the type of virtual work arrangement or communication technology studied. For example, in quantitative studies, researchers have theorized that telecommuting reduces the amount of social support from work colleagues (e.g., Sardeshmukh, Sharma & Golden, 2012) and increases employees' control over their work-nonwork boundary (Golden, Veiga & Simsek, 2006), which respectively decreases work engagement and work-family conflict. In these cases, the dispersion subdimension relevant to social isolation is spatial distance (i.e., physical separation from coworkers), and out-of-office location (i.e., working from home) is relevant to work-family balance. In research on virtual teams, scholars have similarly examined the social isolation effects of spatial distance from team members. Thus, identifying the underlying subdimensions of virtual work responsible for the effects on well-being enabled us to integrate research related to different virtual work arrangements and potentially uncover new virtual work subdimensions that have not been explicitly measured. We applied the same approach to identify relevant subdimensions in the findings of qualitative studies as they had no explicit hypotheses or measures of virtual work.

We used existing labels and definitions for subdimensions previously conceptualized in the virtual work literature, adapting them as needed to the individual level. For subdimensions discussed in the literature but not yet formally defined or measured, our team worked to reach consensus on labels and definitions, consulting with experts in the field as needed. As shown in Figure 1, we identified four technology dependence (communication leanness, asynchronicity, technical complexity, and flexible connectivity) and three dispersion (spatial distance, temporal distance, and out-of-office location) subdimensions. Each one is conceptualized as a continuum whereby work interactions are more virtual when they involve higher levels of a subdimension.

Next, we define these subdimensions and their proposed operationalization based on actual measures used in the studies in our review (where relevant) and/or current measures used in virtual work research that is not focused on well-being. As we have discussed, the subdimensions were not always explicitly measured in the studies we reviewed because some studies were qualitative and some of the quantitative studies focused on virtual work arrangements rather than their underlying subdimensions. The operationalizations we describe can be used to measure the subdimensions in future studies.

Technology dependence subdimensions. The first two subdimensions of technology dependence derive from conceptualizations of team virtuality (Kirkman & Mathieu, 2005), which we apply at the individual level. *Communication leanness* refers to the extent to which the communication media used in virtual interactions limit transmission of informational cues (Daft & Lengel, 1986; Kirkman & Mathieu, 2005). For example, a text-based medium such as email is relatively lean because it lacks many informational cues (e.g., tone of voice, facial expression). In studies on virtual work that do not examine wellbeing outcomes, researchers have used subjective measures to assess this subdimension—for example, based on individuals' report of the extent to which their work communications occur using different communication

technologies, (e.g., email, phone) and the perceived informational value of each of those tools (Kirkman & Mathieu, 2005; Maynard, Mathieu, Gilson, Sanchez, & Dean, 2019); or survey measures that assess the extent of informational value in the tools used for work communications (Hamilton & Mohammed, 2008; Perry, Rubino, & Hunter, 2016). These approaches provide a more direct assessment of communication leanness than the broader measures used in studies focused on well-being—such as overall use of electronic communication (e.g., Hill et al., 2014; Stark & Bierly, 2009) or the use of a specific lean technology such as email (Barley, Meyerson, & Grodal, 2011)—even while theorizing effects due to reduced cues.

Asynchronicity derives from media synchronicity theory (Dennis, Valacich, & Fuller, 2008) and refers to the extent to which there is a time lag between sending a message and receiving a response and the ability to receive multiple messages in parallel (Dennis et al., 2008). For example, email exchanges are asynchronous, as they lack the immediacy of feedback in face-to-face interactions, new emails can be received while composing another one, they can be reprocessed repeatedly, and receivers can take time to compose a response. By contrast, synchronous media (e.g., phone calls, or video conferencing) have no (or little) time lag. In some of the studies in our review (e.g., Chen and Casterella, 2019), and in virtual work research more generally (e.g., Brown, Dennis & Venkatesh, 2010; Hamilton and Mohamed, 2008), scholars have measured this subdimension using surveys to assess employees' perceptions of the degree of synchronicity in their work communications.

Technical complexity is the extent to which information and communication technologies are challenging to use (Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008; Suh & Lee, 2017) and reflect the opposite of "ease of use" (Davis, 1989). Measures of this subdimension in studies in our review (Cho, Kim, Chin, & Ahmad, 2020; Dias, Sílvia Lopes & Ricardo Peixoto, in press; Suh & Lee) as well as other relevant research (Davis, 1989) are typically subjective, using

surveys to assess these perceptions. Perceived technical complexity may occur for different reasons—e.g., lack of skills to use virtual tools (Dias et al., in press) or technical hassles (connection problems, software glitches, etc.) that make them difficult to use (Cho et al., 2020).

Flexible connectivity refers to the extent to which communication technologies provide employees with access to work-related information, systems, and people at any time and from anywhere (e.g., Adisa et al., 2017; Conole & Dyke, 2004; Thomas, 2014). Although our review revealed growing interest in this phenomenon (e.g., Adisa et al., 2017; Duxbury, Higgins, Smart, & Stevenson, 2014; Turel, Serenko, & Bontis, 2011), most researchers focused on specific mobile technologies (such as smartphones) rather than advancing formal definitions to capture their underlying capabilities that impact employee well-being. Our definition of flexible connectivity serves to integrate research across these studies. Lower degrees of flexible connectivity are possible with stationary technologies such as computers that provide connectivity from fixed locations away from a main office (e.g., at home or a hotel). As there is no existing measure of flexible connectivity, one approach is to use surveys to assess employees' perceived access to technologies that provide flexibility to work from any location at any time.

Dispersion subdimensions. The first two dispersion subdimensions are based on conceptualizations of geographic dispersion in virtual team research (O'Leary & Cummings, 2007). At the individual level, we define *spatial distance* as employees' degree of physical separation from coworkers, ranging from low (e.g., same building) to high (e.g., different countries). Virtual work research outside the domain of well-being (e.g., O'Leary & Cummings,; Schweitzer & Duxbury, 2010) typically uses objective measures of spatial distance (feet/miles/etc. or same building/same city/etc.). However, research focused on well-being has generally adopted a dichotomous approach, examining the extent to which work interaction involves co-located vs. distant work colleagues (e.g., Orhan, Rijsman, & Van Dijk, 2016; ter

Hoeven & van Zoonen, in press). In a few studies (e.g., Nurmi, 2011; Nurmi & Hinds, 2020), scholars theorized effects of distance using samples such as dispersed teams that have only high levels of spatial distance between employees.

Temporal distance has been conceptualized and measured in virtual team research as time-related differences (e.g., differences in time zones) between team members (O'Leary & Cummings, 2007). However, most of the studies in our review (e.g., Nurmi & Hinds, 2020) theorized the effects of temporal distance without actually measuring this construct in the study (e.g., Ruppel, Gong, & Tworoger, 2013). Drawing on the team-level definition, we define and propose a measure of individual-level temporal distance as the extent of overlap between an employee's normal work hours and those of coworkers.

Out-of-office location reflects the extent to which employees work in locations outside the main office during regular work hours, with a focus on the conditions in these work contexts that have implications for well-being. It differs from the first two dispersion subdimensions because employees who work in the main office (i.e., low out-of-office location) may nevertheless experience high spatial or temporal distance, because, for example, they work with distributed team members or colleagues who telecommute. It also differs from flexible connectivity to work, because the different out-of-office contexts where work occurs may have distinct impacts (e.g., due to noise and disturbances or a lack of technical support which is available in the main office). The dominant out-of-office location in our review was employees' home offices, often measured as the proportion of the regular work week (e.g., hours, days) spent working from home (e.g., Golden 2006a, Golden & Veiga, 2005). Some researchers used a dichotomous measure comparing full-time work in the main office to working one or more days per week from home (e.g., Konradt, Hertel, & Schmook, 2003, Mann & Holdsworth, 2003). Although nearly all findings in the studies we reviewed related to working from home, mobile

work involves other out-of-office locations such as client sites, hotel rooms, and coffee shops (e.g., Ladkin, Willis, Jain, Clayton, & Marouda, 2016). Despite limited research in this area, work conditions (e.g., noise/disturbances) in these other locations may affect well-being. Thus, a useful approach for measuring out-of-office location is to also assess the proportion of time spent working from locations other than the main office.

Work Characteristics that Mediate Virtual Work's Effects on Well-Being

Figure 1 presents our integrative framework, which includes work characteristics aligned with the four IWDF categories (Morgeson et al., 2012) that mediate the effects of technology dependence and dispersion subdimensions on well-being. These work characteristics were either explicitly hypothesized as mediators, or we discerned them by examining the theoretical arguments used to explain a subdimension's influence on well-being (quantitative studies) or based on descriptions of findings (qualitative studies). Next, we describe the work characteristics in our framework, noting those (shown with asterisks in Figure 1) that may be particularly germane to well-being in virtual work but not specified in the IWDF, which was developed based on traditional work settings.

Task characteristics. Task characteristics relate to employees' perceptions of how their work tasks are accomplished. These include two types of work autonomy described in the IWDF—*scheduling* and *methods autonomy.* These respectively refer to employees' freedom, independence, and discretion to schedule work and to determine the methods used. *Work location autonomy,* which is not mentioned in the IWDF, has also been linked to well-being in past research (Spivack & Milosevic, 2018) and refers to the perceived freedom and discretion to determine one's work location (e.g., Golden & Veiga, 2005; Sardeshmukh et al., 2012; Spivack & Milosevic). Finally, *task significance* is the extent to which a job influences other people's lives either inside or outside the organization (Hackman & Oldham, 1976).

Knowledge characteristics. Knowledge characteristics relate to the perceived cognitive processing, knowledge, skills, and ability requirements individuals experience in their jobs and include *information processing demands*, defined in the IWDF as the requirement to focus on and manage information. Our analysis uncovered two additional knowledge characteristics that are not included as work characteristics in the IWDF but relate to well-being in past research and in the studies we reviewed. These were: (a) *uncertainty and ambiguity* (Handke, Klonek, Parker, & Kauffeld, 2020; Nurmi, 2011), referring to knowledge gaps due to insufficient information to predict outcomes (uncertainty) and information that can be interpreted in different ways (ambiguity) (Weick, 1995); and (b) *learning opportunities* to gain new skills (Korunka, Kubicek, & Paskvan, 2015; Nurmi & Hinds, 2016).

Social characteristics. Social characteristics relate to the social and relational aspects of work and include *social connectivity and support,* defined as the perceived strength of social ties and mutual support from others such as organizational leaders, supervisors, and coworkers (e.g., Bentley et al., 2016; Collins et al., 2016). Social support is an existing social characteristic in the IWDF and includes opportunities to build relationships and to receive help and advice from others (Humphrey et al., 2007). However, because social connectivity is a particular challenge within virtual environments, we modified the label of this work characteristic to make the connectivity element more salient.

Work context characteristics. These characteristics describe attributes of employees' work contexts. The IWDF includes *physical demands* in this category, which are perceived physical requirements involving sustained effort and use of energy reserves (e.g., Nurmi, 2011). We added *boundary control*, which has not received attention in work design research as a work characteristic and refers to employees' ability to control the nature of their transitions between different life domains (Piszczek, 2017). From an IWDF perspective, we view this as a work

context characteristic, because it relates to the permeability of the boundary between employees' paid work and nonwork contexts. Given the importance of managing the work-nonwork boundary in the context of virtual work (and in the studies we reviewed), we believe boundary control deserves separate attention.

EFFECTS OF VIRTUAL WORK SUBDIMENSIONS ON WELL-BEING AND MEDIATING EMPLOYEE WORK CHARACTERISTICS

Having described the virtual work subdimensions and the work characteristics in our integrative framework, we discuss our review findings. Table 1 shows all the well-being outcomes associated with each virtual work subdimension in the studies we reviewed and their positive and/or negative effects on hedonic and/or eudaimonic well-being. Table 2 complements Table 1 by showing the task, knowledge, social and work context characteristics that mediate these helpful and harmful effects and the number of studies supporting each relationship. We synthesize findings in the literature by summarizing the well-being outcomes linked to each virtual work subdimension (Table 1) as well as the mediating work characteristics (Table 2). This approach highlights the different pathways through which each subdimension has been shown in existing research to influence different types of well-being outcomes positively and negatively. We highlight important differences between the subdimensions in our discussion.

Insert Tables 1 and 2 about here

Effects of Technology Dependence Subdimensions on Well-Being

Communication leanness. Only 9.6% of the studies we reviewed examined the relationship between communication leanness and well-being. These studies focused on mostly negative effects for hedonic well-being related to satisfaction with the task, communication, or

team members as well as positive and negative affect. We observed only one positive effect related to team member satisfaction.

Communication leanness affects well-being due to a lack of social and informational cues. On the negative side, a lack of cues reduces understanding in communications and visibility of another's context, which is detrimental to different aspects of social connectivity and support. For example, leaner communication makes it difficult to resolve conflicts (Stark & Bierly, 2009) and develop trust in virtual teams (Johnson et al., 2009; Romeike, Nienaber, & Schewe, 2016). In addition, leaner communication with managers reduces employees' perceptions of support (Braun, Hernandez, Kirchner, Stegmann, & van Dick, 2019) and makes it easier for team members to engage in social loafing (Monzani, Ripoll, Peiro, & Van Dick, 2014; Penarroja, Orengo, & Zornoza, 2017). In a few studies, researchers focused on the negative effects of communication leanness on well-being due to higher uncertainty and ambiguity (knowledge characteristic) and lower autonomy and task significance (task characteristics). For example, Whitman, Malzahn, Chaparro, Russell, Langrall, and Mohler (2005) found that reliance on email and chat functions leads to greater uncertainty regarding tasks and roles. In addition, Hill et al. (2014) found that greater reliance on electronic media in their job reduces employees' psychological empowerment (which includes autonomy and task significance) by making it more difficult to understand the extent of one's authority or the impact of one's work.

A positive effect of communication leanness on well-being occurs through social characteristics. Fewer social cues reduce the salience of team members' status differences, which results in more equal participation and greater team member satisfaction (Stark & Bierly, 2009).

Asynchronicity. Asynchronicity was examined in 11.3% of studies with overwhelmingly negative effects on well-being, primarily involving hedonic outcomes such as stress, burnout, and exhaustion. Eudaimonic outcomes related to asynchronicity include negative effects in the

form of decreased meaningfulness, social connectedness, and personal accomplishment, and a positive effect in the form of enhanced work-life balance.

Negative effects of asynchronicity on well-being are attributed primarily to increased information processing demands associated with communications piling up, email overload and interruptions (e.g., Barley et al., 2011; Lee, 2016; Russell, Woods, & Banks, 2017; ten Brummelhuis, Bakker, Hetland, & Keulemans, 2012)—all of which are knowledge characteristics. For example, incoming emails and phone calls disrupt employees' workflow and require extra energy to address when they are unanticipated, leading to greater exhaustion at the end of the workday (ten Brummelhuis et al.). Asynchronicity also increases feelings of role ambiguity and role conflict because receiving multiple messages simultaneously creates competing demands from different sources (Cho, Lee, & Kim, 2019). The only positive effect found for asynchronicity is that it facilitates boundary control because it allows employees to respond at their convenience, rather than immediately upon receiving a message (Chen & Casterella, 2019).

Technical complexity. Technical complexity is the least studied subdimension (4.3% of studies), and thus far has shown only negative effects on well-being. These include both hedonic outcomes, such as negative affect, strain, exhaustion, and decreased job satisfaction, as well as eudaimonic outcomes, such as a reduced sense of personal accomplishment, reduced work engagement, and work-family conflict.

Technical complexity negatively impacts well-being by affecting knowledge characteristics in the form of information processing demands and uncertainty and ambiguity. For instance, it creates work overload by making work more difficult (Suh & Lee, 2017), and Cho et al. (2020) found that technology-related hassles such as software glitches and internet connection problems delay employees' communications and work progress, causing them to

work extended hours. In Cho et al.'s (2019) study, technical complexity led to role ambiguity due to system feature overload which made it more difficult to interpret information. Research has also shown technical complexity has a negative impact on well-being because it reduces autonomy and social connectivity and support. For example, Dias et al. (in press) found that in the context of the COVID-19 pandemic, employees felt less control and autonomy in teleworking arrangements when they lacked the skills to effectively use virtual communication technologies. Ayoko et al. (2012) showed that problems using technology tools increase interpersonal conflict between members of virtual teams.

Flexible connectivity. The effect of flexible connectivity on well-being has received significant attention (35.7% of studies), primarily related to the use of mobile technologies like smartphones. The well-being outcomes for flexible connectivity differ from those related to the other technology dependence subdimensions in two ways. First, in addition to hedonic outcomes, flexible connectivity influences a broad range of eudaimonic outcomes, such as experiences of recovery (e.g., detachment, relaxation), work-life balance, and work-nonwork conflict. Second, although still skewed toward negative effects, it also has some positive effects, resulting in some opposing influences on the same well-being outcomes (e.g., job satisfaction and stress).

Unsurprisingly, flexible connectivity influences well-being mainly through its effects on the work-nonwork boundary. On the positive side, the ability to work from any location at any time helps employees coordinate work and family responsibilities (e.g., Adisa et al., 2017; Choroszewicz & Kay, 2019; Derks et al., 2016). A few studies also highlight benefits for social connectivity and support, such as being able to connect with coworkers more easily for timely and efficient communications (Ragsdale & Hoover, 2016; ter Hoeven et al., 2016). The positive effects are also attributed to autonomy over how, when, and where work interactions take place (e.g., Fujimoto, Ferdous, Sekiguchi, & Sugianto, 2016; ter Hoeven et al., 2016); however, this

sense of autonomy might be short term, because working "anytime, anywhere" may lead to people working "all the time, everywhere" (Mazmanian, Orlikowski, & Yates, 2013).

The negative effects of flexible connectivity occur through reduced boundary control, as dealing with work requests during nonwork time may interfere with nonwork activities (Derks & Bakker, 2014; Ferguson, Carlson, Boswell, Whitten, Butts, & Kacmar, 2016; Tams, Grover, Thatcher, & Ahuja, in press). Negative effects are also due to information processing demands, as working "all the time, everywhere" extends employees' work hours, making detachment from work more difficult (e.g., Choroszewicz & Kay, 2019; Derks et al., 2016; Turel et al., 2011).

Effects of Dispersion Subdimensions on Well-Being

Spatial distance. Approximately one-quarter (25.2%) of the studies we reviewed examined the effects of spatial distance on both hedonic and eudaimonic well-being. While mixed, these effects are more negative than positive and, as with flexible connectivity, often include opposing effects for the same outcomes (e.g., job satisfaction, psychological strain, and work engagement). Spatial distance is the subdimension with the most evidence for eudaimonic functioning in the form of loneliness (Gao & Sai, 2020; Mann & Holdsworth, 2003) and social and professional isolation (Hislop, Axtell, Collins, Daniels, Glover, & Niven, 2015). This is not unexpected, given the subdimension's focus on physical separation from colleagues.

Spatial distance primarily influences well-being through reduced social connectivity and support. For example, Golden (2006b) showed that teleworkers who work away from the office most of the week have lower levels of leader-member and team-member exchange, and Orhan et al. (2016) found that less face-to-face interaction reduces social interactions and social support among distributed team members. Other negative effects of spatial distance are attributed to uncertainty and ambiguity in work—for example, distributed team members' lack of visibility into teammates' local conditions (procedures, norms, etc.) make it difficult to reach a shared

understanding of team goals and members' roles (Nurmi, 2011). Finally, negative effects of spatial distance also occur through work context characteristics—specifically, the physical demands of traveling (Nurmi, 2011)—which also reduces the ability to manage nonwork responsibilities (Nurmi & Hinds, 2020).

Spatial distance has positive effects on well-being through task, knowledge, and social characteristics. From a task perspective, employees experience greater autonomy over when and how they complete their work tasks, because distant supervisors have less opportunity to micro-manage (e.g., Hornung & Glaser, 2009; Sardeshmukh et al., 2012). Knowledge characteristics also are enhanced among teleworkers who face fewer distractions and interruptions when separated from coworkers (e.g., Anderson, Kaplan, & Vega, 2015; Fonner & Roloff, 2010; Maruyama & Tietze, 2012), and among team members who experience more learning opportunities because they work with geographically dispersed teammates (Nurmi & Hinds, 2016). Socially, spatial distance decreases negative politics and toxic work relationships (e.g., Collins et al., 2016; Fonner & Roloff; Windeler, Chudoba, & Sundrup, 2017).

Temporal distance. Research related to the impact of temporal distance on well-being is limited (5.2% of studies) and shows exclusively negative effects. These include lack of hedonic well-being (strain and reduced satisfaction at work) and eudaimonic well-being in the form of conflict between work and home domains.

Temporal distance has been studied primarily in the context of globally distributed teams with members located in different time zones. Reduced boundary control is an important work characteristic that explains the effects of temporal distance because team members often work after hours during family time to accommodate teammates' work schedules (Sarker, Ahuja, & Sarker, 2018; Sarker, S., & Jana, 2010). This increased workload creates more information processing demands (Nurmi, 2011; Nurmi & Hinds, 2020). Finally, temporal distance reduces

social connectivity and support, as there are fewer opportunities for informal and spontaneous communications that foster strong interpersonal relationships (Ruppel et al., 2013).

Out-of-office location. Nearly all studies that examined out-of-office location focused on employees who work from home, although one study examined mobile workers who travel between different locations for work (Ladkin et al., 2016). This subdimension has received significant attention in the literature (35.7% of studies we reviewed), with balanced positive and negative effects on both hedonic and eudaimonic well-being outcomes. This contrasts with the greater emphasis on negative effects of other subdimensions. It is also the only subdimension to impact outcomes related to nonwork experiences such as leisure satisfaction, life satisfaction, and quality of life. Reflecting the primary focus on the home context, the dual eudaimonic well-being effects emphasize work-life balance but also conflict between work and nonwork; and work engagement but also more difficulty detaching from work.

The mixed effects of working from home on well-being occur primarily through work context characteristics—in particular, boundary control. On the positive side, employees have more boundary control because it is easier to structure work around family needs and to transition between the work and home domains (e.g., Delanoeije, & Verbruggen, 2020; Hilbrecht, Shaw, Johnson, & Andrey, 2008; Mann & Holdsworth, 2003). For example, teleworkers describe benefits such as the ability to attend their children's activities and manage caregiving responsibilities. Working from home also reduces physical demands by eliminating commutes (Baruch, 2000; Mann & Holdsworth). On the negative side, employees experience less boundary control because a permeable work-nonwork boundary increases spillover of demands from one domain into the other (e.g., Delanoeije, Verbruggen, & Germeys, 2019; Eddleston & Mulki, 2017; Gashi, Kutllovci, & Zhushi, 2021). Mobile workers who work out-of-office but not at home also experience less boundary control when moving between work

locations that require a lot of travel, thus increasing time away from home (Ladkin et al., 2016).

Work autonomy also explains the positive effects of out-of-office location on well-being because working from home allows employees freedom to decide when and where they work (Anderson et al., 2015; Delanoeije, & Verbruggen, 2020; Wheatley, 2012). However, this subdimension may have negative effects by causing employees to work extended hours, which increases information processing demands (Peters & van der Lippe, 2007).

Summary: Virtual Work Subdimensions' Differential Pathways to Well-Being

Our literature review shows that the subdimensions have received varying degrees of research attention. Flexible connectivity, spatial distance, and out-of-office location have been studied more extensively, whereas technical complexity, communication leanness, and temporal distance have received very little attention. Thus, our findings based on existing research may not account for all potential effects of virtual work on well-being. Nevertheless, our analysis reveals important insights that point to future research needs. These insights are based on the trends revealed in Table 3, which we discuss in the next section. Table 3 summarizes the positive and negative effects on hedonic and eudaimonic well-being outcomes for each subdimension and the work characteristics that mediate these effects. The subdimensions and work characteristics that have received most attention in existing research are marked with an asterisk. This summary highlights that the subdimensions vary in their degree of positive versus negative impact on hedonic and eudaimonic well-being. In addition, different subdimensions that influence the same type of well-being outcome in the same way (i.e., in the same cell in Table 3) often do so through different work characteristics. For example, asynchronicity negatively influences hedonic well-being through knowledge characteristics (information processing demands), whereas out-of-the office location negatively influences hedonic well-being through work context characteristics (usually by reducing boundary control). These findings suggest that employees' well-being

experiences in virtual work depend on the subdimensions involved.

Insert Table 3 about here

VIRTUAL WORK'S DUAL EFFECTS ON WELL-BEING: KEY TRENDS

Although the subdimensions vary in their impact on well-being, when viewed *across subdimensions,* the summary in Table 3 reveals important trends for understanding virtual work's dual effects. These trends relate to the subdimensions' relative influence on hedonic versus eudaimonic well-being as well as positive versus negative effects.

Trends Related to Effects on Hedonic vs. Eudaimonic Well-Being

All the subdimensions influence hedonic and eudaimonic well-being to varying degrees, except communication leanness, which only impacts hedonic outcomes. Common hedonic outcomes across subdimensions include exhaustion, positive/negative affect, and satisfaction with different targets. Eudaimonic outcomes mostly relate to the work-nonwork boundary (e.g., work-family balance and work-nonwork conflict), but there are also effects on work engagement and social/professional isolation. Although the subdimensions affect well-being through different combinations of work characteristics, our synthesis reveals a dominant set of mediating work characteristics in each category of task, knowledge, social, and work context (see Figure 1 and Table 2). It is worth noting that the work context characteristic of boundary control is the most common mediator of effects on eudaimonic well-being, which highlights the importance of expanding work design theorizing to include outcomes related to the work-nonwork boundary.

Trends Related to Positive vs. Negative Effects on Well-Being

Flexible connectivity, spatial distance, and out-of-office location are associated with the most positive effects on well-being, but also with negative effects. Thus, the oft-touted benefits

of virtual work for freeing employees from the restrictions of working collocated with others in a main office during standard work hours may come at a cost—namely, social and professional isolation, poorer quality relationships, reduced boundary control, and work intensification. Indeed, we found more negative than positive effects on well-being for most subdimensions in the current review. Another important trend highlighted in Table 3 is the potential for the same subdimension to have mixed effects on well-being, including opposing effects through the same work characteristic. For example, flexible connectivity and out-of-office location have both positive and negative effects on well-being by enabling but also undermining employees' control of their work-nonwork boundary. This suggests that managing well-being effectively in virtual work depends on enhancing a subdimension's benefits while mitigating its downsides, which points to the critical role of the contingencies in our integrative framework.

Contingencies of Virtual Work's Effects on Well-Being Through Work Characteristics

As shown in Figure 1 and Table 4, our analysis highlights contingencies at different levels (individual, team, organization, and external context) that strengthen the effects of virtual work subdimensions on work characteristics in each category (task, knowledge, social, work context), thus moderating the subdimensions' indirect effects on well-being. Here, we discuss examples of common types of contingencies that have been found to moderate their effects on well-being through work characteristics in each category. We refer the reader to Table 4 for a complete list.

Insert Table 4 about here

Task characteristics. The task characteristics that mediate virtual work's influence on well-being are different forms of work autonomy regarding when, where, and how work occurs.

Employees are more likely to experience autonomy in virtual work under conditions that allow them to take advantage of the freedom virtual work can provide—for example, in a supportive team (i.e., supervisor and coworkers; Gerdenitsch, Kubicek, & Korunka, 2015; Golden & Veiga, 2008; Hill et al., 2014) and when national cultural norms support work-nonwork integration (Fujimoto et al., 2016)

Knowledge characteristics. Most contingencies for the mediated effects through knowledge characteristics strengthen virtual work's negative effects on information processing demands and involve individual attributes and contextual factors that influence how individuals manage the features of virtual work that potentially create these demands. For example, individuals with poor self-management skills may be less effective at handling accumulated emails in asynchronous work (Soucek & Moser, 2010) and dealing with the challenges of coordinating work with team members in different time zones (Nurmi, 2011). In addition, Type A personalities and workaholics are more prone to staying constantly connected to work in arrangements that offer flexible connectivity (Mazmanian et al., 2013). This constant connectivity is also more likely for individuals in jobs with a greater workload (Duxbury & Higgins, 2014), and whose team, organization, and/or clients have high expectations for constant connectivity (Choroszewicz & Kay, 2019; Lee, 2016; Mazmanian et al., 2013).

Social characteristics. We found contingencies for both positive and negative mediated effects through social connectivity and support. Positive effects are more likely to occur under conditions that foster stronger connections with co-workers. These include employees' positive attitudes toward using technology that allow them to take advantage of flexible connectivity to work with colleagues (Ragsdale & Hoover, 2016); motivation to collaborate with others that helps to overcome challenges of lean communication (Stark & Bierly, 2009); and frequent coworker interactions that help to bridge spatial distance (Windeler et al., 2017).

On the other hand, several different types of contingencies exacerbate negative effects through social characteristics. First, conditions that intensify employees' sense of isolation—e.g., being introverted or living alone (Charalampous, Grant, & Tramontano, 2021; Gao & Sai, 2020; Wiesenfeld, Raghuram & Garud, 2001)—strengthen the negative effects of physical separation from colleagues. Second, factors that increase the need to interact with co-workers heighten the perceived constraints associated with spatial distance or use of technology to communicate. An example at the individual level is having a job with fewer standardized and discrete tasks that are under an employee's sole control (Golden & Veiga, 2005; Neirotti, Raguseo, & Gastaldi, 2019); and an important team-level factor is work involving tasks that require close coordination with others (Golden & Veiga, 2005; Orhan et al., 2016). Finally, inadequate support from team members (Stark & Bierly, 2009), managers (Maruyama & Tietze, 2012; Shockley, Allen, Dodd, & Waiwood, 2021) and the organization (e.g., Bentley et al., 2016) strengthens the negative effects of virtual work on employees' perceptions of social connectivity and support.

Work context characteristics. Contingencies of virtual work's positive and negative mediated effects through work context characteristics primarily relate to effects through boundary control. Employees are more likely to experience positive effects under conditions that make it easier to manage the increased permeability of their work/nonwork boundary when flexibly connected to work or working from an out-of-office location. At the individual level, this includes use of boundary management strategies such as segmentation tactics involving switching off devices (e.g., Choroszewicz & Kay, 2019; Duxbury & Higgins, 2014; Sayah, 2013) and having authority that is embedded in one's job to exercise discretion over one's work (Golden et al., 2006). Other facilitators of boundary control in virtual work include leadership (Lautsch, Kossek, & Eaton, 2009), organizational norms (Chen & Casterella, 2019), and a national culture (Choroszewicz & Kay) that supports work-family balance. Finally, individual

factors that heighten the perceived need for boundary control—e.g., family responsibilities (Maruyama & Tietze, 2012)—also strengthen positive effects through this work characteristic.

Conversely, the negative mediated effects through reduced boundary control are stronger under conditions that make it more difficult to manage spillovers between work and nonwork domains. This includes those who would prefer to segment work and nonwork but struggle to do so (Duxbury & Higgins, 2014), poor time management skills (Fenner & Renn, 2010), excessive job demands (Charalampous et al., 2021), and family responsibilities (e.g., Golden et al., 2006; Mann & Holdsworth, 2003). Other contingencies of negative effects relate to poor support from supervisors, coworkers (Derks, van Duin, Tims, Bakker, 2015; Gerdenitsch et al., 2015) and organizations (Charalampous et al.; Duxbury & Higgins).

FUTURE RESEARCH AGENDA

Based on the trends uncovered in our review, we identify five areas for future research, including more focus on: (a) underlying subdimensions of virtual work; (b) nonlinear effects of the virtual work subdimensions; (c) gaining a balanced understanding of virtual work's positive and negative effects on well-being; (d) expanding the range of mediators and moderators; and (e) examining effects over time. Table 5 summarizes these focus areas, including observations about existing research that support each area as well as related examples of research questions and recommendations for future research.

Insert Table 5 about here

Underlying Subdimensions of Virtual Work

A pressing future research need based on our framework is to shift attention away from hypothesizing and testing effects of different virtual work arrangements or technologies on well-

being to focusing on their underlying subdimension(s). This should facilitate integration of research findings from different virtual work domains and across different types of communication technologies and arrangements. We see two major areas of opportunity. First, in several studies, researchers hypothesized or tested the effects of overall use of technology-mediated vs. face-to-face communication rather than isolating the effect of a specific characteristic of the technology (e.g., communication leanness and asynchronicity). Second, telecommuting scholars typically examine effects of the extent of telecommuting rather than effects related to relevant subdimensions (e.g., working in a specific out-of-office location, spatial distance from coworkers, and properties of technologies used when working from home).

An example of where it might be helpful to focus on underlying subdimensions is Hill, Ferris, & Martinson's (2003) unexpected finding that mobile workers who work from different locations experience less work-life balance than those who work in an office or at home. They proposed two potential reasons for these findings: (a) mobile workers lack cues in their external context to remind them when they are at work or home, and (b) they have access to technology that allows them to connect to work from any location. These explanations respectively align with the effects of working from an out-of-office location other than the home and the effects of flexible connectivity. In future work, researchers might use the measures we have proposed to conduct empirical studies that test which subdimensions are driving these effects.

Nonlinear Effects of Virtual Work Subdimensions

Isolating relevant subdimensions also facilitates examining their more nuanced effects on well-being, such as nonlinear effects and interactions between the subdimensions. These types of effects are mostly lacking in our review, potentially because researchers did not measure virtuality as a continuum in 66% of the studies we reviewed, despite it being conceptualized as such in the literature. Instead, most researchers took a dichotomous approach, comparing face-to-

face work settings with partially or highly virtual settings. For example, in telecommuting studies, most researchers compared employees who worked full time in the office with those who worked one or more days at home. Other researchers used samples consisting solely of employees in highly virtual settings (e.g., a sample of globally distributed teams). Researchers who have examined virtuality as a continuum explicitly or implicitly studied linear effects, except for a few scholars who hypothesized curvilinear effects of the extent of telecommuting (e.g., Golden, 2006b; Virick, DaSilva, & Arrington, 2010). A continuous measure of virtuality is particularly relevant to hybrid work, which is a growing trend (Kropp & McRae, 2022).

A greater focus on curvilinear effects would be helpful for understanding the well-being tradeoffs in virtual work. For example, Golden (2006b) found a curvilinear (inverted U-shape) relationship between spatial distance and job satisfaction. They argued that this is because it is more difficult for managers to monitor employees' work, resulting in increased work method autonomy, which promotes job satisfaction; however, at higher levels of spatial distance, this effect may be offset by having less social interaction with coworkers, which decreases satisfaction. In future research, scholars might explore other curvilinear effects resulting from opposing effects of a virtual work subdimension on the same well-being outcome.

More studies of interactive effects between virtual work subdimensions are also needed, as employees likely to experience more than one subdimension simultaneously. For example, given the use of technology to bridge spatial and temporal distance and to facilitate work from different out-of-office locations, a promising direction is to explore the interactive effects of technology dependence and dispersion subdimensions. We identified a few interactive effects in our review (see Table 4) that are consistent with this direction. For example, in a study of dispersed teams, Ruppel et al. (2013) found that temporally dispersed team members experience less work-family balance when they use more synchronous communication, because real-time

interactions with coworkers require that they work outside their normal hours. On the other hand, synchronous communication may be more effective for relationship-building and social support across spatial and temporal distance. We encourage researchers to consider interactions involving both offsetting and mutually enhancing effects between different subdimensions.

Balanced Understanding of Positive and Negative Effects on Well-Being

We found more negative than positive effects on well-being, with out-of-office location as the only subdimension with balanced positive and negative effects. Thus, a fruitful avenue for future research is to explore more positive effects of subdimensions that have previously explained solely or primarily negative effects. For example, a potential positive effect of technical complexity missing in our review is providing learning opportunities that foster growth and work engagement. Positive effects through learning opportunities were examined in only one study (related to spatial distance; Nurmi & Hinds, 2016).

A reason for the predominantly negative effects associated with the technology dependence subdimensions (except flexible connectivity) in existing research might be due to the focus on older, text-based communication technologies (e.g., email). Although generally viewed as a hindrance relative to face-to-face communication, these technologies are still widely used to communicate in a virtual work. Yet, Treem and Leonardi (2012) proposed that newer technologies such as social media offer unique affordances (or "possibilities for action") that can transform organizational communication. This is consistent with our finding that flexible connectivity, which mostly involves newer mobile technologies such as smartphones, yields many positive as well as negative effects. Furthermore, research on newer meeting technologies like Zoom and Teams could also shed light on the positive and negative effects of virtual work on well-being if their use forms a significant part of the work arrangement (e.g., jobs that involve a lot of meetings). Emerging research in this area suggests that using such technologies increases

mental fatigue but this can be reduced—e.g., by turning off the camera and/or microphone (e.g., Bennet et al, 2021; Shockley, Gabriel et al, 2021). Extensive use of such media could therefore affect work characteristics such as information processing demands. In future research, scholars might examine well-being associated with using newer technologies such as social media, virtual reality, and video meeting technologies where these technologies form a significant part of a person's job. To uncover these effects, researchers may need to expand the subdimensions in our framework to include others that have not yet been examined. For example, social media provides greater accessibility to join social networks (McFarland & Ployhart, 2015), which may influence well-being through aspects of social connectivity and support.

Expanded Range of Mediators and Moderators

Our review highlights a dominant set of work characteristics that explain the subdimensions' effects on well-being as well as multilevel contingencies of these effects. We encourage researchers to explore additional mediators and moderators that illuminate different pathways through which virtual work influences well-being. This may involve other mediating work characteristics in the IWDF that we did not find in our review. For example, several characteristics in the work context category of the IWDF may be relevant to understanding how out-of-office locations other than the home context influence well-being, an area of research mostly lacking in our review. These include physical ergonomics (i.e., how people's bodies interrelate with everyday work implements such as desks, chairs, and keyboards) and environmental conditions (e.g., air quality, noise, privacy), both of which have been associated with job satisfaction, physiological arousal, and work stress (e.g., Colenberge, Jylhä, & Arkesteijn. 2021). In addition, employees working from out-of-office locations may lack access to necessary equipment, resulting in work delays that cause frustration and exhaustion. This relates to the work context characteristic of "equipment use," which Morgeson et al. (2012: 538)

described as a "largely unrecognized contextual characteristic." We also see interesting opportunities to identify knowledge characteristics that mediate *positive* effects of virtual work on well-being rather than the mostly *negative* effects associated with this work characteristic category in our review. For example, the knowledge characteristic of enhanced problem solving in the IWDF may help explain how asynchronicity can support well-being by enabling employees to take time to process and reflect on information they receive.

Future work could also broaden the scope of contingencies examined, including additional organizational and external context moderators, since the contingencies in our review are primarily at the individual and team levels. The dominant types of contingencies that emerged at these lower levels may be a useful starting point to identify additional organizational-level moderators. For example, we found team-level contingencies that help provide employees with the latitude to take advantage of the potential autonomy that virtual work provides. At the organizational level, this points to the importance of organizations promoting an empowering leadership climate, perhaps through the training and rewards provided to managers. Our review also highlights individual traits and skills (e.g., self-management, technical expertise) that help employees cope with the demands of virtual work. Thus, organizational selection and training practices that help prepare employees for working virtually might also play a contingent role.

Regarding the external context, more research is needed to understand how the effects of virtual work on well-being vary across different industries, professions, and countries. For example, in a study of teleworkers in a large organization, Maruyama and Tietze (2012) found that sales and marketing professionals who are spatially distant from work colleagues missed the visibility and professional interactions associated with co-location. These researchers speculated that professional employees (particularly those in customer facing roles) place more value on in-person interactions with coworkers that facilitate professional development and networking.

Although these findings are based on data from a single organization, they point to profession and industry as potentially relevant contingencies. The few external context contingencies uncovered in our review focus on the importance of expectations from external sources—i.e., client expectations (Mazmanian et al., 2013; Park et al., 2020) and a country's cultural norms (Choroszewicz, & Kay, 2019; Fujimoto et al., 2016). Thus, other relevant external context contingencies may be type of industry (related to the type of clients), different types of national cultures, and other country characteristics. Although researchers have studied the well-being effects of virtual work in 22 different countries (see Appendix), more studies are needed that compares effects *across* countries.

Effects Over Time

Consistent with well-being research more generally, the studies we reviewed did not examine effects on well-being beyond a few weeks and mainly used cross-sectional study designs. Studying longer-term effects could provide important insights for understanding how well-being in virtual work changes over time. As organizations increasingly implement hybrid arrangements where individuals alternate between in-person and virtual work, it would be useful to understand which patterns of hybrid work are most beneficial by studying how effects on well-being fluctuate based on daily/weekly changes in virtual work arrangements. For example, is it better to work a week in the office followed by a week at home or to be in the office a few days each week? In addition, study designs are needed to understand how well-being effects develop and accumulate over time. For example, virtual work's effects on social and professional isolation may grow gradually over time, only manifesting after a few months, whereas effects on work-family conflict may emerge more quickly.

Examining the influence of virtual work subdimensions on well-being over time would also facilitate comparisons of their between- versus within-person effects—something mostly

missing in our review. In one example of such a study, researchers examined both between- and within-person effects (Delanoeije & Verbruggen, 2020) associated with a pilot program that allowed employees to work from home up to two days per week. They collected data at the start and end of the pilot to understand between-person changes in well-being outcomes over time as well as data on 13 consecutive workdays after the start of the pilot to test within-person effects. Both types of effects were positive for pilot participants but involved different types of well-being outcomes. Thus, future research might also explore whether between- and within-person effects on well-being can be in opposite directions for the same virtual work subdimension. For example, spatial distance may have positive effects on feelings of accomplishment on days employees work from home because it allows them to work uninterrupted; however, between-person effects for this same outcome may be negative because physical separation from co-workers makes it more difficult to see how their work impacts others.

PRACTICAL IMPLICATIONS

We offer three important strategies for organizations and leaders to apply our integrative framework to improve their employees' well-being in virtual work. First, they can use it to understand how different virtual work arrangements may affect well-being by considering the underlying technology dependence and/or dispersion subdimensions involved. For example, the well-being of an employee who telecommutes while simultaneously collaborating on virtual teams that cross time zones may be impacted by working from a home location as well as working with colleagues across spatial and temporal distance.

Second, the contingencies in our framework serve as a guide to help maximize employees' well-being in virtual work. For example, organizations might address individual-level contingencies by selecting and/or training employees to ensure they have the necessary experience, skills, attitudes, and personal resources (e.g., self-efficacy) for working virtually.

Another effective strategy is to help employees take advantage of virtual work's autonomy-enhancing potential by empowering them to make decisions about their work and providing access to appropriate technologies. Examples of effective actions at the team level include clearly defining work roles and objectives to reduce uncertainty and ambiguity; structuring the team's work and fostering effective communications to reduce information processing demands; and encouraging frequent communications to help reduce remote employees' feelings of isolation. Organizational norms, such as not expecting employees to be available for work during nonwork hours, can also play an important role in countering negative effects of virtual work.

Finally, we encourage organizations to pay particular attention to challenges in managing the work-nonwork boundary that might result from flexible connectivity to work, temporal distance, and working from home. Although mitigating negative effects on boundary control may depend on factors outside their control (e.g., employees' home and family situations), organizations can help employees by implementing practices that support work-family balance.

CONCLUSION

Virtual work is becoming "an essential and increasingly common element of conducting business" (Makarius & Larson, 2017: 159)—even more so because of the COVID-19 pandemic. Thus, managers need to understand how to maximize their employees' psychological well-being in different virtual work arrangements. Toward this goal, we have applied a work design theoretical lens to develop an integrative framework based on a synthesis of 115 empirical studies. Our framework illuminates how subdimensions of technology dependence and dispersion differentially relate to hedonic and eudaimonic well-being outcomes through positive and negative effects on perceived task, knowledge, social, and work context characteristics, including multilevel contingencies of these effects. Our proposed agenda for future research promises to help promote higher levels of well-being in an expanding virtual workforce.

REFERENCES

*Indicates a publication included in the literature review

*Adisa, T. A., Gbadamosi, G., & Osabutey, E. L. C. 2017. What happened to the border? The role of mobile information technology devices on employees' work-life balance. *Personnel Review,* 46: 1651–1671.

Agovino, T. 2020.What will the workplace look like in 2025? *Society for Human Resource Management*. Retrieved from https://www.shrm.org/hr-today/news/all-things-work/pages/the-workplace-in-2025.aspx

*Anderson, A. J., Kaplan, S. A., & Vega, R. P. 2015. The impact of telework on emotional experience: When, and for whom, does telework improve daily affective well-being? *European Journal of Work and Organizational Psychology,* 24: 882–897.

*Ayoko, O. B., Konrad, A. M., & Boyle, M. V. 2012. Online work: Managing conflict and emotions for performance in virtual teams. *European Management Journal,* 30: 156–174.

*Barley, S., Meyerson, D., & Grodal, S. 2011. E-mail as a source and symbol of stress. *Organization Science,* 22: 887–906.

*Baruch, Y. 2000. Teleworking: Benefits and pitfalls as perceived by professionals and managers. *New Technology, Work and Employment,* 15: 34–49.

Bennett, A. A., Campion, E. D., Keeler, K. R., & Keener, S. K. .2021. Videoconference fatigue? Exploring changes in fatigue after videoconference meetings during COVID-19. *Journal of Applied Psychology,* 106: 330-344.

*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.

Bliese, P. D., Edwards, J. R., & Sonnentag, S. 2017. Stress and well-being at work: A century of empirical trends reflecting theoretical and societal influences. *Journal of Applied Psychology,* 102: 389–402.

*Braun, S., Hernandez Bark, A., Kirchner, A., Stegmann, S., & van Dick, R. 2019. Emails from the boss—curse or blessing? Relations between communication channels, leader evaluation, and employees' attitudes. *International Journal of Business Communication,* 56: 50-81.

Brown, A. R. Dennis, & V. Venkatesh. 2010. Predicting collaboration technology use: Integrating technology adoption and collaboration research. *Journal Information Systems*, 27: 9–54.

* Charalampous, M., Grant, C. A., & Tramontano, C. 2021. "It needs to be the right blend": A qualitative exploration of remote e-workers' experience and well-being at work. *Employee Relations: The International Journal*, 44: 335-355.

*Chen, A., & Casterella, G. I. 2019. After-hours work connectivity: Technological antecedents and implications. *IEEE Transactions on Professional Communication,* 62: 75–93.

* Cho, S., Kim, S., Chin, S. W., & Ahmad, U. 2020. Daily effects of continuous ICT demands on work–family conflict: Negative spillover and role conflict. *Stress and Health*, 36: 533-545.

*Cho, J., Lee, H. E., & Kim, H. 2019. Effects of communication-oriented overload in mobile instant messaging on role stressors, burnout, and turnover intention in the workplace. *International Journal of Communication,* 13: 1743-1763.

*Chong, S., Huang, Y., & Chang, C. H. D. 2020. Supporting interdependent telework employees: A moderated-mediation model linking daily COVID-19 task setbacks to next-day work withdrawal. *Journal of Applied Psychology*, 105: 1408-1422.

* Choroszewicz, M., & Kay, F. 2019. The use of mobile technologies for work-to-family boundary permeability: The case of Finnish and Canadian male lawyers. *Human relations,* 73: 1388-1414.

Colenberg, S., Jylhä, T., & Arkesteijn. M. 2021. The relationship between interior office space and employee health and well-being–a literature review, *Building Research & Information*, 49:3, 352-36

*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: 161–175.

Conole, G. & Dyke, M. 2004. What are the affordances of information and communication technologies? *Research in Learning Technology*, 12: 113-124.

Daft, R., & Lengel, R. 1986. Organizational information requirements, media richness, and structural design. *Management Science*, 32: 554-571.

Davis, F. D. 1989. Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13: 318–340.

*Delanoeije, J., Verbruggen, M., & Germeys, L. 2019. Boundary role transitions: A day-to-day approach to explain the effects of home-based telework on work-to-home conflict and home-to-work conflict. *Human Relations,* 72: 1843–1868.

*Delanoeije, J., & Verbruggen, M. 2020. Between-person and within-person effects of telework: A quasi-field experiment. *European Journal of Work and Organizational Psychology*, 29: 795-808.

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. 2001. The job demands-resources model of burnout. *Journal of Applied psychology*, 86: 499.

Dennis, A. R., Valacich, J. S., & Fuller, R. M. 2008. Media, tasks, and communication processes: A theory of media synchronicity. *MIS Quarterly*, 32: 575–600.

*Derks, D., & Bakker, A. B. 2014. Smartphone use, work-home interference, and burnout: A diary study on the role of recovery. *Applied Psychology-an International Review,* 63: 411–440.

*Derks, D., Bakker, A. B., Peters, P., & van Wingerden, P. 2016. Work-related smartphone use, work-family conflict and family role performance: The role of segmentation preference. *Human Relations,* 69: 1045–1068.

*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.

*Dias, P., Lopes, S., & Peixoto, R. in press. Mastering new technologies: Does it relate to teleworkers'(in) voluntariness and well-being? *Journal of Knowledge Management*. https://doi.org/10.1108/JKM-01-2021-0003

*Duxbury, L., Higgins, C., Smart, R., & Stevenson, M. 2014. Mobile technology and boundary permeability. *British Journal of Management,* 25: 570-588.

* Eddleston, K. A., & Mulki. 2017. Toward understanding remote workers' management of work-family boundaries: The complexity of workplace embeddedness. *Group & Organization Management,* 42: 346-387.

*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.

*Fonner, K. L., & Roloff, M. E. 2010. Why teleworkers are more satisfied with their jobs than are office-based workers: When less contact is beneficial. *Journal of Applied Communication Research,* 38: 336-361.

Fried, Y., & Ferris, G. R. 1987. The validity of the Job Characteristics Model: A review and meta-analysis. *Personnel Psychology,* 40: 287–322.

*Fujimoto, Y., Ferdous, A. S., Sekiguchi, T., & Sugianto, L. F. 2016. The effect of mobile technology usage on work engagement and emotional exhaustion in Japan. *Journal of Business Research,* 69: 3315–3323.

*Gao, G., & Sai, L. 2020. Towards a 'virtual' world: Social isolation and struggles during the COVID-19 pandemic as single women living alone. *Gender, Work and Organization,* 27: 754–762.

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: 1524-1541.

*Gashi, A., Kutllovci, E., & Zhushi, G. 2021. E-work evaluation through work–life balance, job effectiveness, organizational trust and flexibility: Evidence from Kosovo during COVID-19. *Employee Relations*, 44: 371-385.

*Gerdenitsch, C., Kubicek, B., & Korunka, C. 2015. Control in flexible working arrangements: When freedom becomes duty. *Journal of Personnel Psychology,* 14: 61–69.

Gilson, L. L., Maynard, M. T., Jones-Young, N. C., Vartiainen, M., & Hakonen, M. 2015. Virtual teams research: 10 years, 10 themes, and 10 opportunities. *Journal of Management,* 41: 1313–1337.

* Golden, T. D. 2006a. Avoiding depletion in virtual work: Telework and the intervening impact of work exhaustion on commitment and turnover intentions. *Journal of Vocational Behavior,* 69: 176-187.

*Golden, T. D. 2006b. The role of relationships in understanding telecommuter satisfaction. *Journal of Organizational Behavior,* 27: 319–340.

*Golden, T. D., & Veiga, J. F. 2005. The impact of extent of telecommuting on job satisfaction: Resolving inconsistent findings. *Journal of Management,* 31: 301–318.

* Golden, T. D., & Veiga, J. F. 2008. The impact of superior-subordinate relationships on the commitment, job satisfaction, and performance of virtual workers. *Leadership Quarterly,* 19: 77-88.

*Golden, T. D., Veiga, J. F., & Simsek, Z. 2006. Telecommuting's differential impact on work-family conflict: Is there no place like home? *Journal of Applied Psychology,* 91: 1340–1350.

Haag, M. 2020. Manhattan faces a reckoning if working from home becomes a norm. *The New York Times.* https://www.nytimes.com/2020/05/12/nyregion/coronavirus-work-from-home.html

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.

Hamilton, K. & Mohammed, S. 2008. The impact of extent of virtuality on team processes. Presented at the 23rd Annual Conference of the Society of Industrial and Organizational Psychology, San Francisco, CA.

Handke, L., Klonek, F. E., Parker, S. K., & Kauffeld, S. 2020. Interactive effects of team virtuality and work design on team functioning. *Small Group Research*, 51: 3-47.

* 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 and Organization,* 15: 454-476.

*Hill, E. J., Ferris, M., & Martinson, 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: 220–241.

*Hill, N. S., Kang, J. H., & Seo, M. G. 2014. The interactive effect of leader-member exchange and electronic communication on employee psychological empowerment and work outcomes. *Leadership Quarterly,* 25: 772–783.

*Hislop, D., Axtell, C., Collins, A., Daniels, K., Glover, J., & Niven, K. 2015. Variability in the use of mobile ICTs by homeworkers and its consequences for boundary management and social isolation. *Information and Organization,* 25: 222–232.

* Hornung, S., & Glaser, J. 2009. Home-based telecommuting and quality of life: Further evidence on an employee-oriented human resource practice. *Psychological Reports,* 104: 395-402.

Hughes, K. D., & Silver, W. A. 2020. Beyond time-binds: Rethinking work–family dynamics for a mobile world. *Human Relations*, 73: 924-952.

Humphrey, S. E., Nahrgang, J. D., & Morgeson, F. P. 2007. Integrating motivational, social, and contextual work design features: A meta-analytic summary and theoretical extension of the work design literature. *Journal of Applied Psychology*, 92: 1332–1356.

Huta, V. 2015 An overview of hedonic and eudaimonic well-being concepts. In L. Reinecke & M.B. Oliver (Eds.), *Handbook of media use and well-being: 14-33.* New York: Routledge/Taylor & Francis Group.

*Johnson, S. K., Bettenhausen, K., & Gibbons, E. 2009. Realities of working in virtual teams: Affective and attitudinal outcomes of using computer-mediated communication. *Small Group Research,* 40: 623–649.

Karasek Jr, R. A. 1979. Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly*, 24: 285-308.

Kirkman, B. L., & Mathieu, J. E. 2005. The dimensions and antecedents of team virtuality. *Journal of Management,* 31: 700–718.

Kirkman, B. L., Gibson, C. B., & Kim, K. 2012. Across borders and technologies: Advancements in virtual teams research. In S. W. J. Kozlowski (Ed.), *The Oxford handbook of organizational psychology,* Vol. 2: 789–858. Oxford University Press.

*Konradt, U., Hertel, G., & Schmook, R. 2003. Quality of management by objectives, task-related stressors, and non-task-related stressors as predictors of stress and job satisfaction among teleworkers. *European Journal of Work and Organizational Psychology,* 12: 61–79.

Korunka, C., Kubicek, B. & Paskvan, M., 2015. Changes in work intensification and intensified learning: challenge or hindrance demands? *Journal of Managerial Psychology*, 30: 786-800.

Kropp, B, & McRae, E. M. 2022. 11 Trends that will shape work in 2022 and beyond. *Society for Human Resource Management.* Retrieved from https://hbr.org/2022/01/11-trends-that-will-shape-work-in-2022-and-beyond

*Ladkin, A., Willis, C., Jain, J., Clayton, W., & Marouda, M. 2016. Business travellers' connections to home: ICTs supporting work-life balance. *New Technology Work and Employment,* 31: 255-270.

*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.

* Lautsch, B. A., Kossek, E. E., & Eaton, S. C. 2009. Supervisory approaches and paradoxes in managing telecommuting implementation. *Human Relations,* 62: 795-827.

*Lee, J. 2016. Does stress from cell phone use increase negative emotions at work? *Social Behavior and Personality,* 44: 705–715.

Levy, A. 2020. Working from home is here to stay, even when the economy reopens. *Forbes.* Retrieved from https://www.cnbc.com/2020/05/11/work-from-home-is-here-to-stay-after-coronavirus.html

Makarius, E., & Larson, B. 2017. Changing the perspective of virtual work: Building virtual intelligence at the individual level. *Academy of Management Perspectives,* 31: 159–178.

*Mann, S., & Holdsworth, L. 2003. The psychological impact of teleworking: Stress, emotions and health. *New Technology, Work and Employment,* 18: 196–211.

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

Maynard, M. T., Mathieu, J. E., Rapp, T. L., & Gilson, L. L. 2012. Something (s) old and something (s) new: Modeling drivers of global virtual team effectiveness. *Journal of Organizational Behavior*, 33: 342-365.

Maynard, M. T., Mathieu, J. E., Gilson, L. L., R. Sanchez, D., & Dean, M. D. 2019. Do I really know you and does it matter? Unpacking the relationship between familiarity and information elaboration in global virtual teams. *Group & Organization Management*, 44: 3–37.

*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.

McFarland, L. A., & Ployhart, R. E. 2015. Social media: A contextual framework to guide research and practice. *Journal of Applied Psychology*, 100: 1653-1677.

*Monzani, L., Ripoll, P., Peiro, J. M., & Van Dick, R. 2014. Loafing in the digital age: The role of computer mediated communication in the relation between perceived loafing and group affective outcomes. *Computers in Human Behavior,* 33: 279–285.

Morgeson, F. P., Garza, A. S., & Campion, M. A. 2012. Work design. In N. W. Schmitt, S. Highhouse, & I. B. Weiner (Eds.), *Handbook of psychology: Industrial and organizational psychology,* Vol. 12, 2nd ed.: 525-559. Somerset: Wiley.

*Neirotti, P., Raguseo, E., & Gastaldi, L. 2019. Designing flexible work practices for job satisfaction: The relation between job characteristics and work disaggregation in different types of work arrangements. *New Technology, Work & Employment,* 34: 116-138.

*Nurmi, N. 2011. Coping with coping strategies: How distributed teams and their members deal with the stress of distance, time zones and culture. *Stress and Health,* 27: 123–143.

* Nurmi, N., & Hinds, P. J. 2016. Job complexity and learning opportunities: A silver lining in the design of global virtual work. *Journal of International Business Studies*, 47: 631-654.

*Nurmi, N., & Hinds, P. J. 2020. Work design for global professionals: Connectivity demands, connectivity behaviors, and their effects on psychological and behavioral outcomes. *Organization Studies*, 41: 1697-1724.

O'Leary, M. B., & Cummings, J. N. 2007. The spatial, temporal, and configurational characteristics of geographic dispersion in teams. *Management Information Systems Quarterly,* 31: 433–452.

Oldham, G. R., & Hackman, R. J. 2010. Not what it was and not what it will be: The future of job design research. *Journal of Organizational Behavior,* 31: 463–479.

*Orhan, M. A., Rijsman, J. B., & van Dijk, G. M. 2016. Invisible, therefore isolated: Comparative effects of team virtuality with task virtuality on workplace isolation and work outcomes. *Journal of Work and Organizational Psychology,* 32: 109–122.

Parker, S. K. 2014. Beyond motivation: Job and work design for development, health, ambidexterity, and more. *Annual Review of Psychology,* 65: 661–691.

Parker, S. K., Morgeson, F. P., & Johns, G. 2017. One hundred years of work design research: Looking back and looking forward. *The Journal of Applied Psychology,* 102: 403–420.

Parker, S., Van den Broeck, A., & Holman, D. 2017. Work design influences: A synthesis of multi-level factors that affect the design of work. *Academy of Management Annals,* 11: 267-308.

Parker, S. K., Wall, T. D., & Cordery, J. L. 2001. Future work design research and practice: Towards an elaborated model of work design. *Journal of Occupational and Organizational Psychology,* 74: 413–440.

*Penarroja, V., Orengo, V., & Zornoza, A. 2017. Reducing perceived social loafing in virtual teams: The effect of team feedback with guided reflexivity. *Journal of Applied Social Psychology,* 47: 424–435.

* Perry, S. J., Rubino, C., & Hunter, E. M. 2018. Stress in remote work: Two studies testing the demand-control-person model. *European Journal of Work and Organizational Psychology,* 27: 577-593.

*Peters, P., & van der Lippe, T. 2007. The time-pressure reducing potential of telehomeworking: The Dutch case. *International Journal of Human Resource Management,* 18: 430–447.

*Piszczek, M. M. 2017. Boundary control and controlled boundaries: Organizational expectations for technology use at the work-family interface. *Journal of Organizational Behavior,* 38: 592–611.

Raghuram, S., Hill, N. S., Gibbs, J. L., & Maruping, L. M. 2019. Virtual work: Bridging research clusters. *Academy of Management Annals,* 13: 1–34.

*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.

Ragu-Nathan, T. S., Tarafdar, M., Ragu-Nathan, B. S., & Tu, Q. 2008. Consequences of technostress for end users in organizations: Conceptual development and empirical validation. *Information Systems Research*, 19: 417–433.

Robinson, B. 2022. Remote work is here to stay and will increase into 2023, experts say. *Forbes.* Retrieved from https://www.forbes.com/sites/bryanrobinson/2022/02/01/remote-work-is-here-to-stay-and-will-increase-into-2023-experts-say/?sh=24588a3e20a6

*Romeike, P. D., Nienaber, A. M., & Schewe, G. 2016. How differences in perceptions of own and team performance impact trust and job satisfaction in virtual teams. *Human Performance,* 29: 291–309.

Rue, C. 2020. Remote working: The new normal? *Forbes.* Retrieved from https://www.forbes.com/sites/forbestechcouncil/2020/05/20/remote-working-the-new-normal/#e4a22e73b12b

*Ruppel, C. P., Gong, B., & Tworoger, L. C. 2013. Using communication choices as a boundary-management strategy: How choices of communication media affect the work-life balance of teleworkers in a global virtual team. *Journal of Business and Technical Communication,* 27: 436–471.

*Russell, E., Woods, S. A., & Banks, A. P. 2017. Examining conscientiousness as a key resource in resisting email interruptions: Implications for volatile resources and goal achievement. *Journal of Occupational and Organizational Psychology,* 90: 407–435.

Russell, J. A. 1980. A circumplex model of affect. *Journal of Personality and Social Psychology,* 39: 1161–1178.

Ryan, R. M., & Deci, E. L. 2001. On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology,* 52: 141–166.

*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: 193–207.

* Sarker, S., Ahuja, M., & Sarker, S. 2018. Work–life conflict of globally distributed software development personnel: An empirical investigation using border theory. *Information Systems Research,* 29: 103-126.

*Sarker, S., Sarker, S., & Jana, D. 2010. The impact of the nature of globally distributed work arrangement on work-life conflict and valence: The Indian GSD professionals' perspective. *European Journal of Information Systems,* 19: 209–222.

*Sayah, S. 2013. Managing work-life boundaries with information and communication technologies: The case of independent contractors. *New Technology, Work, and Employment*, 28: 179–196.

Schweitzer, L., & Duxbury, L. 2010. Conceptualizing and measuring the virtuality of teams. *Information Systems Journal,* 20: 267–295.

*Shockley, K. M., Allen, T. D., Dodd, H., & Waiwood, A. M. 2021. Remote worker communication during COVID-19: The role of quantity, quality, and supervisor expectation-setting. *Journal of Applied Psychology*, 106: 1466-1482.

Shockley, K. M., Gabriel, A. S., Robertson, D., Rosen, C. C., Chawla, N., Ganster, M. L., & Ezerins, M. E. 2021. The fatiguing effects of camera use in virtual meetings: A within-person field experiment. *Journal of Applied Psychology*, 106: 1137-1155.

Sonnentag, S. 2015. Dynamics of well-being. *Annual Review of Organizational Psychology and Organizational Behavior,* 1: 145–172.

*Soucek, R., & Moser, K. 2010. Coping with information overload in email communication: Evaluation of a training intervention. *Computers in Human Behavior,* 26: 1458–1466.

Spivack, A. J., & Milosevic, I. 2018. Perceived location autonomy and work environment choice: The mediating influence of intrinsic motivation. *Journal of Applied Behavioral Science*, 54: 325-348.

* Stark, E. M., & Bierly, P. E. 2009. An analysis of predictors of team satisfaction in product development teams with differing levels of virtualness. *R & D Management,* 39: 461-472.

*Suh, A., & Lee, J. 2017. Understanding teleworkers' technostress and its influence on job satisfaction. *Internet Research*, 27: 140–159.

*Tams, S., Grover, V., Thatcher, J., & Ahuja, M. in press. Grappling with modern technology: Interruptions mediated by mobile devices impact older workers disproportionately, *Information Systems and e-Business Management*, https://doi.org/10.1007/s10257-021-00526-3

Tellegen, A., Watson, D., & Clark, L. A. 1999. On the dimensional and hierarchical structure of affect. *Psychological Science,* 10: 297–303.

*ten Brummelhuis, L. L., Bakker, A. B., Hetland, J., & Keulemans, L. 2012. Do new ways of working foster work engagement? *Psicothema,* 24: 113-120.

*ter Hoeven, C. L., & van Zoonen, W. in press. Helping others and feeling engaged in the context of workplace flexibility: The importance of communication control. *International Journal of Business Communication,* https://doi.org/10.1177/2329488419898799

*ter Hoeven, C. L., van Zoonen, W., & Fonner, K. L. 2016. The practical paradox of technology: The influence of communication technology use on employee burnout and engagement. *Communication Monographs,* 83: 239–263.

Thomas, K. J. 2014. Workplace technology and the creation of boundaries: The role of VHRD in a 24/7 work environment. *Advances in Developing Human Resources*, 16: 281-295.

Treem, J. W., & Leonardi, P. M. 2012. Social media use in organizations: Exploring the affordances of visibility, editability, persistence, and association. *Communication Yearbook*, 36: 143–189.

*Turel, O., Serenko, A., & Bontis, N. 2011. Family and work-related consequences of addiction to organizational pervasive technologies. *Information & Management,* 48: 88–95.

* Virick, M., DaSilva, N., & Arrington, K. 2010. Moderators of the curvilinear relation between extent of telecommuting and job and life satisfaction: The role of performance outcome orientation and worker type. *Human relations*, 63: 137-154.

Wang, B., Liu, Y., Qian, J., & Parker, S. K. 2021. Achieving effective remote working during the covid-19 pandemic: A work design perspective. *Applied Psychology*, 70: 16–59.

Wang, B., Liu, Y., & Parker, S. 2020. How does the use of information communication technology affect individuals? A work design perspective. *Academy of Management Annals,* 14: 695–725.

Waterman, A. S. 1993. Two conceptions of happiness: Contrasts of personal expressiveness (eudaimonia) and hedonic enjoyment. *Journal of personality and social psychology*, 64: 678-691.

Weick, K.E., 1995. *Sensemaking in Organizations*. Sage Publications, Thousand Oaks, CA.

* Wheatley, D. 2012. Good to be home? Time-use and satisfaction levels among home-based teleworkers. *New Technology Work and Employment,* 27: 224-241.

*Whitman, L. E., Malzahn, D. E., Chaparro, B. S., Russell, M., Langrall, R., & Mohler, B. A. 2005. A comparison of group processes, performance, and satisfaction in face-to-face versus computer-mediated engineering student design teams. *Journal of Engineering Education,* 94: 327–337.

*Windeler, J. B., Chudoba, K. M., & Sundrup, R. Z. 2017. Getting away from them all: Managing exhaustion from social interaction with telework. *Journal of Organizational Behavior,* 38: 977–995.

Wiesenfeld, B., Raghuram, S., & Garud, R. (2001). Organizational identification among virtual workers: The role of need for affiliation and perceived support. *Journal of Management,* 27, 213-229.

Zeidner, R. 2020. Coronavirus makes work from home the new normal. *Society for Human Resource Management*. Retrieved from https://www.shrm.org/hr-today/news/all-things-work/pages/remote-work-has-become-the-new-normal.aspx

Table 1

Positive and Negative Effects of Virtual Work Subdimensions on Well-Being Outcomes

Subdimension and Effect on Well-Being	Hedonic Well-Being Outcomes	Eudaimonic Well-Being Outcomes
Communication Leanness (9.6% of studies):		
Positive effect	+ team member satisfaction	
Negative effect	- negative affect - decreased: communication/job/task/team member satisfaction, positive affect	
Asynchronicity (11.3% of studies):		
Positive effect		+ work-life balance
Negative effect	- anger, anxiety, burnout, email stress/strain, emotional exhaustion, negative affect, stress - decreased communication satisfaction	- decreased: environmental mastery, meaning in life, sense of accomplishing meaningful tasks, mindfulness, social connectedness, personal accomplishment
Technical Complexity (4.3% of studies)		
Positive effect	+ No positive effects of technical complexity found in review	
Negative effect	- negative affect, strain, exhaustion - decreased job satisfaction	- decreased: personal accomplishment, work engagement, work-family conflict
Flexible Connectivity (35.7% of studies):		
Positive effect	+ job satisfaction, positive affect + decreased: emotional exhaustion, negative affect, stress	+ psychological detachment, work engagement, work-life balance + decreased: social isolation, work-nonwork conflict/high family role performance
Negative effect	- anger, frustration, burnout, depletion, emotional exhaustion, fatigue, negative affect, strain, stress - decreased job satisfaction	- negative work rumination, negative strain-based work-home spillover, work-nonwork conflict - decreased: work-life balance, work engagement, recovery/detachment/relaxation experience
Spatial Distance: (25.2% of studies):		
Positive effect	+ job satisfaction, positive affect + decreased: exhaustion, negative affect, psychological strain	+ work engagement
Negative effect	- burnout, emotional exhaustion, irritability, stress/strain, worry - decreased job satisfaction	- disengagement, loneliness, social and professional isolation, work-nonwork conflict/nonwork-work conflict - decreased work engagement
Temporal Distance (5.2% of studies):		
	+ No positive effects of temporal distance found in review	
Negative effect	- stress/strain - decreased: communication, job satisfaction	- work-nonwork conflict - decreased work-life balance
Out-of-office Location (35.7% of studies):		

Subdimension and Effect on Well-Being	Hedonic Well-Being Outcomes	Eudaimonic Well-Being Outcomes
Positive effect	+ enthusiasm, job satisfaction, leisure satisfaction (satisfaction with amount of leisure time), positive affect + decreased: exhaustion, negative affect, work-related stress	+ life satisfaction, quality/enjoyment of life, work engagement, work-life balance + decreased: work-nonwork conflict/nonwork-work conflict
Negative effect	- exhaustion, burnout, irritability, worry, strain/stress - decreased job satisfaction	- decreased: life satisfaction, work-nonwork conflict/nonwork-work conflict, work withdrawal, recovery experience (detachment and relaxation), psychological well-being, work-life balance

Note: Table 1 includes all the well-being outcomes examined in the studies in our review database. For a list of references that support each outcome, see the fuller version of Table 1 in the online supplement for this article.

+ Indicates studies where virtual work related positively to well-being

- Indicates studies where virtual work related negatively to well-being

Table 2

Work Characteristics that Mediate Positive and Negative Effects of Virtual Work Subdimensions on Well-Being

Subdimension and Effect on Well-being	Work Characteristics that Mediate the Subdimensions' Positive and Negative Effects on Well-Being: Task Characteristics	Knowledge Characteristics	Social Characteristics	Work Context Characteristics
Communication Leanness:				
Positive effect			+ Social connectivity & support - equal team member participation [1 study]	
Negative effect	- Reduced work autonomy & task significance - difficulty assessing scope of one's own authority and impact on others [1 study]	- Uncertainty & ambiguity - task & role ambiguity [2 studies]	- Reduced social connectivity & support - e.g., communication & relationship-building challenges, difficulty resolving conflicts, social loafing, low leadership support, low trust/cohesion [7 studies]	
Asynchronicity:				
Positive effect				+ Boundary control - arranging work and family responsibilities around each other [1 study]
Negative effect		- Information processing demands - email overload, communications piling up, interruptions [10 studies] - Uncertainty & ambiguity - role ambiguity & role conflict [1 study]	Reduced social connectivity & support - e.g., communication & relationship-building challenges [1 study]	
Technical Complexity:				
		+ No positive effects of technical complexity found in review		
Negative effect	- Reduced work autonomy - lack of control over teleworking arrangement [1 study]	- Information processing demands - work overload, extended hours [2 studies] - Uncertainty & ambiguity - role ambiguity [1 study]	- Reduced social connectivity & support - affective/ interpersonal conflict [1 study]	
Flexible Connectivity:				
Positive effect	+ Work autonomy - regarding location, scheduling, methods; location/time of work in the		+ Social connectivity & support - access to coworkers/support, effective and efficient communications [4 studies]	+ Boundary control - arranging work and family responsibilities around each other [11 studies]

Subdimension and Effect on Well-being	Work Characteristics that Mediate the Subdimensions' Positive and Negative Effects on Well-Being: Task Characteristics	Knowledge Characteristics	Social Characteristics	Work Context Characteristics
	short term; information & interactions [4 studies]			
Negative effect	- Reduced work autonomy - regarding location/time of work in the long term [1 study]	- Information processing demands - extended hours, work intensification, interruptions [16 studies]		- Reduced boundary control - spillover between work and nonwork [27 studies]
Spatial Distance:				
Positive effect	+ Work autonomy - regarding location, scheduling, methods [3 studies]	+ Reduced information processing demands - fewer distractions and interruptions [5 studies] + Learning opportunities [1 study]	+ Social connectivity & support - relief from politics and negative coworker relationships [3 studies]	
Negative effect		- Uncertainty & ambiguity - relating to task, role, goals, work outcomes, information needed for work, and other's work context [3 studies]	- Reduced social connectivity & support – e.g., fewer social & professional interactions, more difficulty helping others, less feedback & social support, communication & relationship-building challenges [16 studies]	- Physical demands - travel to meet with distant colleagues [2 studies] - Reduced boundary control - travel demands disrupting family responsibilities [2 studies]
Temporal Distance:	+ No positive effects of temporal distance found in review			
Negative effect		- Information processing demands - extended work hours, work overload [2 studies]	Reduced social connectivity & support - fewer informal/spontaneous communications [1 study]	- Reduced boundary control - after-hours work across time zones that disrupts nonwork responsibilities [4 studies]
Out-of-office Location:				
Positive effect	+ Work autonomy - regarding location and scheduling [9 studies]			+ Reduced physical demands - no commute/travel [2 studies] + Boundary control - arranging work and family responsibilities around each other, less transition time between work and home domains [22 studies]
Negative effect		- Information processing demands - overwork/extended hours [2 studies]		- Reduced boundary control - spillover between work and nonwork [13 studies]

Notes: The italicized numbers in square brackets after each work characteristic indicates the number of studies in our review that support that work characteristic. For examples of references that support each work characteristic, see fuller version of Table 2 in the online supplement for this article.

+ Indicates studies where virtual work related positively to well-being

- Indicates studies where virtual work related negatively to well-being

Table 3

Summary of Virtual Work Subdimensions with Positive and Negative Influences on Hedonic and Eudaimonic Well-Being and Work Characteristics that Mediate Their Effects

	Type of Well-Being Outcome	
Effects of Virtual Work Subdimensions on Well-Being	Hedonic Outcomes	Eudaimonic Outcomes
Positive	Communication leanness (social) Flexible connectivity (work context, task) Spatial distance* (knowledge, social, task) Out-of-office location* (work context*, task*)	Asynchronicity (context) Flexible connectivity* (work context*, task, social) Spatial distance (knowledge, task) Out-of-office location* (work context*, task)
Negative	Communication leanness* (social*, knowledge, task) Asynchronicity* (knowledge*, social Technical complexity (task, knowledge, social) Flexible connectivity* (work context*, knowledge*, task) Spatial distance* (social*, knowledge) Temporal distance (knowledge) Out-of-office location* (work context*)	Asynchronicity (knowledge) Technical complexity (knowledge, task) Flexible connectivity* (work context*, knowledge*) Spatial distance* (social*, knowledge, work context) Temporal distance (work context) Out-of-office location* (work context*, knowledge)

Notes: Each of the four quadrants in the table shows the virtual work subdimensions found to have positive/negative effects on hedonic/eudaimonic well-being and (in parentheses) the work characteristics that mediate their effects. Subdimensions and work characteristics marked with an asterisk are those supported by more than five studies in our review.

Table 4

Multilevel Contingencies That Strengthen Virtual Work's Positive and Negative Effects on Well-Being Through Different Categories of Mediating Work Characteristics

Subdimensions' Mediated Effect on Well-being that is Strengthened	Contingencies at Different Levels That Strengthen the Mediated Effect*Virtual Work Subdimension That Interacts With Each Contingency[a]	Mediating Work Characteristic Impacted by Contingency* Subdimension Interaction
Effects on well-being mediated through task characteristics:		
Positive effect	• Team: low supervisor and coworker control/expectations*FC • External context: national culture supporting work-nonwork integration*FC	Location/ scheduling/ methods autonomy
Negative effect	• Team: low leader-member exchange*CL, SD	Reduced work methods autonomy
Effects on well-being mediated through knowledge characteristics:		
Positive effect	• Individual off-the-job recovery*SD	Learning opportunities
Negative effect	• Individual - Characteristics: conscientiousness/poor self-control*AS; poor core self-evaluation*AS; type A personality/workaholic*FC; external locus of control*AS - Skills/Attitudes: poor skills in managing emails*AS; felt need to respond quickly to email *AS; lack of job experience and self-management skills*TD; poor attitudes toward technology*FC, TC; high affective commitment*FC - Job: high workload*FC • Team: constant connectivity expectations*FC • Organization: responsiveness/constant connectivity norms*AS, FC; low support for work-family balance*FC; poor/inefficient technology practices*FC • External: client responsiveness expectations*FC	Information processing demands
	• Team: unclear roles and goals*CL, SD; fewer face-to-face meetings/team communications*SD	Uncertainty & ambiguity
Effects on well-being mediated through social characteristics:		
Positive effect	• Individual - Characteristics: preference for teamwork*CL - Attitudes: positive attitudes toward technology*FC • Team: frequent interactions with coworkers*SD	Social connectivity & support
Negative effect	• Individual - Characteristics: introverted/antisocial*SD - Job: low control over technology use for work*SD; low degree of discretion embedded in the job itself*SD; self-employment status *SD; nonstandard work tasks *SD - Home situation: living alone, family duties*SD • Team: low team feedback/reflexivity*CL; poor team relationships*AS; difficult team task*TC; task interdependence*SD; low managerial support*SD • Organization: low organizational support*SD	Reduced social connectivity & support

Subdimensions' Mediated Effect on Well-being that is Strengthened	Contingencies at Different Levels That Strengthen the Mediated Effect*Virtual Work Subdimension That Interacts With Each Contingency[a]	Mediating Work Characteristic Impacted by Contingency* Subdimension Interaction
Effects on well-being mediated through work context characteristics:		
Positive effect	• Individual - Characteristics: integration boundary management preferences*FC; segmentation boundary management tactics*FC - Job: using technology in preferred way*FC, OL; discretion embedded in the job itself*OL - Home situation: family responsibilities*OL • Team: family supportive supervisor*OL • Organization: norms against expecting an immediate response*AS • External context: national cultural expectations for involvement with family-life*FC	Boundary control
Negative effect	• Individual - Characteristics: segmentation boundary management preferences*FC, OL; struggling segmenter*FC; low self-efficacy in telecommuting*OL - Skills/Attitudes: poor skills/practices for using technology*FC; low perceived usefulness of information and communication technologies*FC; poor time management*FC; perceived connectedness to organization*OL - Job: low job control*FC; low control over technology use *OL; excessive demands/deadlines*FC; lack of clear appraisal criteria*FC; external client responsiveness expectations*FC, OL; high travel for work*OL - Home situation: negative attitudes of family*FC; family responsibilities*TD, OL; collocation of family and workspace/no separate home office*OL • Team: use of synchronous technology*TD; supervisor and coworker constant connectivity expectations/control*FC; low interpersonal trust with supervisor/peers*OL • Organization: constant connectivity expectations*FC	Reduced boundary control
Negative effect	• Team: more face-to-face meetings that increase need for travel*SD	Physical demands

Notes: The following designate virtual work subdimensions that interact with the contingencies (i.e., subdimensions whose effect on the mediating work characteristics is moderated by the contingency): CL = communication leanness; AS = asynchronicity; TC = technical complexity; FC = flexible connectivity; SD = spatial distance; TD = temporal distance; OL = out-of-office location. For examples of references that support each interaction effect, see fuller version of Table 4 in the online supplement for this article.

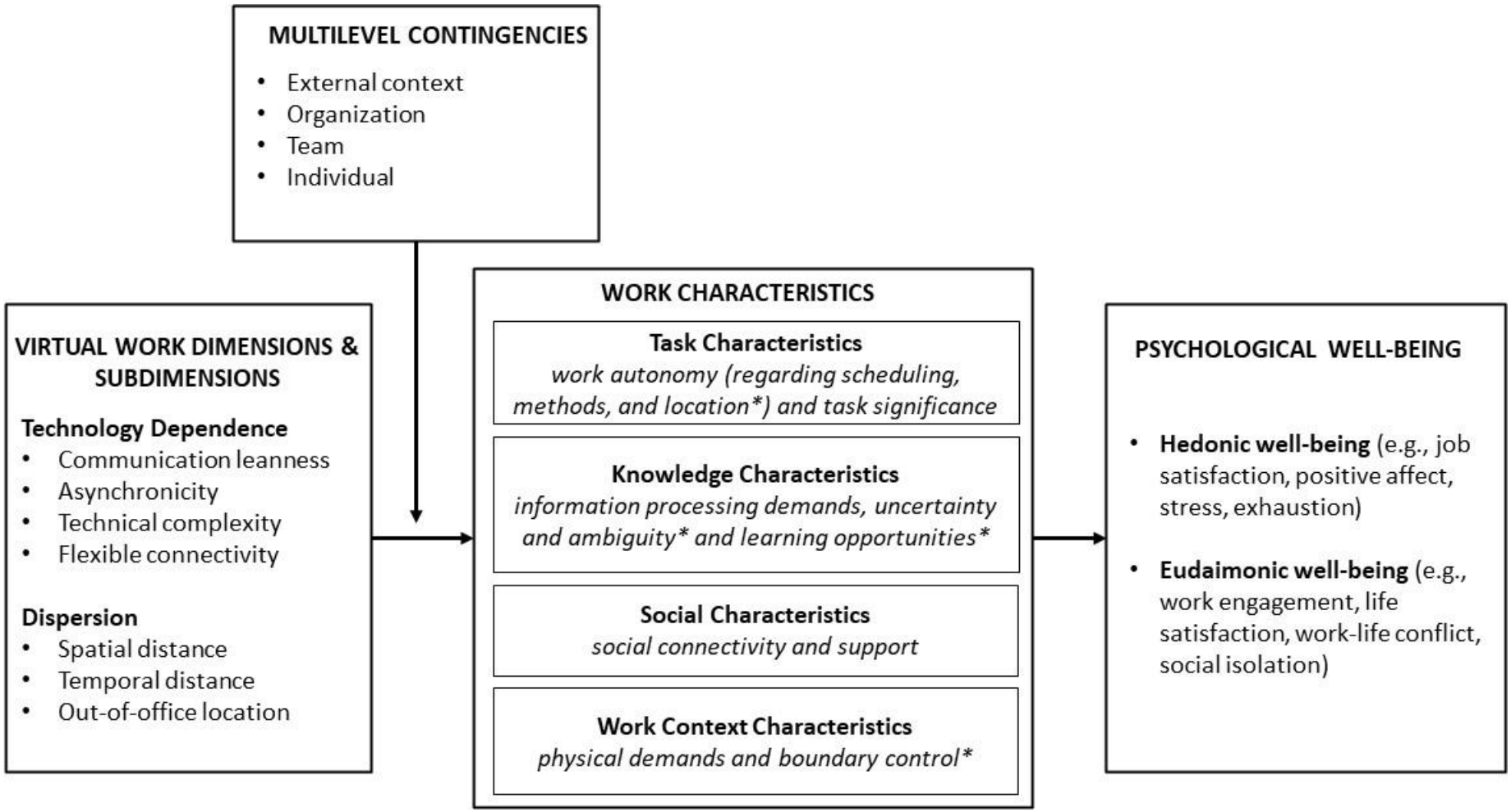
Table 5

Directions for Future Research on Well-Being in Virtual Work

Focus Area	Key Observations About Existing Research That Support Focus Area	Illustrative Research Questions/Recommendations for Future Research in the Focus Area
Underlying subdimensions of virtual work	Researchers often hypothesize and test effects reflecting a particular virtual work arrangement or overall use of technology rather than the underlying subdimension(s) relevant to the well-being outcome.	• Replace hypotheses related to the effects of overall use of technology vs. face-to-face communication with those related to properties of the communication technologies used—e.g., communication leanness, asynchronicity and technical complexity. • Replace hypotheses related to the extent of telecommuting with those related to the relevant subdimensions—e.g., working from a specific out-of-office location, spatial distance from coworkers, and different properties of communication technologies used when working from home. • Apply measures of flexible connectivity and out-of-office location proposed in our review.
Nonlinear effects of virtual work subdimensions	Virtual work was measured as a continuum in only 34% of studies, which precludes examination of more nuanced well-being effects—e.g., curvilinear and interactive effects.	• Are there curvilinear effects resulting from the opposing effects of different virtual work subdimensions on the same well-being outcomes? • How do technology dependence and dispersion subdimensions interact to create offsetting or mutually enhancing effects on well-being?
Balanced understanding of positive and negative effects on well-being	There is an imbalance toward examining the negative rather than positive effects of certain subdimensions and work characteristics.	• What positive well-being outcomes relate to subdimensions previously associated with mostly/solely negative effects in past research—i.e., communication leanness, asychronicity, technical complexity and temporal distance? What work characteristics mediate their effects? • How do different virtual work subdimensions aid well-being by enhancing underexplored work characteristics—e.g., learning opportunities (knowledge characteristic) and task significance (task characteristic)? • How can newer technologies (e.g., social media, virtual reality) enhance well-being in virtual work? What are the underlying subdimensions that explain these effects?
Expanded range of mediators and moderators	Existing research has focused on a narrow set of mediating work characteristics in each category of the IWDF. Contingencies in existing research are primarily at the individual and team-level, with very few at the organizational and external context level.	• How does virtual work influence well-being through work context characteristics related to equipment use, working conditions and ergonomics? • How does virtual work influence well-being through the problem-solving knowledge characteristic? • What organizational characteristics (e.g., leadership climate) and systems (e.g., selection and training) help to promote success in virtual work? • How does virtual work's impact on well-being vary by industry, profession, and country contexts?
Effects over time	Existing research is mainly cross-sectional and focused on shorter-term effects of virtual work on well-being.	• How do well-being outcomes vary based on daily/weekly changes in virtual work arrangements? • How do different well-being outcomes in virtual work develop over time (e.g., cumulative effects)? • Do virtual work subdimensions have different between- versus within-person effects on well-being?

Figure 1

Integrative Framework of Well-Being in Virtual Work



* Work characteristics that are not specified in Morgeson et al.'s (2012) Integrative Work Design Framework.

APPENDIX: METHODOLOGICAL APPROACHES USED TO STUDY THE EFFECTS OF VIRTUAL WORK ON WELL-BEING

Methodological Approach	Number of studies (Total = 115)
Study design:	
Quantitative	85
Qualitative	16
Mixed quantitative and qualitative	14
Quantitative study design (out of 99 studies; some studies using multiple approaches):	
Survey (single point in time)	68
Survey (lagged)	15
Longitudinal/diary/experience sampling	28
Experiment/quasi-experiment	5
Archival data	3
Data source:	
Single-source data	100
Multi-source data	15
Type of Sample:	
Student	5
Organizational	101
Crowdsourcing	9
Country in which sample is located:	
Single country (United States)	30
Single country (21 other countries)	54
Multinational	13
Not Specified	18
Timeframe:	
Short-term (daily/weekly)	24
Medium-term (up to 3 months)	7
Long-term (>3months)	10
Indeterminate	74