Virtual Work From Home and Mental Health:

A Mixed Methods Systematic Review

by

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Author's Declaration

I, Kara Polson hereby declare that I am the sole author of this thesis. This is a true copy of the final thesis, after any required revisions from my supervisor, committee and external examiner revisions. I understand that this thesis may be offered both as a hard copy and electronically to the public.

Abstract

Poor mental health is a risk factor for a number of chronic physical conditions and may impact individuals' ability to remain in the work force (World Health Organization, 2004b). Further, the workplace itself may pose a risk to mental health, affecting one's ability to contribute meaningfully in both personal and professional lives (Jnaneswar & Sulphey, 2020). A number of workplace factors have been identified as risk factors to mental health (Burton, 2010) and the literature suggests that some these factors may be augmented for employees who are working remotely from a virtual office, removed from their central organization (Marshall et al., 2007; Mulki & Jaramillo, 2011; Orhan et al., 2016; J. Stich, 2020). Working from a virtual office poses a number of challenges, including workplace isolation, increased job stress, decreased job satisfaction, and poor communication, to name a few (Mulki & Jaramillo, 2011; Stich, 2020). As the body of evidence on the implications of working from a virtual office has grown, so too has the need for synthesizing the best available evidence. This study is a comprehensive systematic review, examining the quantitative and qualitative literature on virtual offices and mental health. This review is particularly important due to the current Covid-19 pandemic, as millions of employees have transitioned to working virtually, from a home office. The overall goal of this study was to make available evidence more accessible, allowing researchers and other stakeholders to better understand the impact that a virtual office may have on employee mental health.

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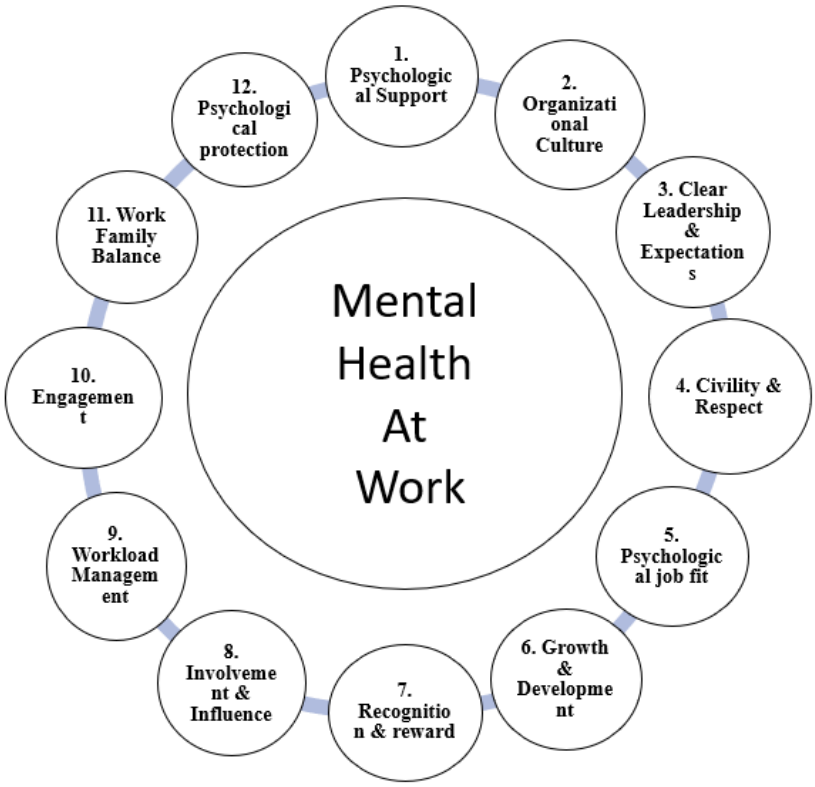
Chapter 1: Introduction & Rationale

Defining health as a state of complete, physical, mental and social well-being and not merely the absence of disease, the World Health Organization (WHO) states that "there is no health without mental health" (World Health Organization, 2004b). Mental health is defined by the WHO as a state of well-being in which every individual realizes her or his own potential, can cope with the normal stresses of life, can work productively and fruitfully and is able to contribute to her or his community (World Health Organization, 2004b). Mental health is a an important construct as it may significantly impact people's quality of life, demands on health care and other publicly funded services, generating consequences to society (World Health Organization, 2004). In Canada, one in five Canadians will experience challenges related to their mental health in any given year, costing the Canadian economy approximately $51 billion per year (Mental Health Commission of Canada, 2016). Notably, $20 billion of these costs result from work-related causes (Mental Health Commission of Canada, 2016).

The average Canadian spends 30-40 hours per week working, highlighting the importance of maintaining a healthy and safe workplace (Mental Health Commission of Canada, 2016). The Mental Health Commission of Canada found that in any given week, 500,000 Canadians do not go to work for reasons related to their mental health (Mental Health Commission of Canada, 2016). Further, 47% of Canadians consider work to be the most stressful part of daily life (Mental Health Commission of Canada, 2016). A wide body of evidence suggests that poor workplace mental health negatively affects performance at both the individual and organizational level. Improving workplace mental health can boost employee satisfaction, engagement, and productivity; it can also reduce health costs, increase employee turnover, and result in lost work time (Mental Health Commission of Canada, 2016). There has been a growing

interest in measuring and understanding mental health in the workplace (Ng Fat et al., 2017) as it is increasingly being recognized that poor mental health in the workplace can seriously affect one's ability to contribute meaningfully in both personal and professional lives (Jnaneswar & Sulphey, 2020). The World Health Organization has outlined twelve risk factors for poor workplace mental health, all based on research evidence, illustrated in Figure 1.1 (Burton, 2010). These risk factors include psychological support, organizational culture, clear leadership and expectations, civility and respect, psychological job demands, growth and development, recognition and reward, involvement and influence, workload management, engagement, work-life balance and psychological protection from violence, bullying and harassment (Burton, 2010). In Canada, a National Standard for Psychological Health and Safety was developed in 2013 (Mental Health Commission of Canada, (C. L. M. Keyes, 2005)). The Standard is a set of voluntary guidelines, tools and resources intended to guide organizations in promoting mental health and preventing psychological harm at work (Mental Health Commission of Canada, 2021). Like the WHO, The Canadian Standard outlines risk factors for poor workplace mental health. These risk factors include all of those identified by the WHO, and two additional risk factors: protection of physical safety, and other chronic stressors as identified by workers (Mental Health Commission of Canada & Standards Council of Canada, 2018).

Figure 1.1 Conceptual model representing greatest risks to mental health at work (World Health Organization, 2004b).



It is important to recognize that some of these risk factors may be more significant than others, depending on the work environment. Further, some of these risk factors may be more burdensome for employees who are working virtually from home.

The relationship between virtual work and mental health is particularly concerning today, as Covid-19 has changed the world of work for millions of Canadians. Covid-19 is having a profound effect on the labour market activities, health and social activities of Canadians (Government of Canada, 2020a). In March 2020, 4.7 million Canadians who did not usually work from home, were ordered to do so (Government of Canada, 2020a). As of September 2020, 4.2 million Canadians continued to adapt to Covid-19 by working remotely (Government of Canada, 2020b). Prior to Covid-19, working from home had been a growing trend in the work

environment (Anderson 1996; Cascio 2000; Marshall, Michaels, and Mulki 2007) with approximately 1.9 million Canadians already working from home (Government of Canada, 2020b). Statistics Canada data suggest that virtual work is most feasible for those in management, natural and applied sciences, business, finance and administration (Government of Canada, 2020a). Those who did not normally work from home, but were able to adapt due to Covid-19 were much more likely to have a bachelor's degree or higher (58.4%), than those who continued to work outside of the home (21.5%) and those who were absent from work (26.9%) (Government of Canada, 2020a). This provides further evidence that working from home is more feasible for workers employed in professional or managerial occupations, which typically require higher levels of education (Government of Canada, 2020a).

With virtual work from home being on the rise, in combination with the large-scale adoption of working from home due to the present-day pandemic, the need to better understand the impacts of virtual work from home has become significant. The body of evidence on the implications of working from a virtual home office has grown and so too has the need for rigorous synthesis of the best available evidence. Although several studies review the implications of working remotely from a central organization, a structured systematic review has not been completed in this area. Further, a review focused on the effect of the virtual workplace on mental health is not readily available. As a result, the proposed study aims to identify, critically evaluate, and summarize the findings of all relevant individual quantitative and qualitative studies related to this topic. The overall goal of this study is to make the available evidence more accessible.

Chapter 2: Literature Review

2.1 Structure of the Literature Review

The study is intended to determine the impact of virtual workplaces on mental health, and to understand the experiences of employees working from a virtual workplace. Therefore, the review of the literature will be related to the following key concepts relevant to the study: virtual workplace, remote work, telework, mental health, mental illness, mental well-being, psychological health, psychological well-being, social well-being, emotional well-being. I conducted a literature search to understand the current body of knowledge regarding these topics, to understand the level of agreement that exists in the literature, and to determine the need for a structured systematic review in this area. I present the results of this literature search by defining and describing the construct of mental health (Section 2.2); defining the construct of virtual work (Section 2.3); highlighting research associating virtual work with mental health outcomes and intermediate outcomes (Section 2.4); and summarizing the findings (Section 2.5).

2.2 Mental health

Before describing mental health as a construct, it is important to identify the different terms that are used in the literature. While these terms are interconnected, some are not interchangeable, and it is important we have a clear definition for each when trying to understand the literature.

> *Mental health* - a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community (World Health Organization, 2004b).

Mental illness – any of a broad range of medical conditions (such as major depression, schizophrenia, obsessive compulsive disorder, or panic disorder) that are marked primarily by disorganization of personality, mind, or emotions to impair normal psychological functioning and cause marked distress or disability and that are typically associated with a disruption in normal thinking, feeling, mood, behavior, interpersonal interactions, or daily functioning (Merriam-Webster, 2021).

Mental well-being- considered a positive state that facilitates individuals and populations to thrive and succeed (Clarke et al., 2011; Jnaneswar & Sulphey, 2020) and includes emotional, social and psychological well-being (Keyes, 2014; Keyes, 2006).

Emotional well-being - includes happiness, interest in life, and satisfaction (Keyes, 2014; Keyes, 2006).

Social well-being- refers to positive functioning and involves having something to contribute to society (social contribution), feeling part of a community (social integration), believing that society is becoming a better place for all people (social actualization), and the way that society works makes sense to them (social coherence) (Keyes, 2014; Keyes, 2006).

Psychological well-being- synonym for mental well-being, includes liking most parts of one's own personality, being good at managing the responsibilities of daily life, having good relationships with others, and being satisfied with one's own life (Keyes, 2014; Keyes, 2006).

Psychological health- synonym for mental health (Mental Health Commission of Canada & Standards Council of Canada, 2018).

Psychologically healthy and safe workplace- a workplace that promotes workers' psychological well-being and actively works to prevent harm to worker psychological health including in negligent, reckless, or intentional ways (Mental Health Commission of Canada & Standards Council of Canada, 2018).

2.2.1 Mental Health: Mental Illness & Mental Well-being

Mental health is a state of complete emotional, psychological, and social well-being, and as a construct, consists of both mental well-being and mental illness (Burton, 2010; Keyes, 2014; Keyes, 2005). Being mentally healthy refers to the presence of optimal experiences and positive functioning (mental well-being) and the absence of mental illness (Keyes, 2014).

Mental illness can embody a wide variety of diagnoses, such as depression and anxiety as examples, that may dimmish an individual's optimal functioning (Marriam-Webster, 2021). Mental well-being, on the other hand, includes the presence of fulfillment with emotional, social and psychological experiences (Keyes, 2014; Seligman & Csikszentmihalyi, 2000).

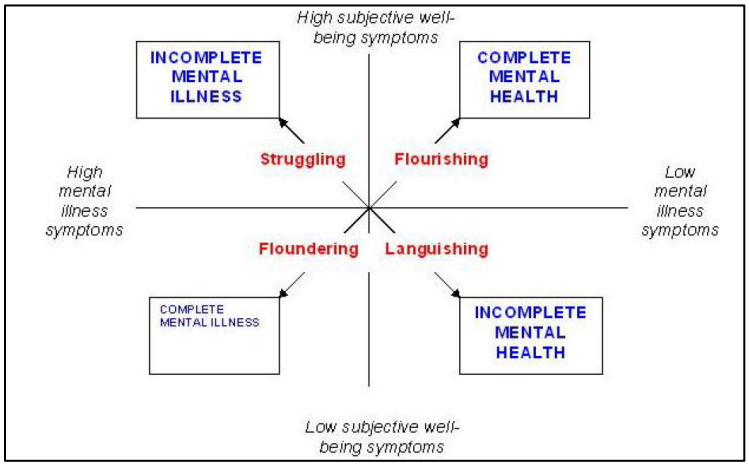
Mental well-being is considered a positive state that facilitates individuals and populations to thrive and succeed (Clarke et al., 2011; Jnaneswar & Sulphey, 2020). The World Health Organization uses the term mental health and mental well-being interchangeably and various social scientists have attempted to explain the complex construct of mental well-being by presenting its varying dimensions. According to Herrman, et al., (2004), mental well-being is a state in which individuals are aware of their potential, can cope very well with stress and can make meaningful contributions to the community through working more productively (Herrman et al., 2004). This definition incorporates all aspects of life including work life, subjective well-being, and psychological and social functioning. In the same manner, Keyes describes mental well-being as indicative of how people are able to function and develop (Keyes, 2007).

Researchers have suggested to simultaneously measure different types of mental well-being (social, emotional, and psychological well-being) and mental illnesses (e.g., depression and anxiety) to comprehensively understand mental health (Ryan & Deci, 2001). Complete mental health is linked to coping, self-esteem, optimism, psychological flexibility, feeling of control, resilience, functioning and adjustment (Bieda et al., 2017; Keyes, 2002; Keyes, 2005; Moore & Diener, 2019; Peterson & Seligman, 2004).

2.2.2 Mental Health: Conceptual Frameworks

A conceptual framework for mental health illustrating the interconnected relationships between mental well-being and mental illness is provided by the Complete State Model of Mental Health (Keyes & Lopez, 2002) and is shown in Figure 2.1. This model illustrates the two dimensions of mental health: mental illness, and mental well-being, and highlights the importance of distinguishing between these three terms (mental health, mental illness, and mental well-being). Mental illness lies on a spectrum, from absent to present. Mental well-being also lies on a spectrum, from low to high as shown below. The relationship and distinction between mental illness, mental health, and mental well-being is critical because it points to the need to support both the reduction of mental illness and the promotion of mental well-being when addressing mental health (Slade, 2010).

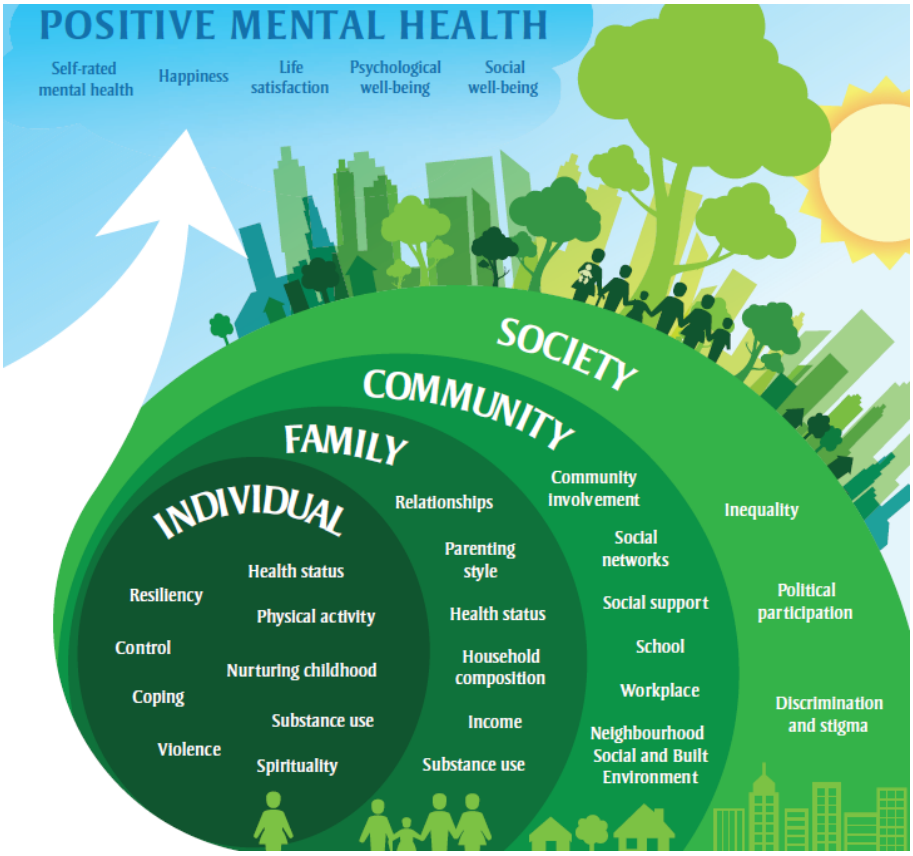
Figure 2.1 A complete model of mental health (Keyes & Lopez, 2002)



The growing body of knowledge on mental well-being in addition to our knowledge of mental illness is allowing for health services to promote mental well-being in addition to simply treating mental illness (Slade, 2010). While the interconnected relationship between mental illness and mental well-being is critical in understanding the definition of overall mental health, it is important to be critical of the fact that this framework is not comprehensive in nature, as it does not consider additional factors that may impact mental health.

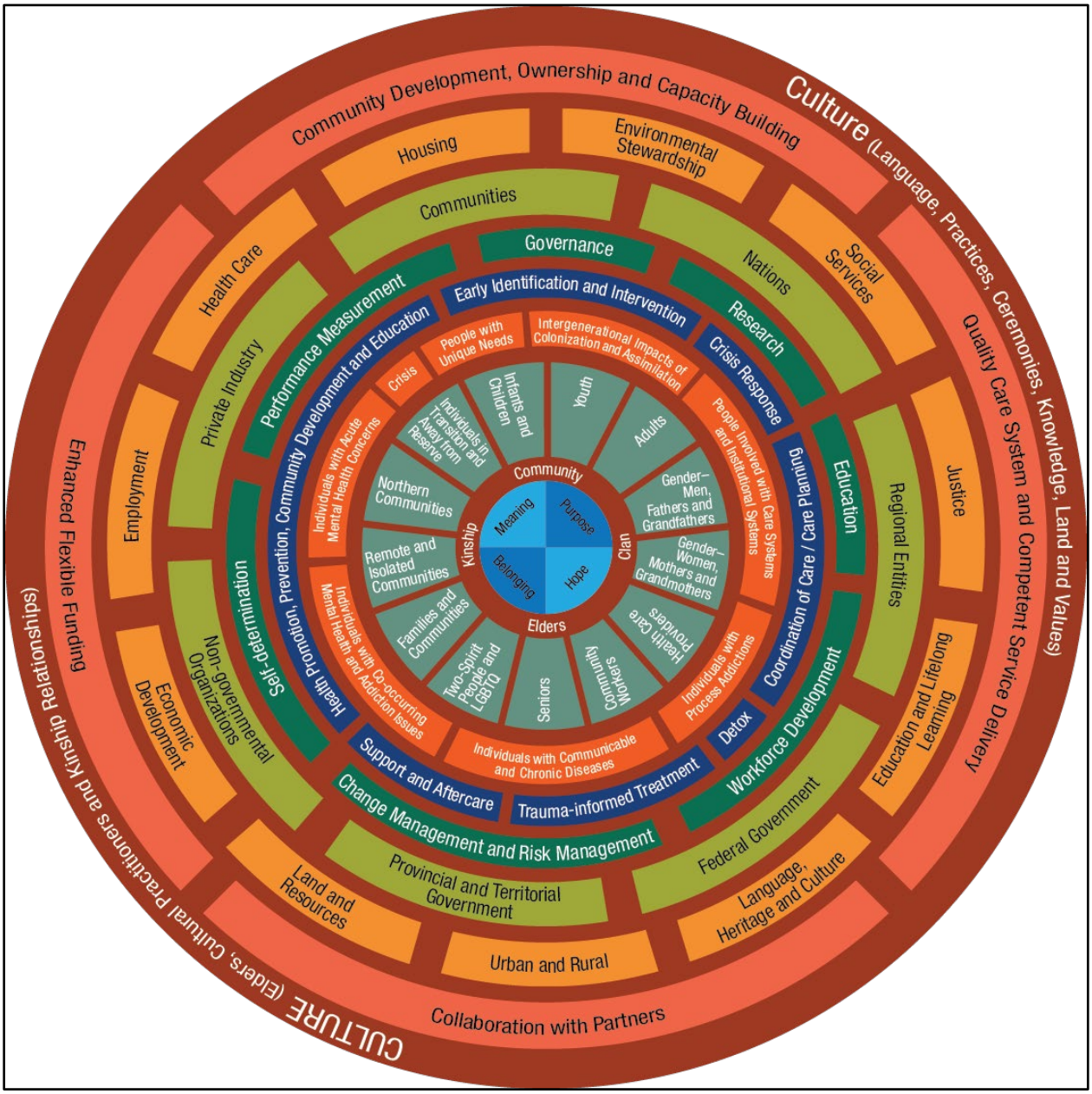
A number of comprehensive frameworks outlining risk factors for poor mental health have been developed (Orpana et al., 2016; VicHealth, 1999; World Health Organization, 2004a). The Public Health Agency of Canada provides a model for mental health, conceptualizing a comprehensive list of potential risk factors to positive mental health based off of a review of the scientific literature (Orpana et al., 2016). The Positive Mental Health Surveillance Indicator (Figure 2.2) paints a comprehensive picture of the key determinants for children, youth, and adults in Canada. This model illustrates five positive mental health outcomes (self-rated mental health, happiness, life satisfaction, psychological well-being and social well-being) and twenty-five related determinant indicators within the individual, family, community, and society that should be considered when examining risk factors to mental health.

Figure 2.2 The Positive Mental Health Surveillance Indicator (Heather Orpana et al.,2016)



While the Positive Mental Health Surveillance Indicator appears to be comprehensive in nature, indigenous frameworks have outlined a far more detailed assessment of mental health. The First Nations Mental Wellness Continuum (FNMWC) is a national framework that addresses mental wellness among First Nations in Canada (Figure 2.3) (Canada & Health Canada, 2015). It identifies ways to enhance service coordination among various systems and supports culturally safe delivery of services (Canada & Health Canada, 2015). The FNMWC provides exemplary insight into the complex nature of understanding mental health as a construct.

Figure 2.3 The First Nations Mental Wellness Continuum (FNMWC) (Canada & Health Canada, 2015).



Given the complex nature of mental health as a construct, the proposed review will follow the framework provided by the World Health Organization (Figure 1.1), Mental Health at Work. This framework allows for a narrower focus, emphasizing the interest in mental health risk factors related to work.

2.3 The Virtual Workplace

Before describing the association between mental health and the virtual workplace reported in the literature, it is important to clearly define the different ways that the literature describes employees that are removed from the central organization, through telework and virtual offices.

Working from home, has also been labelled in the scientific literature as “telework”. Also referred to as “remote work”, “telecommuting” and more recently labelled, “virtual work”, telework is a work arrangement in which work is carried out in a location, remote from the central organization, with the worker having no personal contact with co-workers (Di Martino & Wirth, 1990). Further, while employees do not commute or travel to a central place of work, they maintain continued communication with the central employer (Di Martino & Wirth, 1990).

The term ‘telework; or “telecommuting”, “remote work”, “distance work”; has been used to cover a variety of situations:

Electronic home work (the virtual office)- this is the most widespread form of telework and is practised in the worker’s own home, relying on technology to maintain links with the central employer/organizational network (Di Martino & Wirth, 1990). Examples may include IT professionals, Customer Service Representatives, and Bookkeepers.

Satellite centres. These are separate offices within an organization, geographically removed from the central organization but remaining in constant electronic communication (Di Martino & Wirth, 1990). Example may include a General Insurance Representative managing a branch Office in a remote community.

Mobile Work. Professionals whose work involves travel can use technology to communicate with the central organization (Di Martino & Wirth, 1990). Examples may include Business to Business Sales Representatives.

Although telework was first seen as early as 1950; it did not become practical until personal computers and portable modems were developed, in the early 1970s (U.S. Department of Transportation, 1993). In 1973, the term telecommuting was introduced to emphasize that telework could eventually replace the daily commute to the work site (Nilles, 1994). In the 1980s and 1990s, with the introduction of the computer and the internet, there was a dramatic increase in the number of teleworkers with most early teleworkers being those who voluntarily worked from home one or more days per week (E. J. Hill et al., 1996).

Virtual workplace or virtual office is another important term that is more recently used to describe employees working away from the central organization and replaces the term 'electronic home work'. Virtual office describes the condition of being able to work in and out of office (Messenger & Gschwind, 2016). Virtual offices give employees the ability to work anytime, anywhere, using information and communication technologies, which can result in challenges maintaining the boundary between work and personal life (Reijula et al., 2015). While research suggests that virtual office arrangements can be beneficial to both the employee and the organization (Gainey et al., 1999; Konradt et al., 2000), there are also concerns that there may be negative impacts to the mental health of these employees (Kirkman et al., 2002; Wiesenfeld et al., 2001).

In Canada, the pandemic has highlighted industries that are most suitable for virtual work as they have all surpassed pre-pandemic employment levels. These industries include professional, scientific and technical services; finance, insurance real estate, rental and leasing;

and public administration (Government of Canada, 2021). These industries have the lowest proportion of workers in occupations that typically require close physical proximity to others and working virtually from home has remained at elevated levels throughout the pandemic (Government of Canada, 2021).

2.4 The Virtual Office & Mental Health

In many countries, the rising costs of mental illness in the workplace have prompted interest in the relationship between work and mental health outcomes (Goetzel et al., 2002; World Health Organization, 2000). Employees who are working from home are presented with unique challenges when compared to employees working within the central organization. These include workplace isolation, increased interruptions, increased workload, work-home balance challenges, a lack of physical face-to-face contact, minimal feedback and career support from supervisors, limited opportunities to develop relationships with supervisors, and computer mediated/virtual communication which can result in cyber incivility and cyberbullying (Stich, 2020). According to a recent literature review by JF Stich, these challenges may impact mental health through a number of intermediate outcomes (Stich, 2020), including workplace isolation (Cooper & Kurland, 2002; Marshall et al., 2007), increased job stress (Barley et al., 2011; Stich & Tarafdar, 2019), decreased job satisfaction (Morrison, 2004; Orhan et al., 2016), decreased satisfaction with supervisors (Marshall et al., 2007; Mulki & Jaramillo, 2011; Pinsonneault & Boisvert, 2001; Sarbaugh-Thompson & Feldman, 1998), and negative communication (Baruch, 2005; Byron, 2008; Coyne et al., 2017; Friedman & Currall, 2003; Whitty & Carr, 2006). The relationship between these challenges and mental health outcomes will be described in the sections to follow.

2.4.1 Workplace Isolation

Group membership provides norms of acceptable behaviour, helps reduce anxiety, contributes to performance and enables workers to reach goals (Beehr et al., 2000). From an evolutionary perspective, isolation has elicited alarm in humans and they respond by seeking the company of others (Bowlby, 1973). Recognizing that group membership was essential for survival, tribes used physical and social isolation to punish members (Buss, 1996; Jex & Britt, 2002). Workplace isolation is conceptualized as a psychological construct, most clearly defined by Marshal et al in 2007, who explain that isolation perceptions are formed by the absence of support from co-workers and supervisors, and a lack of opportunities for social and emotional interactions with the team. The construct of workplace isolation is conceptualized as having two dimensions: social isolation, and organizational isolation (Marshall et al., 2007).

2.4.1.1 Workplace Social Isolation

Social isolation for virtual workers manifests when a worker feels separated from co-workers, and the needs for casual interactions, friendship, and camaraderie are not met (Marshall et al., 2007). From a social perspective, these employees experience less social capital, missing out on the social interaction of informal chats, spontaneous discussions, and ‘casual meetings around the water cooler’ (Cooper & Kurland, 2002; Wiesenfeld et al., 1999, 2001). Social capital impacts our sense of belonging, proactivity, feelings of trust and safety, participation and more (Kawachi & Berkman, 2000). Higher social capital typically results in more access to the resources we need to feel supported, be productive and to have better flow in our work lives (Kawachi & Berkman, 2000). Social capital is a strong predictor for work performance and employee health (Kouvonen et al., 2008; Oksanen et al., 2008; Rugulies et al., 2016; Tsuboya et al., 2015). When the need for affiliation and social support is impacted by virtual work,

combined with a lack of informal interaction with colleagues, virtual employees are left feeling socially isolated (Mann et al., 2000; Wiesenfeld et al., 2001). Further, the physical separation of working from home only serves to exacerbate feelings of being out of touch for these employees (Scott and Timmerman 1999).

Social isolation may significantly impact mental health as it often leads to feelings of loneliness (Marshall et al., 2007). Social isolation loneliness is dominated by feelings of exclusion and boredom and according to the literature, is a significant outcome of workplace isolation, with the potential to threaten mental health (Marshall et al., 2007). Loneliness is described as the unpleasant experience a person goes through if social relationships are deficient (Shaver and Brennan, 1991). Two broad types of loneliness have been identified in the literature: social-isolation loneliness, which results from a lack of satisfying friendship relationships or a lack of access to social networks (Russell et al., 1984; Weiss, 1973); and emotional-isolation loneliness, the result of a lack of satisfying romantic relationships, or the absence of close emotional attachments (Russell et al., 1984; Weiss, 1973). Social-isolation loneliness appears to be dominated by feelings of exclusion and boredom, whereas emotional-isolation loneliness is marked by anxiety and apprehension (Weiss, 1973).

2.4.1.2 Organizational Isolation

Organizational isolation generally reflects the employee's desire to be part of the network of colleagues who provide help and support in specific work-related needs (Marshall et al., 2007). More specifically, it represents the employees' perceptions of availability of co-workers, peers, and supervisors for work-based support (Marshall et al., 2007). Workplace organizational isolation is experienced when the employee feels separated from the company and needs for work-based support from both supervisors and the organization are not met (Marshall et al.,

2007). Perceptions of organizational isolation are common for virtual workers as they often fear being “out of sight and out of mind”, and often believe that their efforts are not recognized or valued (Cooper & Kurland, 2002; Kurland & Bailey, 1999). Virtual office employees often hold the belief that their supervisors consider them less committed to their tasks, thus assigning them less visible projects, providing minimal feedback, and giving limited mentoring (Fitzgerald, 1994). In turn, isolated employees tend to believe that their chances for career advancement are less than the traditional office employee (Bailey & Kurland, 2002; Cooper & Kurland, 2002).

Isolated employees also believe that they are ‘unseen’ and ‘unheard and are not members of the organizational network (Marshall et al., 2007). Employees typically view managers as surrogates of the organization and hold them accountable for any perceived lack of organizational support (Mulki & Jaramillo, 2011) and workplace isolation has also been found to be a critical driver of satisfaction with supervisors (Mulki & Jaramillo, 2011).

2.4.1.3 Workplace Isolation Summary

The literature surrounding workplace isolation is largely derived from studies in the sales industry. Perceptions of isolation based on availability for support are compounded for field salespeople because they primarily rely on electronic communication as their link with the office (Anderson, 1996). Studies have shown that various forms of electronic communication generally lack the richness and social presence associated with face-to-face communication (Andres, 2002; Sarbaugh-Thompson & Feldman, 1998; Scott & Timmerman, 1999). Despite the use of smiley faces and other symbols to enrich emails or instant messages, electronic communication is still perceived as cold and lacking emotion by most people, and can often be misinterpreted (Mann et al., 2000).

A notable 2002 study by Cooper and Kurland employed a grounded theory methodology to compare the impact of telecommuting on employees' perceptions of professional isolation. It relied on 93 semi-structured interviews with telecommuters, and non-telecommuters and their respective supervisor (Cooper & Kurland, 2002). The interviews demonstrated that professional isolation of telecommuters is intimately linked to interpersonal networking, informal learning, and mentoring from peers and supervisors. While this study focused on telecommuters, it is reasonable to suspect that the shared experience of isolation from colleagues and supervisors may elicit similar perceptions of organizational isolation (Cooper & Kurland, 2002).

Workplace isolation may arguably be one of the most significant concerns when it comes to virtual work. The construct itself is interconnected with all of the additional intermediate outcomes that will be described in the sections to follow. Outcomes of social isolation and organizational isolation are closely connected with job stress, job satisfaction, supervisor satisfaction, and poor communication (Stich, 2020). However, as each of these additional outcomes can be experienced with or without the perception of workplace isolation, the literature in these areas will be presented separately.

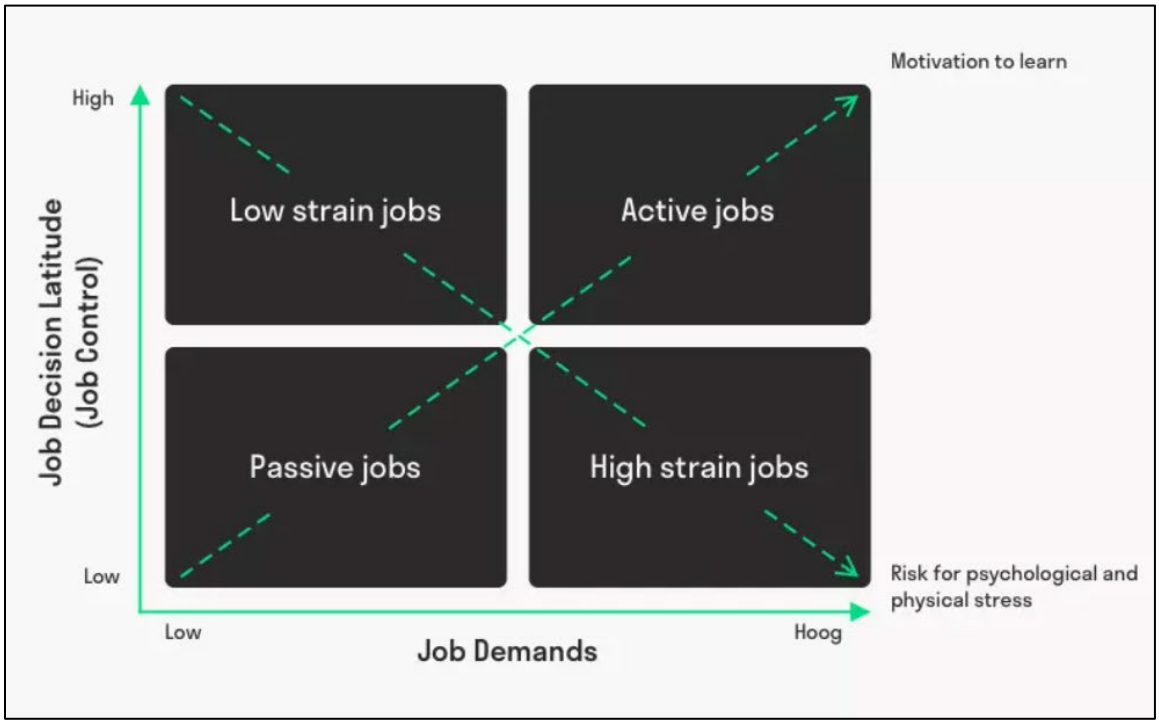
2.4.2 Increased Job Stress

Job stress (also labelled occupational stress, work stress, workplace stress and job strain in the literature) is an important risk factor for mental health among the working population and the literature suggests that employees working remotely from a virtual office are at risk for increased job stress (Stich, 2020). Job stress is defined by a series of reactions that occur when workers are faced with disparity between demands at work and their knowledge skills and aptitudes (Leka et al., 2004). Job stress can also occur when workers do not receive sufficient support from their colleagues and supervisors (Elo et al., 2003; Leka et al., 2004). Empirical

studies demonstrate that job stress is a risk factor for burnout, poor wellbeing, depression and cardiovascular disorders (Gosselin et al., 2016; Landsbergis et al., 2015; Leka et al., 2004; Y. Wang et al., 2015).

One of the main theoretical models used to define the relationship between job stress and employee mental health is the job demand-control model (Figure 2.4) (Karasek, 1979). In the job demand–control model, workers who simultaneously experience high psychosocial job demands (e.g. high strain jobs) and low control are more likely to develop stress-related mental health problems (Karasek, 1979; Karasek & Theorell, 1990; Nakao, 2010). Job demands consist of mental requirements, time pressures, excessive workload, task interruption, intense concentration, and conflicting demands (Karasek, 1979). Control (decision latitude) is the combination of decision authority and autonomy to manage work time (e.g. taking part in decisions) and skill discretion (e.g. opportunities to learn new things) (Karasek, 1979).

Figure 2.4 Karasek's Job Demand-Control Model (Karasek, 1979).



According to Karasek's model, jobs can be classified into four groups: high-strain jobs, low-strain jobs; passive jobs and active jobs (Karasek, 1979). For example, high-strain jobs have the worst combination of factors: high psychological demands, low control, and lack of social support. Working under these adverse conditions can directly increase the risk of developing mental health problems (Stansfeld & Candy, 2006). Virtual offices have been found to impact three sources of job stress directly: frequency of interruptions (e.g. increased job strain and less job control), increased workload (e.g. increased job strain, and low job control) and work-home balance (e.g. may increase job strain) (Cooper et al., 2001)**.**

Unscheduled interruptions, both in virtual and traditional office place strain on the time that employees have available to meet the various demands they face during the workday (Keller et al., 2019; Perlow, 1999). While unexpected interruptions can be positive when they allow crucial information to be shared (Addas & Pinsonneault, 2018), interruptions in traditional offices have been found to be detrimental to employees' mental well-being (Keller et al., 2019). Isolated workers in the virtual office are situated to receive additional interruptions, including more email notifications than the typical office worker, added incoming instant messages, phone calls, and system-generated notifications (Keller et al., 2019). "Even in a quiet office with no colleagues around, one can still be 'tapped on the shoulder virtually' and find this experience as disturbing as a physical interruption" (Stich, et al., 2017, page 210). It is difficult for employees to resist these interruptions, as most leave their email inbox open all day (Renaud et al., 2006).

Using email as an example, this is a form of communication intended to be asynchronous; yet, research has found that most employees handle email as it arrives, the majority being acknowledged in under six seconds (Jackson et al., 2001; Renaud et al., 2006). Employees can take up to fifteen minutes to re-engage in the primary task following the

interruption (Jackson et al., 2001). It is estimated that employees lose 28 minutes every day because of similar interruptions (Gupta & Sharda, 2008), which increases feelings of work overload (Gupta et al., 2013). More specific to virtual office workers, employees can be further interrupted by family members, and the need to deal with home demands (Delanoeiji et al., 2019). Interruptions in virtual offices have been associated with detrimental effects on mental health, such as increased levels of stress (Kushlev & Dunn, 2015), risk of burnout, and poorer sleep quality (Barber & Santuzzi, 2015; Hu et al., 2019). As interruptions consume time, employees may also face increasing workloads (Keller et al., 2019).

Increased workload has been widely accepted as a significant source of workplace stress (Bowling et al., 2015; Cooper et al., 2001; Stich, 2020). One of the main advantages of virtual offices is that information technology is the primary source of communication, allowing critical business information to freely flow between employees (Sumecki et al., 2011). However, unlike working within an office, information technology is the main source of communication with virtual work, and mass transmission of information can be shared very easily (Sumecki et al., 2011). This can quickly represent a significant source of work overload for employees (Stich, 2020). Dealing with such information overload tends to lengthen the workday and increase feelings of work overload (Barley et al., 2011; Stich & Tarafdar, 2019), the risk of burnout (Reinke & Chamorro-Premuzic, 2014), distress (Mano & Mesch, 2010) and depression (Stansfeld & Candy, 2006).

Finally, the virtual workplace has been associated with an increased challenge of balancing work and family. Employees forced to manage the interface between work and life is a significant form of stress (Cooper et al., 2001). In virtual offices, work and home roles are easy to integrate; however, this integration allows work to run outside of a typical work day at the

office, and spill over into employees' personal lives (Diaz et al., 2012). Employees tend to be 'leashed' to virtual offices (Boswell & Olson-Buchanan, 2007), experience constant connectivity, and have difficulties disengaging from work – making it last longer (Mazmanian et al., 2005). Work interferes with personal and family time as employees tend to interrupt personal activities to respond to work demands (Delanoeiji et al., 2019; Derks et al., 2015). Overall, employees experience increased levels of work-life conflict (Derks et al., 2015; Diaz et al., 2012; Matusik & Mickel, 2011; Wright et al., 2014) and increased job stress (Mazmanian et al., 2013). Specific risk factors for reduced mental health that are reported in the literature include emotional exhaustion (Xie et al., 2018), risks of burnout (Wright et al., 2014), as well as depleted energy (Gadeyne et al., 2018).

2.4.3 Decreased Job Satisfaction

Job satisfaction has been described as being the positive emotional reactions and attitudes that an employee has towards their job (Oshagbemi, 1999). Others have described it as a bi-dimensional construct consisting of intrinsic (satisfaction/lack of satisfaction) and extrinsic (dissatisfaction/lack of dissatisfaction) dimensions (Warr et al., 1979; Winefield et al., 1988). A systematic review and meta-analysis of 485 studies suggests that job satisfaction level is an important factor influencing the mental health of workers (Faragher, 2005). The most important determinants of job satisfaction are whether an employee finds their job interesting, has good relationships with their managers and colleagues, has a high income, can work independently, and has clearly defined career advancement opportunities (Sousa-Poza, 2000). Overall, virtual work can have a negative impact on job satisfaction levels as it can limit the opportunity to develop and maintain workplace relationships (Morrison, 2004; Orhan et al., 2016). These

findings suggest that job satisfaction levels are an important outcome to examine when considering the intermediate outcomes of virtual work.

2.4.4 Decreased Satisfaction with Supervisors

It has been reported that supervisors working in a traditional office setting may be less satisfied with their remote office colleagues and as a result, less enthusiastic about providing required support (T. Golden, 2007). Virtual employees may feel that they receive less career support from supervisors (Pinsonneault & Boisvert, 2001), minimal supervisor feedback and limited opportunity for relationship development with their supervisor (Sarbaugh-Thompson & Feldman, 1998). Employees experiencing perceived lack of support from supervisors often consider leaving the organization (Mulki & Jaramillo, 2011).

2.4.5 Poor Communication

Virtual offices introduce new ways for communication to become challenged and for poor communication to take place (Stich, et al., 2017). Communication in virtual offices is typically computer-mediated, and is difficult to master (Whitty & Carr, 2006). Email is a common source of conflicts and misunderstandings: recipients have to decode messages in the absence of senders visual cues and opportunities for clarification (Byron, 2008). As a result, messages can be erroneously interpreted, which may result in ambiguity, inaccuracy, overload (Brown et al., 2014), or conflict escalation (Friedman & Currall, 2003).

Intimidation and insults are the most common forms of hostility in email exchanges (Baruch, 2005). Virtual communication that is particularly poor and disrespectful is studied under the term ‘cyber incivility’ (Lim & Teo, 2009). For example, use of profanity, all capital letters, and excessive exclamation points tend to be perceived as more hostile (Turnage, 2007).

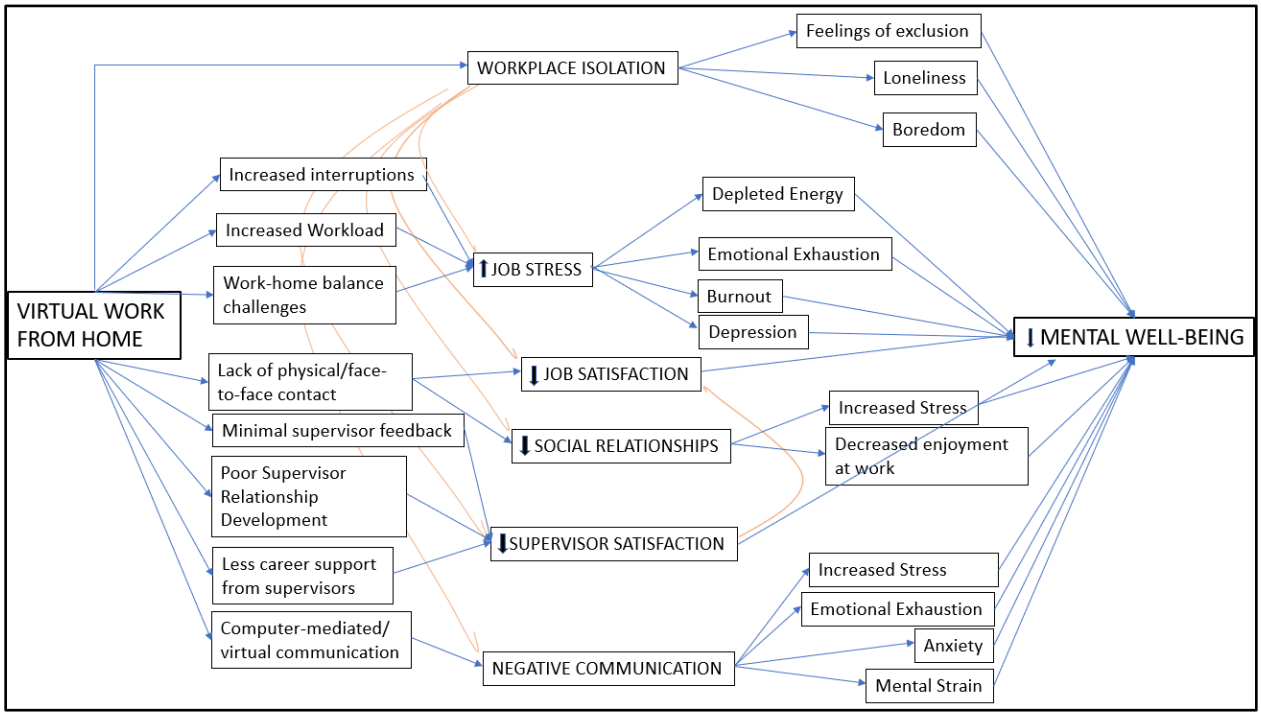
Cyber incivility has been associated with increased blood pressure (Taylor et al., 2005), stress and stress-related illness and lower levels of energy (Giumetti et al., 2013; Park et al., 2018).

In addition to cyber incivility related to email, studies have shown that bullying and harassing behaviours take place in virtual offices under the term ‘cyberbullying’ (Baruch, 2005). Cyberbullying is different from cyber incivility in that it involves negative experiences that are repeated by a colleague, and may be even more damaging to employees than traditional bullying (Coyne et al., 2017; Ford, 2013; Heatherington & Coyne, 2017). Virtual offices make it more difficult for victims to detach psychologically, as the negative experiences can take place anytime, anywhere (Coyne et al., 2017). Cyberbullying is associated with a number of negative outcomes related to mental health, including increased anxiety (Baruch, 2005), emotional exhaustion (Farley et al., 2016), mental strain (Coyne et al., 2017), and increased stress (Snyman & Loh, 2015).

2.5 Proposed Conceptual Framework

Through the literature review, I identified several challenges associated with working virtually from home that directly or indirectly contribute to reduced mental health. To our knowledge, there does not yet exist a model addressing the relationship between these challenges and mental health in the context of virtual work. As such, a conceptual framework is proposed in Figure 2.5, based on the literature review; it hypothesizes the pathways that link virtual work to poor mental health. It is important to note that this framework is based on a preliminary review of the literature and may evolve as the comprehensive systematic review is complete.

Figure 2.5 Theoretical Framework hypothesising the relationship between virtual work and mental health.



2.5.1 Conflicting Evidence

While the literature review thus far, presents supporting evidence of the risks of virtual work from home, Canadians have interestingly reported that they were just as likely to report having good, very good, or excellent mental health as those who usually work from home and those who continued to work at locations outside of the home (Government of Canada, 2020a). There is very limited peer reviewed literature describing positive outcomes related to virtual work; however, it has been suggested that young remote workers appreciate virtual work due to the flexible working hours or less formal atmosphere, and saving commuting time to work (DeSanctis, 1984; Klopotek, 2017). Benefits of working from home may also include meeting family requirements (Klopotek, 2017). Further, in contrast to our literature review findings, it has also been reported in one study that home-based workers report high levels of satisfaction

(Wheatley, 2012). The conflicting evidence and reported experiences of Canadians highlights the need for a rigorous systematic review in this area.

Chapter 3: Research Question and Objectives

The proposed mixed methods systematic review examined and synthesized the quantitative and qualitative evidence about virtual work from home (exposure), and mental health (outcome). The general objective of this review was to determine the association between virtual work (from home) and mental health through a best-evidence synthesis, and to make the available evidence more accessible. The quantitative review aimed to quantify the relationship between virtual work in the home (exposure) and mental health (outcome), while the qualitative review sought to understand the lived experiences of virtual employees. To address both the quantitative and qualitative literature in this subject area, two specific research questions were formulated, incorporating the four elements in the PICO/PICo mnemonics (Population, Intervention/Phenomenon of Interest, Comparison Group, Construct & Outcome)(Aromataris & Riitano, 2014) .

Research Question #1: What is the quantitative effect of working in a virtual office, as compared to working in a standard office, on mental health?

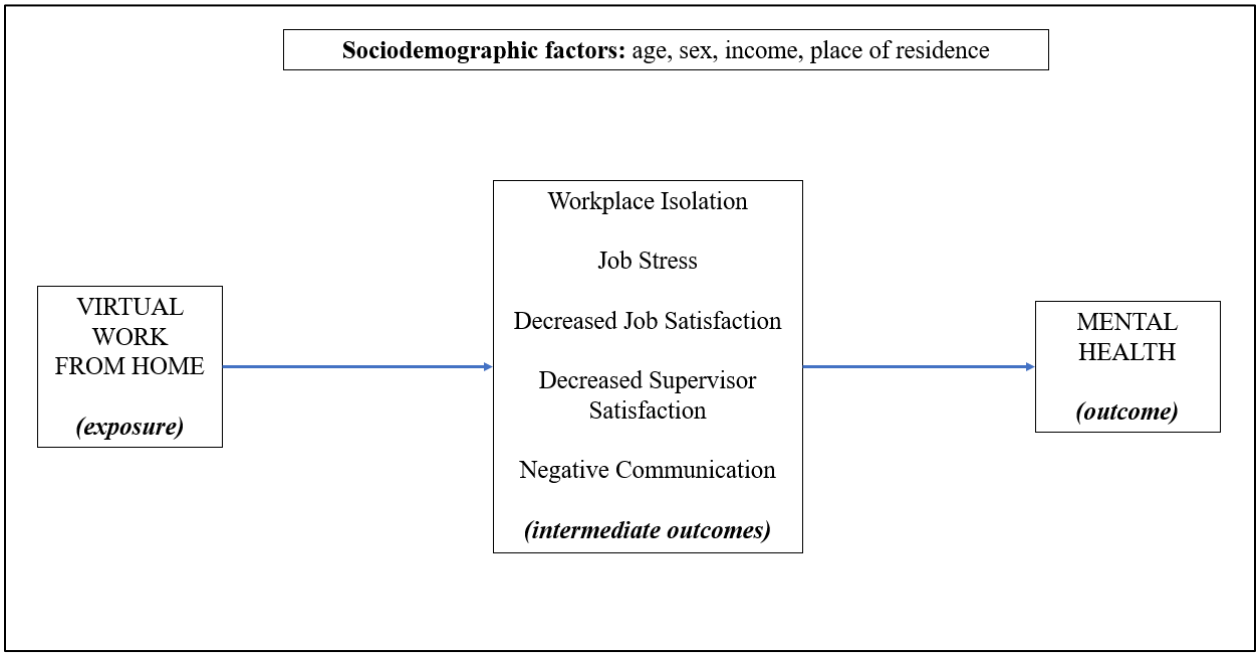
Table 3.1 Initial Logic Grid: PICO elements of the quantitative research question:

Population	**I**ntervention/exposure	**C**omparison	**O**utcome Measures
Office workers	Virtual home office	Working in an office / central organization	Mental Health

The following conceptual framework hypothesised the causal relationship between exposure (virtual work from home) and outcome (mental health), and intermediate outcomes (workplace isolation, job stress, decreased job satisfaction, decreased supervisor satisfaction, negative communication). We associate these outcomes with risk factors outlined in the Mental Health at Work framework provided by the WHO. While we expected sociodemographic factors

to impact the relationships, based on preliminary findings, we did not anticipate enough data to answer this question. (Figure 3.1).

Figure 3.1 Conceptual framework hypothesising the causal relationships between virtual work from home and mental health.



Hypothesis #1 –Virtual work poses a risk to the mental health of employees working remotely, through either one or multiple intermediate outcomes (workplace isolation, job stress, decreased job satisfaction, decreased supervisor satisfaction and negative communication).

Research Question #2: What is the experience of the employee working remotely in a virtual office, removed from the central organization?

Table 3.2 Initial Logic Grid: PICo elements of the qualitative question:

Population	Phenomenon of **I**nterest	**Co**ntext
Office workers	Working in a virtual Office	Working remotely from a central organization, distanced from colleagues and supervisors

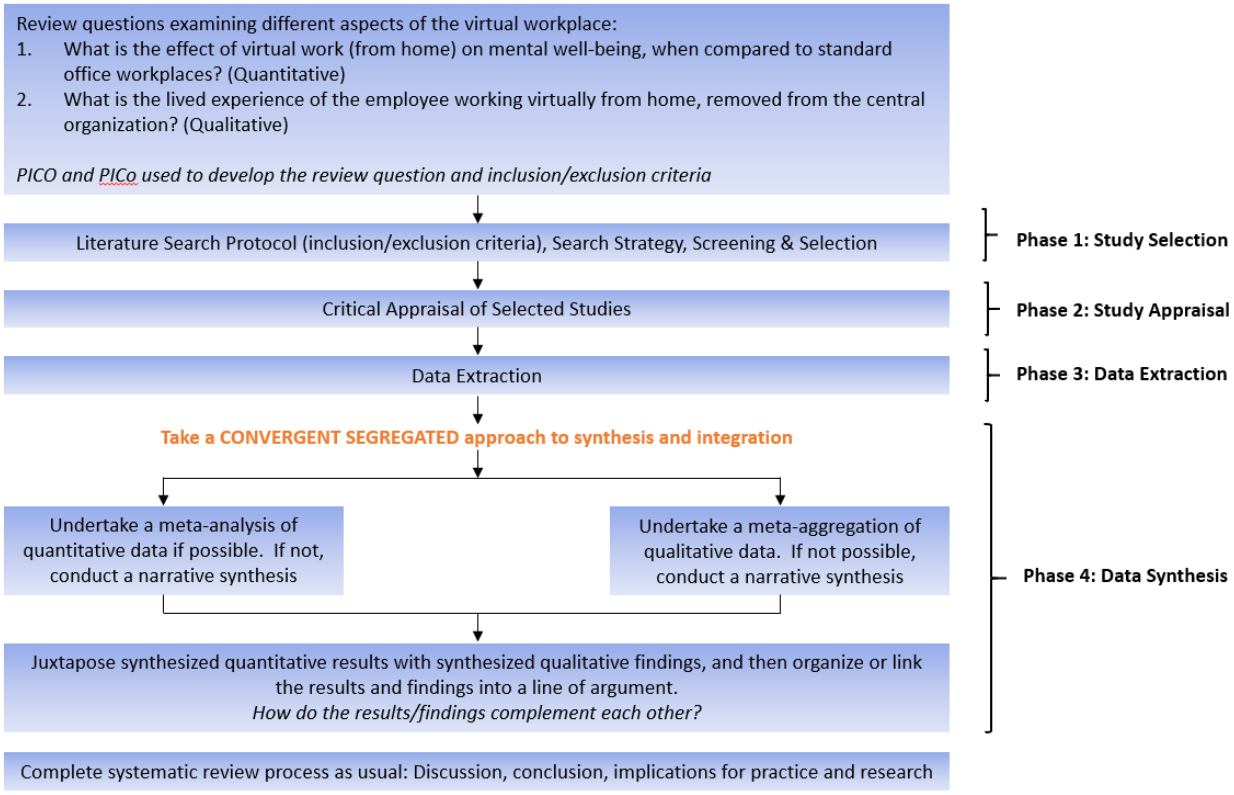
To conceptualize employee experiences, we followed the conceptual model developed in the literature review (Figure 2.5), indicating the risks of working virtually from home and associated outcomes and pathways. We hypothesized the risk factors associated with Mental Health at Work outcomes as per the framework provided by the WHO. The overall aim is to determine which risk factors are significant for employees working from the virtual office and identify their associated outcomes.

Hypothesis #2–Virtual work poses a risk to the mental health of employees working remotely, through either one or multiple intermediate outcomes (workplace isolation, job stress, decreased job satisfaction, decreased supervisor satisfaction and negative communication). While we expected sociodemographic factors may impact the relationships, based on our preliminary findings, again, we did not anticipate enough data to answer this question.

Chapter 4: Methodology

The research questions addressed both quantitative and qualitative studies; therefore, we completed a mixed methods systematic review, conducted in accordance with the Joanna Briggs Institute (JBI) methodology for mixed methods systematic reviews. We conducted a convergent segregated research design involving independent synthesis of quantitative and qualitative data followed by the integration of the two types of evidence (Aromataris & Munn, 2020). By integrating the quantitative and qualitative synthesized findings, we were able to have a greater in-depth understanding of the phenomena of interest compared to undertaking two separate component syntheses without formally linking the two sets of evidence (Aromataris & Munn, 2020). The methodology described in this chapter is summarized below in Figure 4.1.

Figure 4.1 Summary of methodology: Convergent segregated approach adapted from (Aromataris & Munn, 2020).



Similar to primary research, methodology and reporting standards have been developed for systematic reviews: The PRISMA statement or Preferring Reporting Items for Systematic Reviews and Meta-Analysis, provides a checklist for authors on how to report a systematic review (Moher et al. 2009). The quality of a systematic review, and the recommendations drawn from it, depends on the extent to which methods are followed to minimize the risk of error and bias (Moher et al., 2009); therefore, the methodology followed the PRISMA guideline checklist, referenced in Appendix A.

4.1 Methodology Phase 1: Study Selection

The following inclusion/exclusion criteria contributed to the replicability of the review: *Inclusion Criteria-* This systematic review considered studies using either qualitative, quantitative, or mixed methods designs. Qualitative studies included the following approaches: phenomenology, grounded theory, narrative, ethnography, and case study. Quantitative studies that are experimental, or observational were considered, as the nature of our research question is focused on assessing the association between virtual or office work, which could be experimentally manipulated or observed. We included review articles for the purpose of searching the associated reference lists, though we did not critically appraise review articles. Studies must include the exposure or phenomenon of interest to be considered: workers conducting full-time virtual work from home (quantitative exposure and qualitative phenomenon of interest).

When evaluating studies for outcomes of interest, studies must include the key concepts related to our primary outcome and/or intermediate outcomes of interest. Our primary outcome concepts include mental health, mental illness, and mental well-being. Intermediate outcomes that may impact mental health (those that have been identified in our literature review) will also

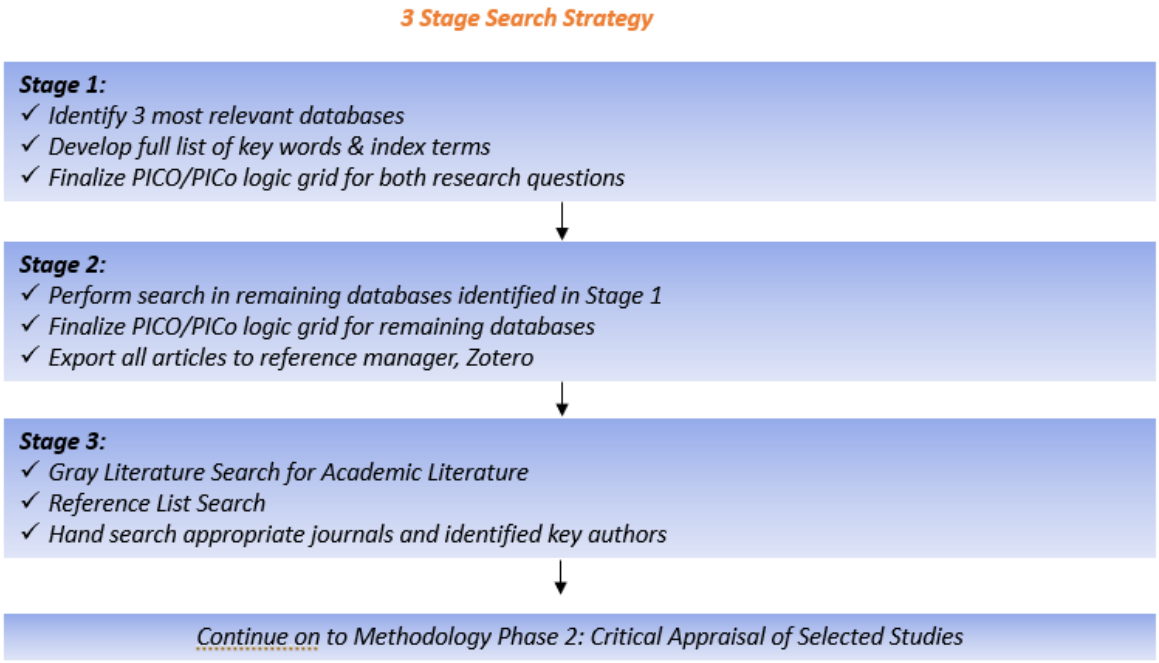
be included but are not mandatory for inclusion. The population of interest included any employees working in an office environment, in comparison to those removed from the central organization (e.g., exposed to virtual work); we are not focused on a particular occupation or industry.

Exclusion Criteria- Firstly, we only included publications in peer reviewed academic journals. Therefore, articles from such outlets as trade journals, conference proceedings, book chapters, editorials, extended abstracts, magazines, and newspapers were excluded. Secondly, descriptive studies were excluded as these studies do not address the association between our exposure and outcomes of interest. Third, articles that are not in English were excluded. Finally, we excluded all articles prior to 2010: technology and virtual work has significantly evolved over the past 10 years, and it is important that we present findings that are relevant to the present virtual home office.

4.1.1 Search Strategy

This section describes the methodology for a search strategy that is both sensitive and specific: a sensitive search will identify all relevant studies, while a specific search will exclude irrelevant studies (Aromataris & Riitano, 2014). A search that is overly sensitive may capture all of the necessary studies but may require a labor-intensive vetting of unnecessary studies at the stage of study selection (Aromataris & Riitano, 2014). A search that is overly specific will yield fewer results, but is always subject to the risk that important studies may have been omitted (Aromataris & Riitano, 2014). The search strategy used, comprised of three stages is summarized in Figure 4.2 below and described in detail in the sections to follow.

Figure 4.2 Summary of search strategy: Three stage approach.



Stage 1: Stage 1 of the research protocol involved identifying relevant citation databases and finalizing our logic grid by identifying keywords and index terms to be included in our final search. Initially, the reviewer identified relevant databases by using Ovid, seeking the guidance of an institutional librarian, and testing the various search terms identified in the initial logic grid for each research question. Ten databases with the highest number of results were identified and used for the review. Initial key words included virtual work OR telework OR remote work OR electronic work OR electronic home work OR satellite work OR mobile work AND mental health OR mental illness OR mental well-being OR psychological health OR psychological well-being OR social well-being OR emotional well-being OR well-being. This initial search was expanded to include each intermediate outcome identified in our literature search, with the following key words: “workplace isolation” “job stress”; “job satisfaction”; “social relationships”; “supervisor satisfaction”; and “negative communication”. The literature reports

several keywords that are associated with workplace isolation, job stress and negative ; these were included in our search and are detailed in the finalized logic grid (Appendix B). The search was completed for all databases, combining all identified terms.

Stage 2: Stage 2l included performing the search in the ten identified databases in stage one. Using the full list of keywords and index terms developed in Stage one, the search was completed across all selected citation databases identified. The structure of the search strategy remained the same regardless of the search platform used to search. Once the search was complete, results were exported to systematic review software, Covidence (Covidence Systematic Review Software, 2014). This program was used for organizing the search results, removing duplicate citations, and selecting studies.

Stage 3: The final stage of our search strategy involved searching reference lists of review papers of peer reviewed academic literature not already identified in stages 1 and 2.

Once the search was complete and the results from each source were identified, results were exported to Zotero (for management of references in drafting final manuscript) and Covidence (for screening, selection, and full-text review) (Covidence Systematic Review Software, 2014; Roy Rosenzweig Center for History and New Media., 2016).

4.1.2 Screening & Selection Process

Study selection began once the database and hand searches were complete. Covidence was used to complete the screening and selection phase of the study. Using the inclusion and exclusion criteria, the reviewer screened titles and abstracts for inclusion into the review. If a study could not be clearly excluded on the basis of its title and abstract, the full text was included (Aromataris & Munn, 2020). For abstracts with insufficient information, full text was obtained and reviewed. Once studies to be critically appraised had been chosen, the reviewer obtained and

read the full-text articles, discarding any that on second consideration did not meet the inclusion criteria.

4.2 Methodology Phase 2: Critical Appraisal of Selected Studies

The aim of the critical appraisal was to first exclude studies that were of low quality and whose results may compromise the validity of the recommendations of the review, and secondly, to identify the strengths and limitations of the included studies (Porritt et al., 2014). For quantitative evidence, we aimed to identify the risk of bias in the published research in order to decrease the possibility of including biased or misleading results and for qualitative evidence, we aimed to emphasize the thoroughness of the research and the level of transferability. The goals and methods of quantitative and qualitative research differ, and so did the critical appraisal checklists used to appraise them (Porritt et al., 2014). As we conducted a mixed methods systematic review, appraising both quantitative and qualitative research, the quality of each paper was assessed, according to study design, using the appropriate Joanna Briggs Institute Tool (JBI) (Joanna Briggs Institute, 2001). A more detailed description for the two types of appraisals are described in the following sections.

4.2.1. Appraising Quantitative Studies

A range of quantitative studies may present evidence on the association of exposure and outcome, including experimental, quasi-experimental, and observational. The study design used depended on the question investigated and had its own advantages and limitations. The appraisal of the quantitative studies examined both internal and external validity.

Establishing internal validity: Internal validity refers to how much bias has potentially influenced the results, and how well a causal relationship between exposure and outcome can be inferred (Aromataris & Munn, 2020; Celentano & Szklo, 2019; Porritt et al., 2014). Its

assessment involves determining whether the methods used in the study can be trusted to provide a genuine, accurate account of the exposure and outcome (Joanna Briggs Institute, 2001; Khan, 2003; Pearson, 2005; Tricco, 2011) using the appropriate critical appraisal checklist for the study design.

Establishing external validity. External validity refers to the extent to which results can be generalized to other groups, populations and contexts (Aromataris & Munn, 2020; Celentano & Szklo, 2019; Porritt et al., 2014). It was assessed by reviewing sampling methods and sample characteristics, context (cultural or organizational factors), and the exposure (Porritt et al., 2014) using JBI critical appraisal checklist tools.

4.2.2 Appraising Qualitative Studies

Many researchers resist the notion of critical appraisal of qualitative research (Sandelowski, 1997; Shaw, 2004; Sherwood, 1999; Walsh & Downe, 2005), though it has as much potential to be flawed as does quantitative research. Critical appraisal of qualitative research contributes to its ongoing dependability, credibility, transferability, and theoretical potential (Averis & Pearson, 2003; Pearson, 2004). The JBI critical appraisal checklist tool for assessing qualitative literature was used.

The critical appraisal tools were used to identify any significant bias or fatal flaws in study design and methodology; if either were to exist, the study would be excluded in the final synthesis. Once the list of accepted studies was finalized, the reviewer moved onto the data extraction of all qualified articles.

4.3 Methodology Phase 3: Data Extraction

4.3.1 Data Management

All data extraction items were managed in Word, via the data extraction tools developed for this review.

4.3.2 Data Extraction

The reviewer extracted all data relevant to the research questions. Standardized data extraction tools promote the extraction of similar data across all the included studies and are required for JBI systematic reviews (Aromataris & Munn, 2020); therefore, extraction tools from the JBI Manual for Evidence Synthesis were used for both quantitative and qualitative designs (Aromataris & Munn, 2020). In particular, the data extracted from quantitative and mixed methods studies included details about the populations, study methods, interventions/exposures, and outcomes of significance to the research objectives. The data extracted from qualitative and mixed methods studies included details about the population, context, culture, geographical location, study methods and the phenomena of interest relevant to the review objectives and findings.

4.4 Methodology Phase 4: Data Synthesis & Integration

We followed a convergent segregated approach to synthesis and integration according to the JBI methodology for mixed methods systematic reviews: separate quantitative and qualitative syntheses followed by integration of the resultant quantitative and qualitative evidence (Aromataris & Munn, 2020).

Quantitative synthesis – Based on a preliminary review of the literature, we did not anticipate the ability to perform a meta-analysis, due to limited quantitative literature, and lack of homogeneity

across studies. As such, the findings were presented in narrative form, including tables and figures, where appropriate.

Qualitative synthesis- Based on a preliminary review of the qualitative studies, we did not anticipate the ability to pool findings using a meta-aggregation approach. Therefore, a narrative synthesis approach was utilized, where the findings are presented in narrative form, with illustrations (e.g., word clouds and conceptual models) where appropriate.

Integration of quantitative and qualitative evidence. Qualitative and quantitative evidence was organized to produce an overall narrative summary of the findings and their biases, strengths, and limitations. To ensure readers are able to discern how the evidence was evaluated and whether conclusions are biased, we emphasized the characteristics of the studies.

Chapter 5: Results

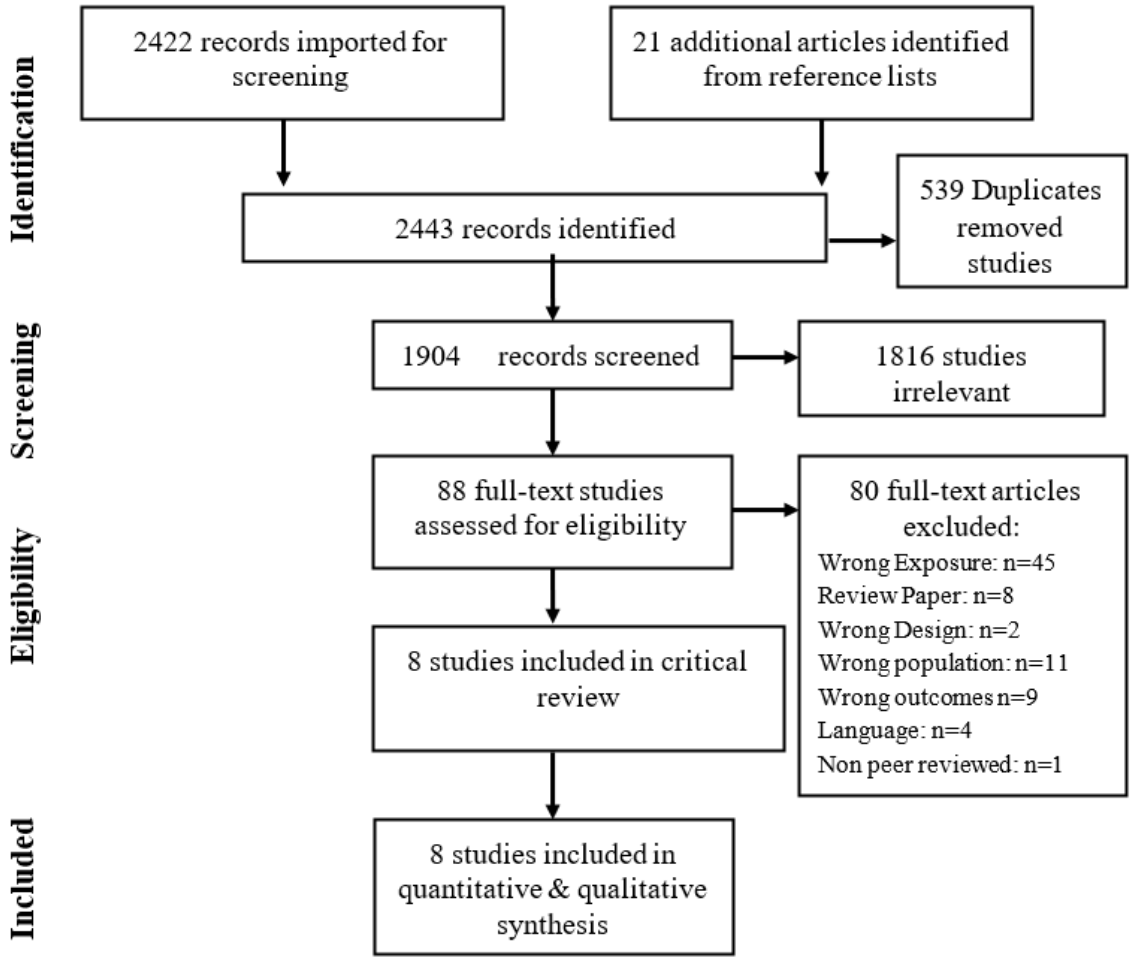
5.1 Phase 1 Results: Study Selection

Adhering to the eligibility criteria stipulated in the research protocol ensured that studies selected for inclusion were selected based on their research method, as well as the PICO/PICo elements of the study, and not solely on the studies findings (Aromataris & Riitano, 2014). This rigorous approach limited the potential for bias and reduced the possibility of altering the focus or scope of the review after the results are seen. In Stage One, the search strategy was finalized, keyword lists were developed and PICO/PICo tables and logic grids completed (Appendix B). Based on established search protocol (developed with institutional librarian), scientific journals from psychological, social, management and health fields of study were searched. Relevant literature was identified by searching ten electronic databases, namely: ABI Inform Global, Psych Articles, Psych INFO, Coronavirus Research Database, Publicly Available Databases, Sociological Abstracts, Applied Social Sciences Index and Abstracts. CINAHL, Web of Sciences, PubMed. To ensure literature saturation, reference lists of included studies or relevant reviews that were identified through the search were also scanned. Limits imposed on the search included studies had to be published between 2010-2021, be in the English language and peer reviewed. In Stage two of study selection, all remaining databases were searched and imported into Covidence for screening. The result for each database search is provided in Appendix C. All retrieved articles (n=2422) were imported into the Covidence database for review and duplicated articles were removed (n= 539). The lead reviewer assessed the remaining identified papers (n=1883) by screening the studies' titles, keywords, and abstracts against the PICO/PICo elements of the research questions, and inclusion and exclusion criteria described above. In stage three, reference lists of included or relevant papers reviewed were also scanned, to ensure

literature saturation. An additional 21 articles identified from reference lists were imported into Covidence for further title and abstract screening.

In cases where the decision to include one article or not could not be made by just the title, keywords and abstract (e.g., when population not clearly defined), then the article was retrieved, and full text reviewed before making a final decision. A total of 88 studies were assessed based on full text. Finally, a total number of eight studies were set as eligible to be included based of PICO/Pico elements and inclusion/exclusion criteria. Common theme patterns in excluded studies can be found in the PRISMA diagram (Figure 5.1). It was observed that a significant number of articles were excluded due to incorrect exposure (e.g. virtual work was not full-time), and there was no comparison group include (e.g. research population was virtual workers only).

Figure 5.1 PRISMA Results Diagram



5.2 Phase 2 Results: Critical Appraisal

The purpose of phase two, critical appraisal, was to exclude studies of low quality and identify strengths and limitations of included studies. This review has sought a broad range of studies, including case-control, cohort, quasi-experimental, observational, and qualitative research. The results of Phase 1 screening provided three qualitative studies and five quantitative, cross-sectional design, studies. Notably, the quantitative studies were all cross-sectional designs.

The quantitative appraisals aimed to identify the risk of bias in the published research to decrease the possibility of including biased or misleading results. Several factors were assessed, including clear inclusion criteria, validity and reliability of exposure and outcome measures, identification and management of confounding factors and appropriate statistical analysis. The qualitative appraisal aimed to assess the thoroughness of the research. Studies were appraised with an overall assessment by the reviewer rather than a score, determining whether any significant design flaws should eliminate it from the review. Results of the critical appraisal did not identify any fatal research design flaws. Given the manageable number of studies (n=8), the lead reviewer did not exclude any from the final synthesis of findings. Critical appraisal results can be found in Appendix D.

5.3 Phase 3: Data Extraction Results

The lead reviewer extracted data from the included studies into predefined data extraction forms. Quantitative and qualitative extraction was completed separately and summarized below in Results Table 5.1 and 5.2, respectively. Detailed extractions for each study can be found in Appendix E.

Table 5.1 Summary of Quantitative Studies

Author/Year/Location	Study type/design/methods	Study population/sample information	Data source	Exposure Information (Definitions & terminology)	Outcome measures	Results	Risk of Bias
Fonner & Roloff (2010); USA	Cross-sectional, primary data collection	Total n =192 Teleworkers n=89 High-intensity teleworkers	Primary data collection; web-based survey	Telework employees, defined as "working at least 3 days a week at home: Exposure Terminology: Telework	5-item global job satisfaction scale (Pond & Geyer, 1991)	High-intensity teleworkers are more satisfied than office-based employees; teleworkers reported significantly lower work-life conflict, less stress from meetings and interruptions, less perceived general politics, but greater job satisfaction than office-based employees	Selection Bias (non random sampling), Low Response rate
Felstead & Henseke (2017); United Kingdom	Cross-sectional; retrospective analysis of existing data	Total n=13,086	Skills and Employment Survey (SES) Series - Britain, 2001, 2006, 2012 pooled	Multiple exposures: At home; same grounds and buildings as home (adjoining property or land); in a single workplace away from home; variety of workplaces Exposure terminology: remote workers	Single item 7-point scale to assess how satisfied respondents are with their job	Remote workers report significantly higher levels of job satisfaction; illustrated by 7 percentage point gap between the proportions reporting that they are very satisfied or better with their jobs; remote working is associated with significantly higher levels of enthusiasm for the job and overall job satisfaction.	Low Response Rate. Measurement error. Uncontrolled confounding
Giménez-Nadal et al., (2020); USA	Cross-sectional; retrospective analysis of existing data	Total n =2471 Teleworkers n=304	American Time Use Survey 2003-2015	Teleworkers identified as workers who do not report any period "commuting to work" Exposure Terminology: teleworkers	Well-being while working, 7-point scale for 6 items: pain, happiness, sadness, fatigue, stress	Male teleworkers have lower average values for sadness, stress, tiredness in comparison to male commuters (P193); females, no differences	Low Response Rate. uncontrolled confounding Exposure Measurement error Outcome Measurement Error: not validated instrument
Morganson et al (2010); USA	Cross-sectional; retrospective analysis of existing data	Total n=578 employees within one engineering and technology research organization	Web-based survey	Main office: n=238 Satellite location: n=108 Client location: n=150 At home: n=82	Job satisfaction scale created for study (α=0.79); three-item five-point scale	Job satisfaction: Home-based and office workers reported similar levels of job satisfaction; work life balance significantly positively predicted job satisfaction: main office	Selection bias (non-random sampling) Low response rate (52.5% response rate)

				Exposure Terminology: working at home	Workplace inclusion scale created for study (α = 0.89); four items; five-point scale	workers reported significantly lower job satisfaction than home-based workers. Workplace inclusion: main-office workers reported the highest levels of workplace inclusion than home based workers.	Exposure measurement error: unclear if full-time virtual work or hybrid model. Outcome measurement error: no use of validated instrument
Song & Gao (2019); USA	Cross-sectional; retrospective analysis of existing data	Total 3962 respondents, full-time wage/salary workers between the ages of 18-65	American Time Use Survey 2010, 2012, 2013 Well-being modules	4 work classifications: Bringing work home, telework, nonworking, working in the workplace. Telework – defined as working at home, no episodes of work-related commuting on that day Exposure Terminology: Telework	Subjective well-being: Respondents asked to rate happiness, pain, sadness, stress, and tiredness they felt during their activity and to evaluate the meaningfulness of the activity using a scale from 0 to 6	Telework is associated with more stress; overall, working at home instead of in the workplace has a negative effect on subjective well-being (SWB); Failed to detect any beneficial effect of teleworking on SWB. Fathers experienced increased stress when teleworking on weekdays; Mothers feel less happy when teleworking on weekends compared to those working in the workplace. Teleworking on weekends is less painful for mothers than working in the workplace. Childless males- no difference in SWB between working at home and working in the workplace on weekdays but feel less painful when teleworking on weekends/holidays. Childless females no difference in SWB between working in the workplace and home working on weekdays, but feel more stressed when teleworking on weekends/holidays	Low response rate Exposure measurement error: unclear if these are full-time virtual workers or hybrid model. Outcome measurement error: not validated instrument.

Table 5.2 Summary of Qualitative Studies

Author/Year/ Location	Study type/design/methods	Phenomenon of interest	Study population/sample information	Context (exposure information)	Results	Level of Evidence	Conclusions	Limitations
Belle, Burley & Long (2015); USA	Phenomenology; semi-structured interviews	Organizational Belonging	10 High-intensity teleworkers' experience of organizational belonging	Telework: employees who perform full-time work at home for at least three out of five days in a traditional work week.	Not belonging is apparent where there is a lack of credibility, conflict, loss of stability and exclusion from ownership. Organizational belonging definition: experiencing an acknowledgement of one's talents, interests, and experiences, and finding whole acceptance of oneself expression of these. On the individual level, participants reported being able to identify with others who share their social or leisure interests, and who give attention to the daily occurrences that form part of their personal lives.	10 quotations provided for both narrative description of belongingness and exhaustive description of organizational belonging (table 2, P85)	Importance of high-intensity teleworkers possessing notions of organizational identification, desire to be included, and demonstrating communal qualities such as empathy, care for each other, and self-sacrifice.	Loss to follow-up: and the ability of the researchers to receive feedback from all participants during the validation phase of the study. Issues of organizational culture may have been missed due to structure of the question, though researchers probed when the subject arose. A more direct inquiry into organizational culture may have provided further insight
Wang, B., Qian, J., Parker, SK. (2021); China	Grounded theory, individual interviews	Well-being	39 participants who worked from home during the pandemic: range of industries and occupations. Most worked away from the office for the first time during COVID;. In this study, only one experienced remote worker	Remote Work: working from home until further notice	Remote work challenges: work-home interference, ineffective communication, procrastination, and loneliness	1-2 quotations provided for each item identified (table 2 p11-12)	Remote work challenges (work-home interference, ineffective communication, procrastination, and loneliness), Work factors: (social support, job autonomy, monitoring, and workload) and one key individual difference factor (workers' self-discipline) affect remote workers' performance and well-being.	Data collected in China ; Remote working in China and other developing countries is relatively new Research was conducted during COVID-19 Pandemic (added pressures

Grant, Wallace & Spurgeon (2013); United Kingdom	Exploratory Study	Well-being	11 e-workers across five organizations and three sectors (private, public and voluntary); all working remotely using technology independent of time and location for several years and consider themselves to be experts; one to two years of experience as a remote e-worker and proficiency using technology remotely to communicate with work.	E-workers: full-time, proficient with technology	Communication and support from colleagues emerged as two critical success factors to ensure successful remote working and to balance the psychological aspects of well-being. Managing boundaries –the collapsing of boundaries between work and private lives and the impact being able to work 24 hours a day, seven days a week has on other family members and health was a common theme. Social interaction: building relationships and maintaining communication channels both at work with colleagues and relationships outside of work emerged as a common theme for maintaining the psychological well-being of the interviewees	1-2 quotations provided within the text.	The research has raised some clear implications for e-workers and their managers: E-workers should not be allowed to become “invisible workers”, they may be very skilled at their job, but they do still require support to be effective remote workers. It is recommended that managers communicate regularly with remote workers, not just about work matters but also psychological issues such as over-work, managing work and home boundaries and their stress levels. -Trust, working practices, skills and competencies were important but so were considering the mental health issues of e-workers	The current study was limited in generalizability by the small qualitative sample

5.4 Synthesis of Findings

The results presented below are a narrative synthesis of the included qualitative and quantitative, followed by a combined synthesis comparing the results. The final sample is made up of eight studies, including 19,346 working individuals from single studies. Five studies explored well-being, two studies looked at concepts related to workplace isolation (organizational belonging and workplace inclusion) and three studies examined at job satisfaction.

5.4.1 Quantitative Synthesis

Statistical pooling was not possible; therefore, findings are presented in narrative form. We were unable to assess publication bias by generating a funnel plot as our review resulted in less than 10 studies. The following synthesis is made up of five cross-sectional studies (one primary data collection, four secondary data analyses) involving 19,286 individuals. Terminology used to describe virtual work included ‘telework’ and “remote work’. The quantitative literature, while not causal, indicates that there is a relationship between virtual work and job satisfaction, workplace isolation and well-being.

Job Satisfaction: Virtual workers are either equally or more satisfied with their job when compared to office workers. Secondary data analysis examining telework within a single organization (N=578) finds that virtual workers reported similar levels of job satisfaction than their main office counter parts (Morganson et al., 2010). However, when researchers considered whether work-life balance and workplace inclusion impacted job satisfaction, main office workers reported significantly lower job satisfaction than virtual workers (Morganson et al., 2010). A more recent study in a larger sample (n=13,086) indicates that remote workers are very satisfied or more with their jobs, when compared to office workers (Felstead & Henseke, 2017).

Finally, when examining high intensity workers in particular, results reveal that teleworkers (n=89) are more satisfied than office-based employees (n=103) and achieve significant benefits from their work arrangement, with work-life conflict most influential toward job satisfaction (Fonner & Roloff, 2010).

Workplace Inclusion: Workplace inclusion was not a factor included in our proposed framework; however, it is included in the review as it is a term in the literature that may relate to workplace isolation. Secondary data analysis in a sample of 578 individuals supports the idea that virtual workers may experience workplace isolation. Not surprisingly, main office workers reported higher workplace inclusion than those employees working from home (Morganson et al., 2010).

Well-being: Well-being in virtual workers was captured as a keyword related to mental health in the database search and captured in three studies. Overall, the findings are varied and indicate that individual factors and gender may mediate the relationship between virtual work and well-being. One study measured subjective well-being (SWB) in 3962 individuals, of which 180 individuals worked virtually from home (Song & Gao, 2020). SWB was measured by measuring six variables: happiness, pain, sadness, stress, tiredness, and meaningfulness (Song & Gao, 2020). Overall, working from home is associated with lower SWB when compared to working in the workplace: telework on weekdays or weekends/holidays is associated with more stress; parents, especially fathers, report a lower level of SWB when working at home on weekdays, but a higher level of SWB when working at home on weekends/holidays; non-parents SWB does not vary much by work location on weekdays; however on weekends/holidays, childless males feel less painful whereas childless females feel more stressed when working from home (Song & Gao, 2020). These findings suggest that having children may have an effect on the relationship between virtual work and SWB (Song & Gao, 2020).

Well-being while working was examined in a sample of 2471 workers, of which 304 were working remotely from home (Giménez-Nadal et al., 2019). Well-being of workers in their job tasks was measured via five items (pain, happiness, sadness, fatigue, and stress), and teleworkers were compared to their commuter counterparts. Overall, male teleworkers are better off than male commuters in terms of instantaneous well-being while working, reporting lower levels of stress, pain and tiredness (Giménez-Nadal et al., 2019). Female teleworkers were no different when compared to female commuters (Giménez-Nadal et al., 2019).

5.4.2 Qualitative Synthesis

The synthesis of qualitative literature is based off three studies that examine the experiences of 60 teleworkers. The qualitative literature search captured concepts of workplace isolation (organizational belonging) in one paper, and well-being in two papers. Additional factors captured, not included in this review include experiences around work-life balance.

Organizational belonging: The term workplace isolation was an intermediate outcome in the search; however, it was not directly captured in the review. One study describes the experience of organizational belonging (a related term for workplace isolation) in teleworkers. Organizational belonging and organizational inclusion were explored in ten individuals employed across a variety of industries (Belle et al., 2015). Not belonging was apparent when there was a lack of credibility, conflict, a loss of stability and exclusion from ownership (Belle et al., 2015).

Psychological Well-being: A study involving eleven in-depth interviews indicates that e-working impacts well-being by challenging the management of boundaries between work and private lives, and social interaction (Grant et al., 2013). The blurred boundaries between work and

private lives and the impact of being able to work 24 hours a day, seven days a week was a common theme: "[…the blur between work and home is badly affected. I work 12-14 h days as a norm and it is impacting my well-being. Clients can always reach me […] I don't think I'm as productive because I'm so exhausted". Habitual accessing of work remotely, ignoring family commitments, preferring to work instead of engaging with family, not knowing when to stop working for rest damages health, including logging onto work past normal hours and over-working are all examples from the interviews, identifying ways in which remote working can impact well-being (Grant et al., 2013).

Social interaction has been found to be impacted by virtual work: building relationships and maintaining communication channels both at work with colleagues and relationships outside of work is an important factor in maintaining the psychological well-being of individuals (Grant et al., 2013). Trust in the remote worker impacts well-being as there is limited opportunity to build trusting relationships, and the remote worker experiences a lack of trust on behalf of their organization. Employees reported that building trusting relationships while working remotely was challenging. Overall, communication and support from colleagues emerged as two critical success factors to ensure successful remote working and to balance the psychological aspects of well-being.

5.4.3 Integration of Qualitative and Quantitative Syntheses

While the literature in this review is limited, overall, the qualitative literature provides some context to the quantitative findings, primarily the quantitative findings related to decreased well-being and decreased organizational belonging. The quantitative literature suggests that there is a positive relationship between virtual work and job satisfaction (Felstead & Henseke, 2017;

Fonner & Roloff, 2010; Morganson et al., 2010), however there were no qualitative studies to provide supporting contextual evidence in this area.

5.4.3.1 Virtual Work, Well-being & Mental Health

We hypothesized that virtual work would have a negative impact on mental health, and the results of this review conclude that the association of virtual work and mental health as it relates to mental illness, has not been directly examined directly in the past ten years. The studies included in this review included key terms related to mental health: subjective well-being, and well-being, and indicate that there is an association between virtual workers and subjective well-being, when compared to office workers (Giménez-Nadal et al., 2019; Song & Gao, 2020). The findings are conflicting, though suggestive of supporting our hypothesis that virtual work may negatively impact well-being.

The included quantitative studies use the same data source (American Time Use Survey Well-Being Modules) but employ different empirical research methods and demonstrate conflicting results. The first paper by Giménez-Nadal and colleagues, mainly analyzes the characteristics of teleworkers but also investigates how telework affects subjective well-being. They find that male teleworkers experience improved well-being, including lower levels of stress, tiredness and pain while working than their commuter counterparts. These differences are present after controlling for differences in the type of jobs between the two groups of workers, indicating that such differences are not due to differences in jobs. Interestingly, there was no difference found in female teleworkers versus office workers. This may indicate that, despite female telecommuters having greater flexibility with their working hours and schedules than their counterparts, they may still have problems balancing work and household responsibilities and therefore, do not experience the improved well-being experiences that males do.

It was noted that Giménez-Nadal et al. controlled for limited demographic factors and job characteristics and their results may therefore be subject to some bias, limiting our trust in their findings. Again, due to the limited findings in this area, we continued to include this study in the review, while identifying and describing the limitations in the design.

Unlike Giménez-Nadal and colleagues, Song & Gao present different results, suggesting that telework negatively affects subjective well-being (SWB) (Song & Gao, 2020). Overall, this study adopts a more rigorous research design, leading to more reliable results. They consider two types of homeworking (telework and bringing work home outside the office), they separate the sample by working weekdays and weekends, include a comprehensive set of confounding factors, and include one additional year of well-being data and a larger sample, and employ fixed effects modelling to control for individual differences within the sample. Findings suggest that telework is associated with more stress and has a negative effect on subjective well-being (Song & Gao, 2020). Teleworking on weekdays is associated with a higher level of stress for fathers, and mothers are less happy when teleworking on weekdays (Song & Geo, 2020). For childless workers, their SWB does not vary much by where they work on weekdays. These results on fathers and childless males are different than that of Giménez-Nadal et al, who found that male teleworkers experienced improved SWB, perhaps explained by more rigorous design by Son and Gao. Overall, the comparison of parents and non-parents highlights the idea that working at home affects SWB through increased work-family conflicts and work-life balance challenges. Parents perhaps have a more complicated work-family relationship, with families being demanding on one's time. As a result, working at home may affect the SWB of parent's more than non-parents.

The higher level of stress associated with telework could possibly be explained by increased demands of balancing home and work. However, Song and Gao control for whether the respondents conduct childcare or elder care as a secondary activity in addition to work, suggesting that the increased stress is not simply the result of balancing childcare with telework (Song & Gao, 2020).

While we find the results of Son and Gao to be more reliable than Giménez-Nadal et al., there are limitations in both studies. Firstly, the American Time Use Survey (ATUS) does not directly characterize teleworkers and thus the exposure variables in both studies may not be consistent. Further, the ATUS is a cross-sectional database, therefore results cannot provide causality and the association may be due to unmeasured/unobserved factors or reverse causality (e.g., those with lower mental health are more likely to work at home).

The qualitative literature supports the findings of Son and Gao, and provides some context to the results (Grant et al., 2013; Wang et al., 2021). Virtual workers experience adverse effects on their well-being, due to over-working and a lack of time for recuperation. Overall, the two included qualitative studies that explore well-being are well designed, and thorough in providing conceptual frameworks and supporting literature for both phenomena of interest and key outcomes of interest leaving us confident in their findings. Grant et al (2013) explored psychological factors affecting e-workers across different organizations while Wang et al. completed their study in virtual workers in 2020 during the Covid-19 pandemic.

Communication and support from colleagues are identified as critical success factors to ensure successful remote working and to balance the psychological aspects of well-being (Grant et al, 2013). Social interaction, building relationships and maintaining communication both at

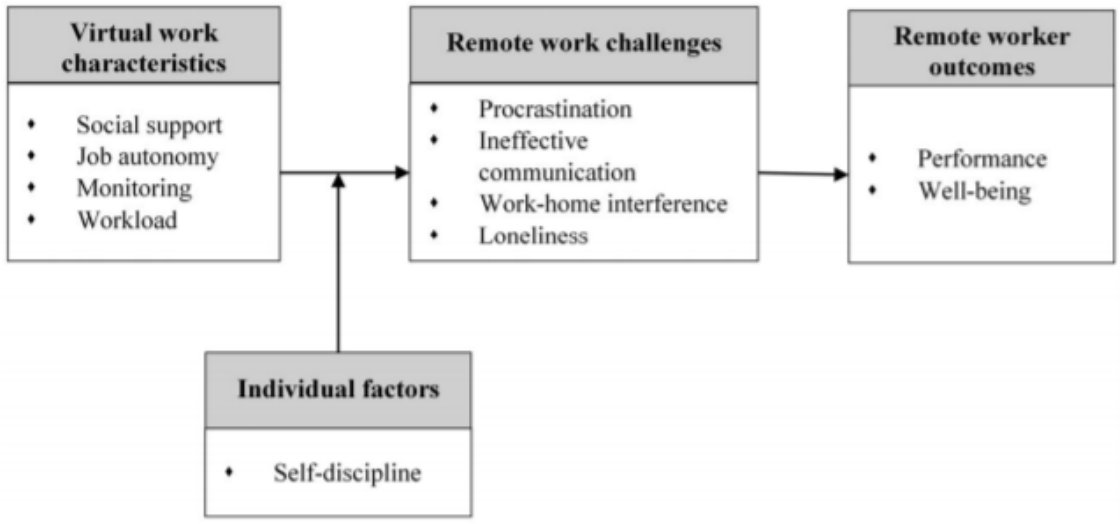
work with colleagues is a common theme for maintaining psychological well-being (Grant et al., 2013). One interviewee indicated that they would prefer to be in the office to maintain social contact: "I'm probably a person who would enjoy coming more into the office rather than staying at home" (Grant et al., 2013). Being able to manage social interaction when away from the office and missing social cues when remote working were also raised. An alternative view is that other family members may be around to provide support: "some say they miss social company, but I don't feel isolated. The husband is at home". "I think working in the office is better…when you are working from home, it is difficult to seek help from colleagues or leaders…" (Wang et al., 2021).

Further, managing boundaries between work and home has impacted well-being in virtual workers (Grant et al., 2013). The collapsing of boundaries between work and private lives and the impact of being able to work 24 hours a day, seven days a week has on health was a common theme: "[…] the blur between work and home is badly affected. I work 12-14 h days as a norm, and it is impacting my well-being. Clients can always reach me […] I don't think I'm as productive because I'm so exhausted" (Grant et al., 2013). Virtual workers over-work to relieve work pressures and need to manage home and work boundaries carefully (Grant et al., 2013). Habitual accessing of work remotely, ignoring family commitments, preferring to work instead of engaging with the family, not knowing when to stop working for respite so that it damages health, including logging onto to work past normal hours and over-working are examples from the interviews of where remote working can outweigh the benefits of flexibility (Grant et al., 2013). "You can become addicted to it; it is there so you just start work". This can limit the amount of time left for non-work and respite from work activities (Grant, 2013). "I have been advised that I need to draw strict boundaries to get my life back" (Grant et al., 2013). Wang and

colleagues found that the work-home interference was a challenge with remote work: “The same thing can be solved immediately in the office, because there is no other thing involved. At home, when I was about to prepare for the task, the child came (Wang et al., 2021). At this time, I would certainly put the work at hand to deal with some home affairs, and the work efficiency is definitely not as high as in the office”.

Findings generated from the qualitative studies provide context to the quantitative literature, revealing the set of challenges in remote working that may negatively affect individuals’ well-being. Wang et al. (2021) developed a theoretical model to summarize their findings and explain how virtual work characteristics matter in the current remote work context demonstrated in figure 5.2 below.

Figure 5.2 Theoretical framework: remote challenges and remote worker outcomes (Wang et al., 2021).



5.4.3.2 Virtual Work & Workplace Isolation

The review of the literature in this area supports our hypothesis that virtual work from home results in increased workplace isolation. The results highlight the lack of causal literature in this area. Further, there is a lack of consistent language, as the one study included in this review examined virtual work and workplace inclusion, rather than the concept of workplace isolation and the qualitative literature describes the concept of organizational belonging. Morganson et al (2010) identified a large effect between work arrangement and workplace inclusion indicating that people working in a client location were less likely to experience workplace inclusion than main office workers (Morganson et al., 2010). The findings of the included study support claims that social isolation is a drawback of teleworking (Morganson et al., 2010). Main office workers reported significantly higher inclusion than home office workers. This study points to the importance of workplace inclusion and its impact on the telework-job satisfaction relationships. Home based and main office workers reported similar levels of job satisfaction; however, after controlling for differences in inclusion, the job satisfaction of remote workers was much higher.

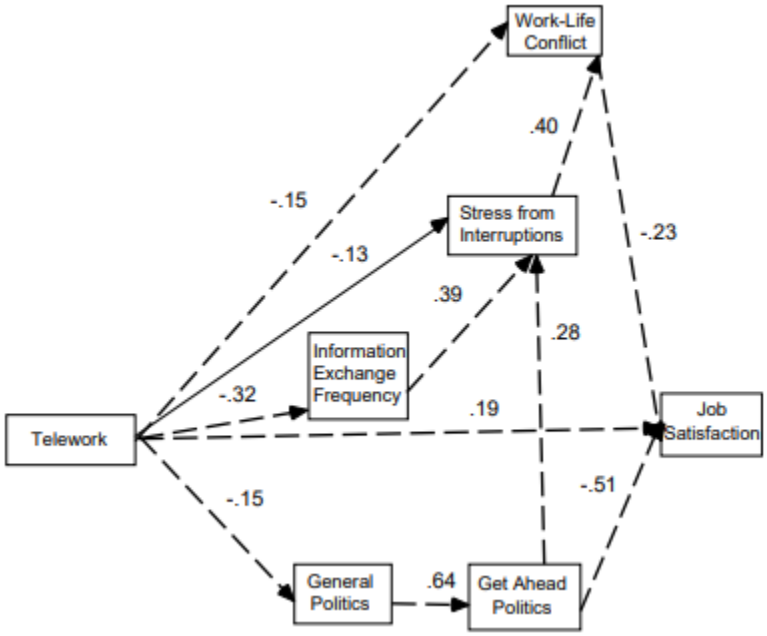
The qualitative review in this area is based on two studies indicating that workplace isolation is a concern with virtual, due to fewer face-to-face interactions with co-workers and feelings of loneliness (Wang et al., 2020). “I feel lonely working at home… compared to face-to-face interactions, online communications cannot give people a sense of intimacy and closeness.” (Wang et al., 2020 p11). Social interaction may be limited to family and local friends, and virtual workers may miss out on the office grapevine excluding them from important information.

Organizational belonging has been investigated in high-intensity teleworkers, indicating that experiences of not belonging develop where there is a lack of credibility, conflict, and loss of stability and exclusion from ownership (Belle et al., 2015). This study provides a definition of organizational belonging: experiencing an acknowledgement of one's talents, interests, and experiences, and finding whole acceptance of oneself expression of these. Overall, virtual workers have a desire to be included, and the challenge for organizations is to nurture the kind of relationship with its employees such that they feel the organization cares about their contributions and values their well-being (Belle et al., 2015). While the qualitative literature is limited in this area, this one study provides a rich sense of organizational belonging as it is experienced by high-intensity teleworkers.

5.4.3.3 Virtual Work and Job satisfaction

We hypothesized that a review of virtual work and its association would indicate a negative relationship between virtual work and job satisfaction. The quantitative literature suggests that there is a positive relationship between virtual work and job satisfaction (Felstead & Henseke, 2017; Fonner & Roloff, 2010; Morganson et al., 2010), the qualitative did not provide evidence in this area. The review includes three cross-sectional papers indicating that virtual work leads to improved job satisfaction, when controlling for workplace inclusion. Fonner and Roloff (2010) examined the extent to which telework affects job satisfaction through several intermediate variables. They found that that high-intensity teleworkers are more satisfied than office-based employees. Further, these workers achieve significant benefits from their work arrangement, with work-life conflict most influential toward job satisfaction (Fonner & Roloff, 2010). They provide a path model revealing the complex indirect path linking telework and job satisfaction in Figure 5.3.

Figure 5.3 Path-analytic model: relationship of work arrangement to job satisfaction, mediated by work-life conflict, information exchange frequency, stress from meetings and interruptions, general politics and get ahead politics. Broken lines indicate statistically significant relationships (Fonner & Roloff, 2010).



These results are supported by Morganson et al. (2010), who analyzed web-based survey data, revealing that home-based workers reported higher job satisfaction than main-office workers when controlling for workplace inclusion (Morganson et al., 2010). Finally, Felstead and Henseke (2017) also report that remote workers experience higher levels of job satisfaction when compared to office workers (Felstead & Henseke, 2017).

Chapter 6: Discussion

6.1 Summary of Findings

Our research question is focused on the association between full-time virtual work and mental health when compared to office workers. The results of this review suggest that there is a relationship between virtual work, and the following outcomes: mental health (well-being), job satisfaction, and workplace isolation. The body of knowledge has identified significant differences in well-being, job satisfaction, and workplace isolation when comparing virtual workers to office workers, perhaps due to virtual workers experiencing increased work-life balance challenges, increased workload, and decreased interactions with colleagues. Causation cannot be inferred from this review due to a lack of longitudinal studies. Our findings agree with some of the existing literature, particularly, the literature identifying factors that negatively affect virtual workers, including increased workplace isolation, reduced mental well-being. Our findings related to virtual work indicate a positive relationship with job satisfaction, disagreeing with our initial literature search that indicated a negative relationship between virtual work and job satisfaction.

6.1.1 Virtual Work, Well-being & Mental Health

The results of this review indicate that there is an association, between virtual work and mental health (mental well-being and well-being). The results are conflicting, as both positive and negative mental well-being outcomes were identified. The findings of a negative relationship between virtual work and mental well-being are founded on stronger, more rigorous research design, with supporting qualitative contextual evidence. Therefore, suggestive that the relationship between virtual work and mental health is likely negative, supporting our hypothesis that virtual work reducing mental health outcomes.

Song and Gao indicate that telework is associated with more stress and has a negative effect on subjective well-being (SWB) (Song & Gao, 2020). These findings agree with a large body of existing literature presented in the literature review. A comparison of parents and non-parents highlights the idea that working at home affects SWB through increased work-family conflicts and work-life balance challenges. Parents perhaps have a more complicated work-family relationship, with families being demanding on one's time. As a result, working at home may affect the SWB of parent's more than non-parents. The higher level of stress associated with telework could possibly be explained by increased demands of balancing home and work.

The Giménez-Nadal and colleagues identified a positive relationship between well-being and virtual work; however, their study is of weaker design. There is a body of literature that supports these findings, showing that teleworkers report higher levels of well-being (A. J. Anderson et al., 2015; Kossek et al., 2006) and lower levels of strain (Bentley et al., 2016). However, it is important to note that these studies did not provide a comparison of virtual workers to office workers, methodologies were not critically appraised as part of this review, and therefore, should be interpreted with caution.

When comparing men and women, there were notable differences: men appear to experience improved well-being, while there are no differences found in women. This may indicate that, despite female telecommuters having greater flexibility with their working hours and schedules than their counterparts, they may still have problems balancing work and household responsibilities and therefore, do not experience the improved well-being experiences

Overall, we find the literature supportive of our hypothesis that virtual work may negatively impact well-being, however with the conflicting findings of this review, and

disagreement in the existing literature, we cannot conclude the direction of this relationship without further quantitative evidence. Finally, this review concludes that mental health as it relates to mental illness has not been studied in the past ten years. Previous literature found a positive relationship between telework and depression; they identified the decrease in face time with other employees and social isolation as the likely explanation (Campione, 2008).

6.1.2 Virtual Work & Workplace Isolation

This review indicates that virtual work from home results in increased workplace isolation, agrees with the current literature presented in literature review. The most notable finding in this area is the lack of causal data. Further, there is a lack of consistent language when considering isolation, as other terms such as inclusion, organizational belonging have also been identified, with limited supporting definitions. Overall, social interaction may be limited to family and local friends, and virtual workers may miss out on the office grapevine excluding them from important information. While the qualitative literature is limited in this area, one particular study provides a rich sense of organizational belonging as it is experienced by high-intensity teleworkers.

6.1.3 Virtual Work and Job satisfaction

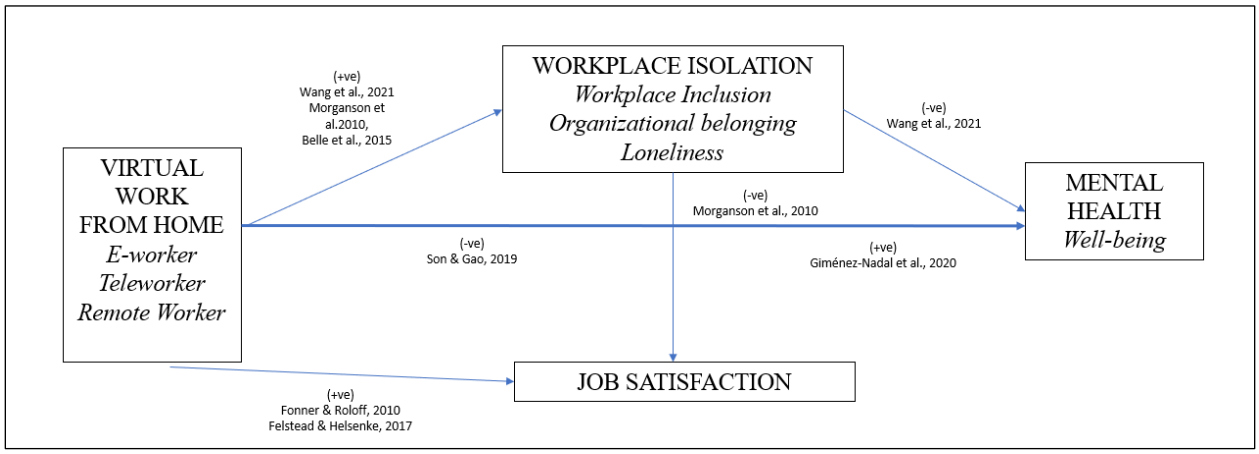
Our overall findings suggest that there is a positive relationship between virtual work and job satisfaction (Felstead & Henseke, 2017; Fonner & Roloff, 2010; Morganson et al., 2010), however the qualitative did not provide evidence in this area. This conflicts with our findings of our literature review, which presents literature indicating a negative relationship between virtual work and job satisfaction. While the existing literature in this area is sparse, we may suspect that telework may be associated with improved job satisfaction because it provides individuals autonomy and flexibility to meet their own needs and personal life demands (Baltes et al., 1999;

T. D. Golden & Veiga, 2005). In Sullivan and Lewis's (2001) qualitative study of home-based workers, increased independence and autonomy in scheduling work emerge as advantages of teleworking (Sullivan & Lewis, 2001). In other qualitative research, increased employee morale was identified as an outcome of working from home (Hill et al., 2003; Hill et al., 1998). In an empirical study comparing mobile and home-based workers, home-based workers reported higher levels of job satisfaction (Hill et al., 2003). Previous meta-analytic findings revealed a positive relationship between home-based telework and job satisfaction (Gajendran & Harrison, 2007). Our review did not find any qualitative data exploring the experience of full-time virtual workers and job satisfaction to provide context to the quantitative findings. Given the limited literature in this area and the disagreement that exists, future research should examine the impact of virtual work over-time, both quantitative and qualitative.

6.2 Theoretical Framework

Our proposed conceptual framework based on the initial literature review has been adjusted to reflect the evidence found in this review. Much of the literature used to develop the proposed framework was excluded for several reasons: studies were completed prior to 2010, full-time virtual work was not the exposure of interest, and the comparison between office and virtual workers was not included. Figure 6.1 below represents the adjusted theoretical framework, highlighting the association with each outcome. The findings of this review indicate that virtual work has a positive impact on well-being, workplace isolation and job satisfaction. Virtual work was also found to be negatively associated with mental well-being. Finally, workplace isolation was found to be negatively associated with mental health.

Figure 6.1 Theoretical Framework illustrating the relationship between virtual work and mental health.



6.3 Strengths and Limitations of Existing Literature

The primary limitation in this body of literature is that all quantitative studies are of observational, cross-sectional design and therefore, there is no causal data to determine the association between virtual work and any of our outcomes of interest. There is very limited qualitative data that specifically looks at full-time virtual workers, resulting in limited qualitative literature providing context to quantitative knowledge. Below we will review the epidemiological considerations related to the included studies and the assess the qualitative literature included.

6.3.1 Quantitative Literature: Epidemiological Considerations

6.3.1.1 Cross-sectional Design Considerations

Cross-sectional designs are most appropriate for developing hypotheses because they require a relatively shorter time commitment and few resources to conduct (Carlson & Morrison,

2009). While they are relatively cost effective to conduct, investigators can study a diverse population in a range of settings, and sophisticated multivariate techniques may be utilized in an attempt to account for confounding, however, there are several limitations that should be reviewed. Firstly, since the exposure and outcome are simultaneously assessed, there is generally no evidence of a temporal relationship between exposure and outcome (Carlson & Morrison, 2009). While the investigators may determine that there is an association between virtual work and our outcomes of interest, there is generally no evidence that the exposure caused the outcome (Carlson & Morrison, 2009). The second limitation of the cross-sectional design is that the study evaluates prevalent rather than incidence outcomes and thus excludes people who develop the outcome but perhaps are unavailable to participate in the study (in this case, due to absence from work due to mental health) (Carlson & Morrison, 2009). There is a bias towards inclusion of individuals with more favourable outcomes (Carlson & Morrison, 2009). Selection bias will be discussed further below. Finally, cross-sectional designs should be assessed for whether alternative explanations for study results have been appropriately ruled out, for example, by measuring and controlling for potential confounding variables. The control of confounding variables in the included studies will be addressed below as well.

Three of the included studies are analyses of secondary data. Secondary data analysis has many benefits, including being relatively quick to conduct and inexpensive, sample sizes tend to be large, and samples may cover a large geographic area, allowing for ability to assess national trends, and is unobtrusive to subjects (Carlson & Morrison, 2009). However, disadvantages are that the data may not include all variables of interest and it may be difficult to understand how and why data elements were collected (Carlson & Morrison, 2009). Only one study used primary data (Fonner & Roloff, 2010), allowing investigators to control all aspects of the study, including

design, sampling techniques, data collection and follow-up methods. As a result, all variables of interest to the researcher were measured, allowing for more valid and reliable findings than a secondary data analysis design. Overall, the quantitative studies included are of high external validity, and low internal validity due to limitations within the cross-sectional study design. Given the limited literature in this area, these studies were included in this review, with design limitations discussed in the sections below.

6.3.1.2 Validity

Validity refers to a lack of systematic error (Carlson & Morrison, 2009). Observational studies were evaluated in terms of both internal and external validity.

Internal validity refers to the degree of systematic error in a study. Lower internal validity results in greater bias. The key question in assessing internal validity is whether the observed changes can be attributed to the exposure and not to other possible causes. One particular way that internal validity of a study may be compromised is by not having a control group or by having a control group that is not comparable to the exposed group in measurable or unmeasurable ways (Carlson & Morrison, 2009). Our research question guided this review to ensure included studies consist of a control group of office workers (unexposed) in comparison to virtual workers (exposed); therefore, all studies included in this review involved a comparison group. Most of the evidence is based on secondary data analysis that included limited confounding variables. The internal validity of these studies is therefore limited in comparison to those studies that included more rigorous collection of potential confounding variables. Further, internal validity may be compromised by measurement (information bias), selection (selection bias) and confounding bias. These additional concerns will be addressed in the following

sections. Despite these concerns, the limited literature in this area led us to include all studies in the review.

External validity is the ability to generalize study results to a more universal population (Carlson & Morrison, 2009). External validity is the degree to which the conclusions in a study would hold for other populations (Carlson & Morrison, 2009). The most common loss of external validity in observational research comes from studies that employ small samples obtained from a single geographic location or facility (Carlson & Morrison, 2009). Because of this, one cannot be sure that the conclusions drawn about cause-effect relationships apply to people in other geographical locations. While three of the studies contain very large samples from national datasets, allowing for strong external validity, two studies included smaller samples and particular workplaces: high intensity teleworkers and employees within two organizations. These studies demonstrate lower external validity.

6.3.1.1. Bias due to Uncontrolled Confounding

Confounding may be one of the most important considerations in observational epidemiologic studies. Uncontrolled confounding is the effect of a third variable that is related to the two variables under study (Celentano & Szklo, 2019). This relationship can alter the apparent relationship between the exposure and outcome variables (Celentano & Szklo, 2019). One particular variable that has not been considered in the literature is the access to virtual software to communicate with colleagues, or additional organizational variables. Applications such as Zoom and Microsoft Teams have been implemented to maintain visual communication among employees and may have an impact out the experience of virtual workers. Further, organizational culture may impact outcomes related to virtual work. Social experiences of the employees is also an important factor to consider (e.g., whether employees have met their employers or colleagues

physically in person. Future literature should consider all of these factors in order to control for confounding factors.

6.3.1.3 Selection Bias

Selection bias is a concern affecting cross-sectional studies (Celentano & Szklo, 2019). Non-response was identified in the quantitative studies reviewed, and becomes a significant concern when the characteristics of the non-responders differ from responders (Celentano & Szklo, 2019). This becomes a particularly concerning when the characteristics of the non-responders differ from responders. Generally speaking, those who refuse to participate in a study often differ from those who participate in demographic, socioeconomic, cultural, lifestyle and health status factors. Therefore, non-response is an important issue to address in any cross-sectional design (Celentano & Szklo, 2014).

6.3.1.4 Measurement Error

Measurement of virtual/tele-work is inconsistent and much of the literature is inconsistent in classifying part-time vs full-time virtual work. A large body of literature was excluded from this review as the exposure was not defined as full-time virtual work. For the included studies, the measures used to assess outcome variables were not validated instruments. While some studies provided confirmatory factor analysis and Chronbach's alpha values, some outcomes were measured with only a single question "e.g. how satisfied were you in your job". Future studies should implement the use of validated instruments.

6.3.2 Qualitative Literature: Methodological Considerations

The qualitative literature, while limited, provides some strength to this body of knowledge, as this reviewer concludes all studies were well designed, and employ rigorous

analysis techniques. Objectives and methodology are presented clearly in all studies, researcher positionality is acknowledged, and participants voices are adequately represented. A number of quotations are presented for all findings. The conclusions drawn from the research are clearly developed from thorough transcript analysis. Loss to follow-up during the validation phase of study was noted as a concern in one particular study. Further, like the quantitative data, full-time and part-time are not well-defined: results from these two levels of exposure should be analyzed and presented separately. Overall, the qualitative literature provides strong context to the quantitative findings.

6.4 Strengths and Limitations of This Review

This systematic review has focused on the comparison of office workers and virtual workers. To our knowledge, this is the first review to be completed in this area, with novel results highlighting gaps in the current literature.

Despite the strengths of the current review, such as its rigorous contextual framework and breadth of search efforts, there are some limitations that need to be address. Particularly, this review focuses on research within a specific time frame, excluding any research conducted before 2010. Consequently, including different studies prior to 2010 may result in different findings. However, this is a common limitation of both systematic reviews and meta-analyses (Harker Martin & MacDonnell, 2012). Further, our inclusion criteria was set at 2010 to account for the technological changes that have taken place for virtual workers in more recent years. In our opinion, the experiences, and findings in studies prior to 2010 would be very different than that of today. Secondly, this study was completed with one reviewer, therefore, results are subject to some bias.

6.4.1 Internal and External Validity

Validity is the extent to which our conclusions are well-founded, given the design and analysis of the study (Celentano & Szklo, 2019). Internal validity refers to how well a study reduces its own systematic error (Celentano & Szklo, 2019). This review paper was conducted by one reviewer; therefore, interrater reliability could not be calculated and there is some risk of error. This risk is mitigated by a rigorous approach to study selection and appraisal, using standardized tools to critically appraise all studies. External validity is the extent to which the findings of a study can be generalized to different groups. In this case, given the limited amount of literature, it is challenging to generalize our results. Overall, this study highlights the need to conduct more rigorous experimental research in this subject area.

6.5 Implications and Significance of This Study

Despite discussed limitations, we believe that this review can offer implications for practice to a variety of stakeholders. Considering that the impact of virtual work on well-being is complex, organizations should weight these concerns and consider the challenges that virtual work can bring. These challenges can be exacerbated for those who have children at home. Organizations may consider the positive impact that virtual work may have on job satisfaction; however, they should consider that workplace isolation may cause the opposite to occur. Individuals should be aware of the isolating nature of virtual work, as per this review, the importance of social support from colleagues is especially heightened for individuals working virtually from home. Organizations should openly discuss ways to decrease feelings of isolation with virtual workers and should be encouraged to create social support networks between virtual workers, colleagues, and supervisors.

6.6 Suggestions for future research

The results of this review demonstrate the complex relationship between virtual work and several outcomes. To further understand the body of knowledge related to virtual work, a systematic review identifying all factors impacting virtual workers may help to guide future experimental literature. The results of such a review would identify important intermediate outcomes of virtual work that may impact mental health that have not been included in this study; findings from such a review would complement the findings of this study, helping to guide experimental research in this area. When it comes to future experimental research, studies should continue to focus on mental health: future studies should consider examining mental illness as this is lacking in the literature and build upon the findings of mental well-being that were uncovered in this review. To better understand the causal relationship between virtual work, job satisfaction, workplace isolation and mental health, future experimental research is needed. It is imperative for future research to explore the causal relationship between virtual work and mental health. A multi-dimensional approach that includes all intermediate outcomes related to mental health is suggested, as this review points to the complex relationships between mental health and a number of intermediate factors.

Finally, future observational research may also provide further insight into the outcomes of virtual work. Observational cohort design would be ideal, to determine the association between virtual work and mental health. Since the existing cross-sectional literature is primarily secondary data analysis lacking robust collection of potential confounding variables, any additional studies of this design should be done as primary data collection in order to include a wide range of confounding variables, including access to technology and organizational factors including workplace culture. Further, any cross-sectional studies should use validated

instruments when measuring outcomes, as this is a concern with the existing literature in this area.

Chapter 7: Conclusions

Mental health is an important indicator of overall health (World Health Organization, 2004b) which is costly to the Canadian economy on an annual basis. One in five Canadians will experience a psychological health problem in any given year, with $20 billion in costs resulting specifically from work-related causes (Mental Health Commission of Canada, 2016). With the average Canadian spending 30-40 hours per week working (Mental Health Commission of Canada, 2016), the importance of understanding work-related mental health outcomes is significant.

Our review of the literature suggests that employees working from home are faced with added challenges that may further impact mental health, including impact to well-being, and workplace isolation. However, the literature suggests that virtual workers are more satisfied than their office counterparts. Overall, the literature is conflicting, and we conclude that more rigorous methodology be applied to future observational studies, and opportunities for experimental research be explored.

The findings of this review are particularly concerning today, as Covid-19 has changed the world of work for many Canadians. Interestingly, Canadians who were working from home during the pandemic reported that they were just as likely to report having good, very good, or excellent mental health as those who usually from work from home and those who continued to work at locations outside of the home (Government of Canada, 2020a). This review indicates that the association between virtual work and well-being is unclear. Some studies suggest a reduction in wellbeing while others indicate positive associations between virtual work and improved job satisfaction. Taking into consideration the experiences reported by Canadians, and the inconsistencies reported in the literature, it is critical that we address this particular field of

research. Sytch and Greer (2020) argued that the post pandemic work will be hybrid, that is, remote work will be more prevalent in the future. Indeed, Facebook and Twitter have announced that their employees can choose to work from home “forever” after the pandemic (Sytch & Greer, 2020). The changing world of work resulting from the COVID-19 pandemic makes this subject area even more significant today.

Chapter 8: Knowledge Translation and Exchange

I will disseminate the findings of this review, ensuring that the appropriate stakeholders are informed of the results. Stakeholders include employees, employers, compensation systems, healthcare providers and society in general. Results of the review will be shared through public presentations and peer reviewed journals. As a recipient of the Institute for Work and Health (IWH) Syme Fellowship, I will have the opportunity to present my findings at one of the monthly IWH Speakers Series. These live-stream webinars allow stakeholders and researchers to hear about new research, with the opportunity to ask questions and engage in discussion with the researcher. Additionally, as a student with Enhancing the Prevention of Injury and Disability at Work (EPID@Work) Research Institute, I will present my findings at one of the EPID Talks Sessions held four times throughout the academic calendar. Like the IWH Speakers Series, these live-stream webinars engage community stakeholders, students, and other researchers. For both presentations, recorded webinars are made available on the related web page within a week of the event. The results will also be disseminated by peer-reviewed journal publications.

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Appendix A: PRISMA Guideline Checklist:

Checklist of items to include When reporting a systematic review:

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	5
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	31
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	n/a
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	35-36
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	35-36
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	35-40

Section/topic	#	Checklist item	Reported on page #
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	40-42
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	42
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	42-44
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	40-42
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	n/a
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	43
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	40-42
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	n/a – narrative summary
RESULTS			
Study selection	10 1	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	Appendix D
Study characteristics	10 3-11 5	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	Appendix E&F

Section/topic	#	Checklist item	Reported on page #
Risk of bias within studies	10 2	Present data on risk of bias of each study and, if available, any outcome-level assessment (see Item 12).	Appendix E&F
Results of individual studies	99	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group and (b) effect estimates and confidence intervals, ideally with a forest plot.	Appendix E&F
Synthesis of results	52	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	n/a – narrative summary
Risk of bias across studies	45	Present results of any assessment of risk of bias across studies	n/a- narrative summary
Additional analysis	n/a	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression)	n/a- narrative summary
DISCUSSION			
Summary of evidence	57	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., health care providers, users, and policy makers).	45
Limitations	67	Discuss limitations at study and outcome level (e.g., risk of bias), and at review level (e.g., incomplete retrieval of identified research, reporting bias).	45
Conclusions	75	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	48
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	N/A

Appendix B: Finalized Logic Grid

Population: Office Workers

Comparison/**Co**: Working in an office/central location

	Intervention/Exposure	**O**utcomes	Intermediate **O**utcome
Mental Health	virtual work OR telework OR remote work OR electronic work OR electronic home work OR satellite work OR mobile work	**AND Mental health or mental illness OR mental well-being OR psychological health OR Psychological well-being OR social well-being OR emotional well-being OR well-being**	
Workplace Isolation	virtual work OR telework OR electronic work OR electronic home work OR satellite work OR mobile work	AND Mental health or mental illness OR mental well-being OR psychological health OR Psychological well-being OR social well-being OR emotional well-being OR well-being	**AND workplace isolation OR social isolation OR organizational isolation**
Job Stress	virtual work OR telework OR remote work OR electronic work OR electronic home work OR satellite work OR mobile work	AND Mental health or mental illness OR mental well-being OR psychological health OR Psychological well-being OR social well-being OR emotional well-being OR well-being	**AND Job Stress OR job strain OR job control OR occupational stress OR workplace stress**
Job Satisfaction	virtual work OR telework OR remote work OR electronic work OR electronic home work OR satellite work OR mobile work	AND Mental health or mental illness OR mental well-being OR psychological health OR Psychological well-being OR social well-being OR emotional well-being OR well-being	**AND job satisfaction**
Supervisor Satisfaction	virtual work OR telework OR remote work OR electronic work OR electronic home work OR satellite work OR mobile work	AND Mental health or mental illness OR mental well-being OR psychological health OR psychological well-being OR social well-being OR emotional well-being OR well-being	**AND supervisor satisfaction**
Negative Communication	virtual work OR telework OR remote work OR electronic work OR electronic home work OR satellite work OR mobile work	AND Mental health or mental illness OR mental well-being OR psychological health OR Psychological well-being OR social well-being OR emotional well-being OR well-being	**AND negative communication OR cyber incivility OR harassment OR intimidation OR bullying OR cyberbullying**

Appendix C: Individual Database Search Results

Database 1:	ABI Inform Global	786
Database 2:	Psych Articles	132
Database 3:	Psych Info	129
Database 4:	Coronavirus Research Database	152
Database 5:	Publicly Available Databases	436
Database 6:	Sociological Abstracts	158
Database 7:	Applied Social Sciences Index and Abstracts (ASSIA)	105
Database 8:	CINAHL	27
Database 9:	Web of Sciences	109
Database 10:	PubMed	388
	Total	2422

Appendix D: Critical Appraisal Results

Reviewer: K Polson **Date: May 1, 2021**

Author: Giménez-Nadal, JI., Molina, JA., Velilla, J. **Year: 2020**

	Yes/No; Unclear; Not Applicable	Comments
1. Were the criteria for inclusion in the sample clearly defined?	Y	Yes, description of participants included into the study, US population 15 and over; very clearly defined sample: full-time wage workers, 18-65
2. Were the study subjects and the setting described in detail?	Y	Adequate allowing other researchers to determine if comparable to the population of interest (time period, location, demographics all included)
3. Was the exposure measured in a valid and reliable way?	Y	Questionable, Teleworkers identified from the diary-level information as those workers who do not report any period of time "commuting to work"; there could be variation on different days
4. Were objective, standard criteria used for measurement of the condition?	Y	Yes, those included in the study and in the analysis were.g. rouped according to workplace; standard measures for outcomes used for all participants
5. Were confounding factors identified?	Y	Yes- demographic and job characteristics considered (limited)
6. Were strategies to deal with confounding factors stated?	Y	Yes, controlled for in OLS models; however, they only control for limited demographic and job characteristics, models more likely to be impacted by bias
7. Were the outcomes measured in a valid and reliable way?	Y	Unclear, not validated instrument: Well-being while working, 7-point scale for 6 items: pain, happiness, sadness, fatigue, stress
8. Was appropriate statistical analysis used	Y	Yes, simple OLS Modelling

Overall Appraisal: **Include** Exclude, Seek further info

Reviewer: K Polson **Date: May 4, 2021**

Author: Song, Y., Gao, J **Year: 2019**

	Yes/No; Unclear; Not Applicable	Comments
1. Were the criteria for inclusion in the sample clearly defined?	Y	Yes, description of participants included into the study, US population 15 and over; very clearly defined sample: full-time wage workers, 18-65
2. Were the study subjects and the setting described in detail?	Y	Adequate allowing other researchers to determine if comparable to the population of interest (time period, location, demographics all included)
3. Was the exposure measured in a valid and reliable way?	Y	Main independent variable is categorical measured with one question, whether respondent worked at home or not; unclear whether full time virtual worker, however they did specify working after hrs vs working from home.
4. Were objective, standard criteria used for measurement of the condition?	Y	Yes, those included in the study and in the analysis were.g. rouped according to workplace; standard measures for outcomes used for all participants
5. Were confounding factors identified?	Y	Yes- items which may also affect the SWB reported included: whether interacting with someone during the day; whether providing secondary childcare or eldercare; start time, duration, cumulative hours of work from 4am to end of day.
6. Were strategies to deal with confounding factors stated?	Y	Fixed-effects modelling already takes into account the average difference across individuals; separate analysis for weekdays and weekends/holidays to account for differences in work patterns.
7. Were the outcomes measured in a valid and reliable way?	Y	Unclear, P2654: “Main dependent variables are 6 measures of SWB: happiness, pain, sadness, stress, tiredness, meaningfulness”
8. Was appropriate statistical analysis used	Y	Yes, fixed effects modelling

Overall Appraisal: **Include** Exclude, Seek further info

Reviewer: K Polson **Date: May 5, 2021**

Author: Felstead & Henseke **Year: 2017**

	Yes/No; Unclear; Not Applicable	Comments
1. Were the criteria for inclusion in the sample clearly defined?	N	However, national survey described briefly with reference to more details.
2. Were the study subjects and the setting described in detail?	N	Not described in paper however referenced National Survey for further details
3. Was the exposure measured in a valid and reliable way?	Y	Main independent variable is categorical measured with one question,
4. Were objective, standard criteria used for measurement of the condition?	Y	Yes,
5. Were confounding factors identified?	Y	Yes- covariates measured and controlled for: occupation, flexible work, age, gender, number of children in the household
6. Were strategies to deal with confounding factors stated?	Y	Yes, controlled for within the analysis
7. Were the outcomes measured in a valid and reliable way?	Y	Questionable, 1 question within the survey: "all in all, how satisfied are you with your job?' Respondents offered a 7-pt satisfaction scale with 'completely satisfied' =7
8. Was appropriate statistical analysis used	Y	Multivariate regression modelling

Overall Appraisal: **Include** Exclude, Seek further info

Comments: (including reason for exclusion):

Reviewer: K Polson **Date: May 2, 2021**

Author: Fonner & Roloff M. **Year: 2010**
Record Number:

	Yes/No; Unclear; Not Applicable	Comments
1. Were the criteria for inclusion in the sample clearly defined?	Y	For inclusion into the study, participants required to self-select into one of two categories based on the best description of their current work arrangement.
2. Were the study subjects and the setting described in detail?	Y	Adequate allowing other researchers to determine if comparable to the population of their interest; descriptive statistics provided in table 1
3. Was the exposure measured in a valid and reliable way?	Y	-categorical variable measured with one question, for self-selection into work category: appropriate in this case.
4. Were objective, standard criteria used for measurement of the condition?	Y	Yes, those included in the study and in the analysis were.g. rouped according to workplace; standard measures for outcomes used for all participants (confirmatory factor analysis completed for all)
5. Were confounding factors identified?	Y	Yes, a number of demographic questions asked, and included in analysis to determine if should be in the final model; (chi-squared tests)
6. Were strategies to deal with confounding factors stated?	Y	Yes, statistical control utilized, ANOVA & Chi-squared tests used to determine which variables should be included in final model;
7. Were the outcomes measured in a valid and reliable way?	Y	Yes, work arrangement, work-life conflict; stress from meetings and interruptions; perceived organizational politics; information exchange; job satisfaction; confirmatory factor analysis completed for all
8. Was appropriate statistical analysis used	Y	Yes, univariate analysis completed to understand sample; bivariate correlations completed; multiple mediation analysis

Overall Appraisal: **Include** Exclude, Seek further info

Reviewer: K Polson **Date: May 3 2021**

Author: Morganson, V., Major, D., Osborn, M., Verive, J., Heelan, M. **Year: 2010**

	Yes/No; Unclear; Not Applicable	Comments
1. Were the criteria for inclusion in the sample clearly defined?	N	Secondary data analysis; inclusion/exclusion criteria into the sample not clearly
2. Were the study subjects and the setting described in detail?	Y	- Adequate allowing other researchers to determine if comparable to the population of their interest
3. Was the exposure measured in a valid and reliable way?	Y	-categorical variable measured with one question, appropriate in this case.
4. Were objective, standard criteria used for measurement of the condition?	No	Yes, those included in the study and in the analysis were.g. rouped according to workplace
5. Were confounding factors identified?	Y	Yes, a number of demographic questions asked, and included in analysis to determine if should be in the final model; (chi-squared tests)
6. Were strategies to deal with confounding factors stated?	Y	Yes, chi-square tests were run on all possible confounders to determine if they should be included in the analysis
7. Were the outcomes measured in a valid and reliable way?	Y	Yes, measures had not been used in previous research, confirmatory factor analysis performed; standard measure used for job satisfaction, workplace inclusion and WLB support; note, only two item, 3 item and 4 item measure, questions the robustness of the measure
8. Was appropriate statistical analysis used	Y	Yes, univariate analysis completed to understand sample; multiple regression modelling to test 3 hypotheses

Overall Appraisal: **Include** Exclude, Seek further info

Reviewer: K Polson **Date: May 2, 2021**

Author: Wang & Parker **Year: 2020**

	Yes/No; Unclear; Not Applicable	Comments
1. Is there congruity between the stated philosophical perspective and the research methodology?	Y	Philosophical perspective not described, however
2. Is there congruity between the research methodology and the research question or objectives?	Y	Objective: To explore how virtual work characteristics shape remote working experiences. Qualitative explorative methodology allows capture of remote workers' first-hand accounts of experiences and challenges Grounded theory approach for systematic approach to data collection and analysis to answer the research question and to build theoretical foundation
3. Is there congruity between the research methodology and the data collection methods?	Y	Semi-structured interviews conducted, recorded and transcribed; 3 step approaches to analyzing the data; coding well described
4. Is there congruity between the research methodology representation and analysis of data?		
5. Is there congruity between the research methodology interpretation of results?	Y	Categories were organized systematically among the research team, and unified around central phenomena and existing literature; conflicts were resolved through discussion
6. Is there a statement locating the researcher culturally or theoretically?	N	However, it was acknowledged that researchers should deeply immerse themselves in the research context
7. Is the influence of the researcher or the research, and vice-versa, addressed?	Y	Acknowledged (as described in 6.): the first author had worked remotely for 3 weeks during the COVID-19 outbreak; knowledgeable regarding remote working experiences in China and the COVID-19 Context
8. Are participants and their voices adequately represented?	Y	Adequate quotations described in relation to categories and provided in table 2 (p11-12)

9. Is the research ethical according to current criteria or, or recent studies, and is there evidence of ethical approval by an appropriate body?	Y	Ethical approval noted
Do the conclusions drawn in the research report flow from the analysis, or interpretation of the data?	Y	Very systematic approach to methods, data collection, analysis and presentation and interpretation of findings.

Overall Appraisal: **Include** Exclude, Seek further info

Reviewer: K Polson **Date: May 3, 2021**

Author: Belle, Burley & Long **Year: 2014**

	Yes/No; Unclear; Not Applicable	Comments
1. Is there congruity between the stated philosophical perspective and the research methodology?	unclear	
2. Is there congruity between the research methodology and the research question or objectives?	Y	Objective: To describe and understand the essence of high-intensity teleworkers' experiences of organizational belonging Use of phenomenology, researchers sought to understand the phenomenon from the perspective of those involved and who attend the phenomenon of telework in their everyday lives.
3. Is there congruity between the research methodology and the data collection methods?	Y	Semi-structured interviews: open ended questions and probes included, provided P 81;
4. Is there congruity between the research methodology and the representation and analysis of data?	Y	Yes, analysis used Colaizzi's 1978 method to formulate meaning and exhaustive descriptive approach; ; Fig 1 P 82 provides sequential steps in analysis of the data ; analysis methods provided for the in-depth understanding of phenomenological experiences and involved becoming g intimately familiar with the actual experience as it was related by the participant.
5. Is there congruity between the research methodology interpretation of results?	Y	Yes, data reduction well described; validating step in the process involved returning to each participant their textural narrative descriptions, list of significant statement and associated meanings and thematic clusters and their unique description of the essence of organizational belonging as they had experienced it.
6. Is there a statement locating the researcher culturally or theoretically?	Y	P90, theoretical perspective suggests three avenues to securing a sense of organizational belonging: choice, negotiation and knowing.
7. Is the influence of the researcher or the research, and vice-versa, addressed?	N	No mention
8. Are participants and their voices adequately represented?	Y	Adequate quotations supporting each of the developed themes and significant statements

9. Is the research ethical according to current criteria or, or recent studies, and is there evidence of ethical approval by an appropriate body?	Y	Ethical research procedures and standards for data collection and handling were followed based on the researcher's Institutional Review Board
Do the conclusions drawn in the research report flow from the analysis, or interpretation of the data?	Y	Very systematic approach to methods, data collection, and analysis, development of framework clearly developed from data; results validated by participants

Overall Appraisal: **Include** Exclude, Seek further info

Reviewer: K Polson **Date: May 7 2021**

Author: Grant et al. **Year: 2013**

	Yes/No; Unclear; Not Applicable	Comments
1. Is there congruity between the stated philosophical perspective and the research methodology?	unclear	Exploratory study, qualitative thematic analysis - philosophical perspective is not clear perhaps from the exploratory perspective, methodology is well described and defined and suited for exploratory perspective if that is the case
2. Is there congruity between the research methodology and the research question or objectives?	Y	Objective: to explore the impact of remote e-working on the key research areas of work-life balance, job effectiveness and well-being. Methods, qualitative thematic analysis allows for development of thematic framework connecting key research areas of interest
3. Is there congruity between the research methodology and the data collection methods?	Y	Semi-structured interviews; derived using literature on research areas of interest; open style of questioning employed to compliment questions; methods well described
4. Is there congruity between the research methodology and the representation and analysis of data?	Y	Yes, themes are clearly presented as developed from methodology
5. Is there congruity between the research methodology interpretation of results?	Y	Yes, results align with presented data
6. Is there a statement locating the researcher culturally or theoretically?	N	No mention
7. Is the influence of the researcher or the research, and vice-versa, addressed?	Y	Not directly noted, however systematic approach to methodology and rigorous analysis methods by multiple researchers addresses this concern
8. Are participants and their voices adequately represented?	Y	Adequate quotations supporting each of the developed themes
9. Is the research ethical according to current criteria or, or recent studies, and is there evidence of ethical approval by an appropriate body?	N	Ethical approval not noted

Do the conclusions drawn in the research report flow from the analysis, or interpretation of the data?	Y	Very systematic approach to methods, data collection, and analysis, development of framework clearly developed from data

Overall Appraisal: **Include** Exclude, Seek further info

Appendix E: Individual Study Extraction Results

Citation Information: Giménez-Nadal., JI., Molina, JA., Velilla, J. Work time and well-being for workers at home: evidence from the American Time Use Survey. International Journal of Manpower 41(2).
Review Information: May 13, 2021
Study Methods: Study Objective, Setting, Study design, Number of Participants, Follow-up/study duration. **Objective**: to analyze the time-allocation decisions of individuals who work from home (ie. Teleworkers) and compare them with their commuter counterparts. Setting: USA **Participants**: Total n=2471; Teleworkers (n=304) **Data source**: American Time Use Survey Well-Being Modules **Follow up study duration** n/a
Demographic Information:
Age: Workers 15-65. Mean and SD provided for the following key independent variables: Interacting with anyone, secondary childcare/eldercare, duration in hours, cumulative work hours Individual level Characteristics: Sex, Age, Ethnicity, Education, Marital Status, Number of Children, currently a student, Immigrant status, disability status, Family income, Hours worked; summary statistics, separated by male/female, commuters /teleworkers: table 2 p189
Exposure information
Full-time or Part-time work: unclear (see below definition of telework exposure)
Virtual work from home Yes/No: Yes
Teleworkers identified from the diary-level information as those workers who do not report any period of time "commuting to work" Exposure Terminology: teleworkers
Identified challenges of working from home (e.g., increased interruptions): addresses subjective well-being only

Outcome Information
Outcomes identified & terms used (e.g., mental health, mental well-being, social well-being): well-being
Intermediate Outcomes identified & terms used (e.g., job stress, workplace isolation):
Well-being while working, 7-point scale for 6 items: pain, happiness, sadness, fatigue, stress
Analysis Methods: Simple OLS modelling
Results Data:
Male teleworkers have lower average values for sadness, stress, tiredness in comparison to male commuters (p193); females, no differences
Conclusions:

The effects of homeworking on SWB varies across parental status and gender
Male teleworkers are happier at work than their commuter counterparts; this is the case for male teleworkers but not females: male teleworkers are happier than male commuters, but there are no differences between female teleworkers and female commuters in terms of well-being while working
Limitations/Bias
Selection bias, uncontrolled confounding, Exposure measurement error: inconsistency in the definition of telework; Lack of causality

Citation Information: Song, Y. & Gao, J. Does Telework Stress Employees Out? A Study on Working at Home and Subjective Well-being for Wage/Salary Workers
Review Information: May 17, 2021
Study Methods: Study Objective, Setting, Study design, Number of Participants, Follow-up/study duration **Objective**: To examine how subjective well-being varies among wage/salary workers between working at home and working in the workplace using individual fixed-effects models Design: Cross-Sectional, secondary data analysis Setting: USA **Participants**: 3962 respondents; full-time wage/salary workers who are between 18-65 years of age, data source: American Time Use Survey Well-Being Modules **Follow up study duration** n/a
Demographic Information:
Age: Workers 15-65. Mean and SD provided for the following key independent variables: Interacting with anyone, secondary childcare/eldercare, duration in hours, cumulative work hours Individual level Characteristics: Sex, Age, Ethnicity, Education, Marital Status, Number of Children, currently a student, Immigrant status, disability status, Family income, Hours worked
Exposure information
Full-time or Part-time work: unclear (see below definition of telework exposure)
Virtual work from home Yes/No: Yes
If not virtual work, type of remote work/definition used (e.g., remote work; telework): Term use: 'working from home'; 'telework' Work activity is classified into four categories: bringing work home, telework, nonworking, and working in the workplace Telework defined as – working at home and had no episodes of work-related commuting on that day.
Identified challenges of working from home (e.g., increased interruptions): addresses subjective well-being only

Outcome Information
Outcomes identified & terms used (e.g., mental health, mental well-being, social well-being): Subjective well-being
Intermediate Outcomes identified & terms used (e.g. job stress, workplace isolation):
Scales or tools used to measure any/all outcomes: SWB – 6 measures Respondents asked to rate happiness, pain, sadness, stress, and tiredness they felt during their activity and to evaluate the meaningfulness of the activity using a scale from 0 to 6; These questions measure respondents' instantaneous SWB in multiple dimension (p2654).
Analysis Methods: t-tests & Fixed effects modelling
Results Data:

On weekdays, telework is associated with more stress, in comparison to working in the workplace FE modelling; on weekends/holidays, telework increases stress; overall, working at home instead of in the workplace has a negative effect on SWB; Telework, regardless of being conducted on weekdays or weekends/holidays, is always associated with a higher level of stress; failed to detect any beneficial effect of teleworking on SWB
Fathers- telework on weekdays is associated with higher levels of stress
Mothers- Feel less happy when teleworking on weekdays when compared to working in the workplace; on weekends/holidays, teleworking is less painful than working in the workplace
Childless males- no difference in SWB between working at home and working in the workplace on weekdays, but feel less painful when teleworking on weekends/holidays
Childless females no difference in SWB between working in the workplace and home working on weekdays, but feel more stressed when teleworking on weekends/holidays
Conclusions:
The effects of homeworking on SWB varies across parental status and gender
Among all samples explored, failed to discover that telework on weekdays has any beneficial effect on SWB;
Limitations/Bias
Selection bias, uncontrolled confounding,

Citation Information: Felstead & Henseke. (2017). Assessing the growth of remote working and its consequence for effort, well-being and work-life balance. New Technology, Work and Employment 32(3).
Review Information: May 16, 2021
Study Methods: Study Objective, Setting, Study design, Number of Participants, Follow-up/study duration **Objective**: To examine the consequences of working remotely on work effort, job-related well-being, and work-life balance. Setting: Britain **Participants**: 13,086 employees in Britain **data source**: Skills and Employment Survey (SES) Britain **Follow up study duration** n/a
Demographic Information:
The following variables collected: age, gender, the number of children in the household, occupational code, however descriptive table not provided,
Exposure information
Full-time or Part-time work: unclear (see below definition of telework exposure)
Virtual work from home Yes/No: Yes
Work location assessed the identifying main work location: At home; in same.grounds and buildings as home (adjoining property or land); in a single workplace away from home; variety of different places of work; working on the move Exposure terminology: remote workers
Identified challenges of working from home (e.g. increased interruptions): work-life balance

Outcome Information
Outcomes identified & terms used (e.g. mental health, mental well-being, social well-being): job related well-being noted in the objective, though no measure completed as an outcome
Intermediate Outcomes identified & terms used (e.g. job stress, workplace isolation): job satisfaction
Scales or tools used to measure any/all outcomes: Single item 7-point scale to assess how satisfied respondents are with their job
Analysis Methods: regression modelling
Results Data:
Proportions
Remote workers report significantly higher levels of job satisfaction; illustrated by 7% gap between the proportions reporting that they are very satisfied or better with their jobs; regression analyses support these findings, remote working is associated with significantly higher levels of enthusiasm for the job and overall job satisfaction.
Conclusions:
Remote working is, on the whole, advantageous to employers and employees.
Limitations/Bias
Cannot infer causation;

Selection bias, uncontrolled confounding, Measurement error (exposure, results may vary by different types of remote workers; outcome, job satisfaction scale not validated instrument)

Citation Information: Fonner, K., and Roloff, M. (2010). Why Teleworkers are More Satisfied with Their Jobs than are Office-Based Workers: When Less Contact is Beneficial. Journal of Applied Communication Research, 28(40). 336-361
Review Information: May 14, 2021
Study Methods: *Study Objective, Setting, Study design, Number of Participants, Follow-up/study duration* **Objective**: To examine the extent of which telework affects job satisfaction through the experiences of work-life conflict, stress due to meetings, and interruptions, perceived organizational politics, and information exchange. Setting: USA Design: cross-sectional, primary data collection Number of Participants: 89 teleworkers; 103 office-based employees Follow-up/study duration: n/a

Demographic Information:
Sex: M=35% Age (years): =42.88 Organizational Tenure (years) =10.40 Job tenure (years)=5.83 Martial Status: Single: 9% Married: 75% Divorced: 5% Has Children: Yes = 64% Organizational Position (%): Administrative: 5 Entry Level:4 Between entry level/mid management: 22 Upper Management: 37 Executive:5 Other: 10 Missing: 0 Type of Organization: (%) Privately owned: 35 Publicly owned: 44 Non-profit: 3 Public: sector/government:4 Public education:1

Other:2
Geographic Location: USA
Exposure information
Theoretical frameworks identified: Gajendran & Harrison's (2007) theoretical framework for the consequences of telecommuting; identifies intervening mechanisms through which remote work affects individual outcomes, including job satisfaction. The mediating variables in their model represent three conceptual themes within the telework literature: managing home and work balance, psychological control and autonomy, and potential for isolation and relational impoverishment
Full-time or Part-time work:- not collected
Virtual work from home Yes/No: telecommuter- arrangement to work at least 3 days a week at home
If not virtual work, type of remote work/definition used (e.g. remote work; telework): 'telework'; telecommuter'
If not virtual work – shared characteristics with virtual work:
Identified challenges of working from home (e.g. increased interruptions): work-life conflict; information exchange frequency; information quality; stress from interruptions; general politics, 'get ahead' politics – see Figure 2, path-analytic model including significant associations

Outcome Information
Outcomes identified & terms used (e.g. mental health, mental well-being, social well-being): not mentioned
Intermediate Outcomes identified & terms used (e.g. job stress, workplace isolation): Job satisfaction Additional outcomes: Work-life conflict Stress from meetings and interruptions Perceived organizational politics Information exchange
Scales or tools used to measure any/all outcomes: Work-life conflict: Hill et all (2003) five item scale Stress from meetings and interruptions – scale developed based on literature Perceived organizational politics – The Perceived Organizational Politics scale (Kacmar & Ferris, 1991) Information exchanged – original four item scale developed based on the literature Job Satisfaction- five-item scale representing global job satisfaction (Pond & Geyer, 1991)
Analysis Methods: multiple mediation analysis
Results Data:
Measure of Association: proportion
Teleworkers reported significantly lower work-life conflict, less stress from meetings and interruptions, less perceived general politics, and lower information exchange frequency, but

greater job satisfaction than did office-based employees. Telework was not significantly related to information quality or to perceived get ahead politics
Mediators, work-life conflict, and perceiving get ahead politics were negatively linked to job satisfaction. Telework was significantly related to stress from meetings and interruptions and information exchange frequency, but that neither of these was significantly related to job satisfaction.
Frameworks developed: see figure 2 p351; revised path-analytic model: the relationship of work arrangement to job satisfaction mediated by a number of factors
Conclusions:
High-intensity teleworkers are more satisfied than office-based employees; teleworkers reported significantly lower work-life conflict, less stress from meetings and interruptions, less perceived general politics, but greater job satisfaction than office-based employees
Limitations/Bias
Selection Bias, non-response bias, Sample may not accurately represent teleworking or other employee populations as they examined high-intensity teleworkers; no random selection

Citation Information: Morganson, D., Major, A., Oborn, K., Verive, J., Heelan, M. Comparing telework locations and traditional work arrangements. Differences in work-life balance support, job satisfaction, and inclusion. Journal of Managerial Psychology 25(6). 2010
Review date: May 17, 2021
Study Methods: Objective: to examine differences in work-life balance support, job satisfaction, and inclusion as a function of work location. Location: USA Design: Cross-sectional, web-based survey data Participants: 578 employees working at one of four locations (main office, client location, satellite office, and home) Study Objective, Setting, Study design, Number of Participants, Follow-up/study duration
Demographic Information:
Age: Collected on an interval scale in the following increments: 1 (18-24), 2 (25-24), 3 (35-44), 4 (45-54), 5 (55-65), and 6 (65 and over). M= 3.81 SD= 1.28 78% 35-64
Sex: M=67.2%
Geographic Location: USA, further detail not included
Education: not included
Job Position: technical staff 75.9% Manager: 10.8% Support personnel: 11.0%
# of years in job: tenure was collected in five year increments 1 (less than 1 year), 2 (1-5), 3 (6-10), 4 (11-15), and 5 (more than 16 years). Main office: M=2.99; SD = 1/29 Work from home: M=3.35; SD 1/26
Ethnicity: White 75.9% * * not fully reported
Any other sociodemographic factors identified (e.g. living alone or with family): **Impact of dependents measured**: Participant also indicated the extent to which having children or other dependents at home was a factor in whether or not they would telework. Responses ranged from 1 to 3 (not a factor, minor factor, major factor): Main office: M=1.46; SD 0.72 Work from home: M= 1.46; SD= 0.77
Exposure information
Frameworks identified: Hackman & Oldham's (1980) job characteristics model; Feldman & Gainey (1997) suggest telework should have positive implications for employee motivation.

Full-time or Part-time work: Full or part time indicated (95.6% indicated working at least 40 hours per week
Virtual work from home Yes/No: Work from home was collected
- If not virtual work, type of remote work/definition used (e.g. remote work; telework): satellite office was also collected ad measured
If not virtual work – shared characteristics with virtual work:
Identified challenges of working from home (e.g. increased interruptions): Outcome measures include job satisfaction, workplace inclusion and work life balance support
Identified Challenges related to which National Standard Risk Factor (e.g. work family balance, workload management):

Outcome Information
Outcomes identified & terms used (e.g. mental health, mental well-being, social well-being):
Intermediate Outcomes identified & terms used (e.g. job stress, workplace isolation): Job satisfaction, work life balance, workplace inclusion
Scales or tools used to measure any/all outcomes: WLB Support: A measure of WLB support was created for the current study. Participants responded to two items using a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Items included, “The work environment at [name of organization] supports a balance between work and personal life,” and “The work environment within my department/division supports balance between work and personal life.” The items were correlated r(590) ¼ 0.81, p , 0.001. Job Satisfaction: A job satisfaction scale was created for the current study (a ¼ 0.79). Participants responded to three items using a five-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Items included, “Overall, I am satisfied with my job,” “I recommend [name of organization] to others as a good place to work,” and “I am satisfied with my current work schedule.” Workplace inclusion. A four-item measure of workplace inclusion was created for the current study (a ¼ 0.89). Participants were asked to “Think of your primary work location and indicate how much you feel about the following:” They responded to four items using a five-point scale ranging from 1 (very little) to 5 (very much). Example items included, “A sense of belonging to your department/division,” and “‘In the loop’ with what’s going on within your department/division.”
Analysis Methods: Univariate, Bivariate analysis, regression modelling
Results Data:
Measure of Association: proportion
Job satisfaction: Work status significantly predicted job satisfaction; part-time workers reported greater job satisfaction than full-time workers; Primary work location accounted for an additional 2 percent of the variance in job satisfaction beyond the control variables

Home-based and main office-based workers reported similar levels of job satisfaction Home-based workers reported similar job satisfaction as satellite-based workers. Home-based workers reported greater job satisfaction than client-based workers **Workplace Inclusion:** H3 predicted that main office workers would report greater inclusion than home-based, satellite-based, and client-based workers. The first step of the regression equation was non-significant, F(3,564) ¼ 0.844, n.s., R 2 ¼ 0.00. None of the control variables significantly predicted inclusion (see Table V). Primary work location accounted for an additional 18 percent of the variance in inclusion beyond the demographic variables, F(3,561) ¼ 20.19, p , 0.001, DR 2 ¼ 0.18. H3 was fully supported. Main office workers reported higher inclusion than home, satellite, and client-based workers, **Exploratory analysis: Does WLB support and workplace inclusion drive differences in levels of job satisfaction across primary work location.** As an exploratory analysis, WLB support and inclusion as control variables were entered into the regression model; Inclusion and WLB support significantly positively predicted job satisfaction. After controlling for work status, tenure, gender, WLB support, and inclusion, work location predicted incremental variance in job satisfaction. Main office workers reported significantly lower job satisfaction than home-based worker. Satellite and client-based workers reported similar levels of job satisfaction as home-based workers.
Conclusions: Results generally indicated that where workers spend the majority of their work day may alter their relationship with their employer and explain the differences in outcomes. Research tends to treat all types of telework similarly or to focus solely on home-based telework, but these results suggest a need to recognize distinctions in the different types of remote work. **Job Satisfaction:** home-based and main office workers reported similar levels of job satisfaction; home-based workers reported higher job satisfaction than client-based workers. Yet, after controlling for differences in inclusion, the observed differences resembled our original hypothesis: home-based workers reported higher job satisfaction than main-office workers. Additional research is needed to understand the mechanisms through which telework relates to job satisfaction.
Limitations/Potential Bias
Lack of causality, selection bias, non-response bias

Citation Information: Wang, B., Qian, J., Parker, SK. (2020). Achieving Effective Remote Working During the COVID-19 Pandemic: A Work Design Perspective
Review Information: May 11, 2021
Study Methods: Study Objective, Setting, Study design, Number of Participants, Follow-up/study duration Objective: To explore how virtual work characteristic shape remote working experiences. Setting: China Study Design – Grounded theory Participants: 39 participants who worked from home during the pandemic; a wide range of industries and occupations.
Demographic Information:
Age: Average Age of 32.62 Years
Sex: 23 women
Geographic Location
Education – not collected
Job: Participants were employed in a wide range of industries (e.g., education, IT, media, finance, etc.) and occupations (e.g., managers, teachers, designers, etc.)
# of years in job teleworking : Most Chinese workers in our sample worked away from the office for the first time during the COVID-19 situation. In our study, only one participant (#4) was an experienced remote worker
Ethnicity: three individuals from ethic minority groups participated: not reported
Any other sociodemographic factors identified (e.g. living alone or with family) Marital Status: 15 were married, 18 had caring responsibilities.
Theoretical Frameworks Identified: n/a
Exposure information
Full-time or Part-time work: working remotely until further notice, full-time
Virtual work from home Yes/No: Yes
Type of home work space: no mention
If not virtual work, type of remote work/definition used (e.g. remote work; telework): remote workers
If not virtual work – shared characteristics with virtual work:
Identified challenges of working from home (e.g. increased interruptions): theme 1 identified remote work challenges include work-home interferences, ineffective communication, procrastination and loneliness,

Outcome Information
Outcomes identified & terms used (e.g. mental health, mental well-being, social well-being):

Intermediate Outcomes identified & terms used (e.g. job stress, workplace isolation): Organizational belonging

Analysis Methods:

Data collected in this study were analyzed using Colaizzi's(1978) formulated meaning and exhaustive description approach. Colaizzi's(1978) method of data analysis

Results Data:

Findings:

Identified that remote work challenges (theme 1), virtual work characteristics (theme 2), and individual factors (theme 3) were crucial for remote workers' performance and well-being during the pandemic (Table 2).; illustrated below

Illustrations from the publication (e.g. frameworks, work clouds):

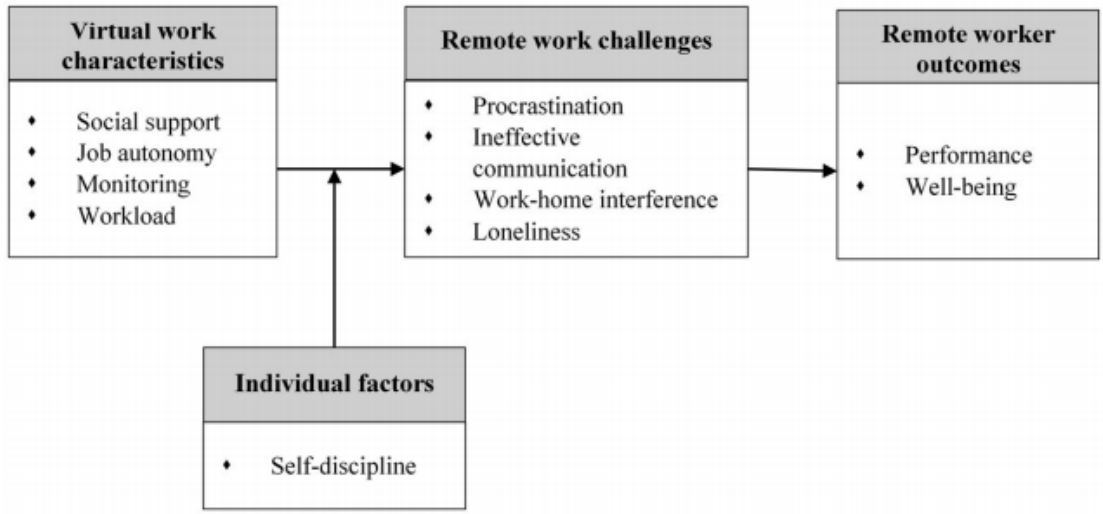


FIGURE 1 P17. Theoretical framework identified. Although we did not analyze the relationship between the four virtual work characteristics and the challenge of ineffective communication in Study 1, we still include it in our framework because this challenge might be influenced by other virtual work characteristics such as technical support, task interdependence, and task complexity

Quotations from research participants:

Table 2 P11 provides supporting quotations for each theme developed

Conclusions:

Four key remote work challenges (work-home interference, ineffective communication, procrastination, and loneliness), as well as four virtual work characteristics that affected the experience of remote work challenges (social support, job autonomy, monitoring, and workload) and one key individual difference factor (workers' self-discipline) affect remote workers' performance and well-being.

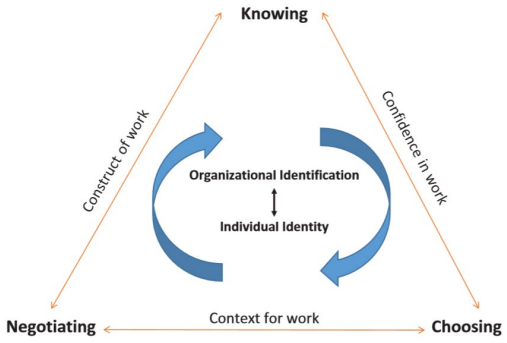
Limitations:

Data collected in China, which may raise concerns about generalizability; Remote working in China and other developing countries is relatively new, which means we can capture individuals' unique experiences during the sudden transition from the onsite office to home.

Second, our research was conducted in an extraordinary context – the COVID-19 Pandemic This context provides extra pressure for employees, such as worry about the pandemic, social isolation, financial pressure, greater family interferences, and the like, which likely shaped the findings. Despite this difference in context, we believe our approach and findings will be important in future remote working research and practice.

Citation Information: Belle, Burley & Long. (2015). Where do I belong? High-intensity teleworkers' experience of organizational belonging. Human Resource Development 18(1): 76-96.
Review Information: May 12, 2021
Study Methods: Study Objective, Setting, Study design, Number of Participants, Follow-up/study duration Objective: To describe and understand the essence of high-intensity teleworkers' experience of organizational belonging Study Design – phenomenology Participants: (1) Worked from home for at least three days in a 5-day work week in their current job. (2) Employed full-time with their current employing organization for at least 6 months prior to their participation in the study. (3) Employed in organizational roles that were characterized by the performance of work duties from a single physical location. (4) Eligibility was not restricted to employment in particular sectors or industries. (5) Able to participate in face-to-face interviews with the researchers, as well as remotely by phone and/or Skype. Recruitment methods included the use of social media (e.g., LinkedIn). Snowball sampling was also utilized as professional contacts and the first study participants identified other potential participants
Demographic Information:
Age: range from Mid 20s-mid 50s (p83)
Sex: Seven women; three men
Geographic Location
Education – not collected
Job: Variety of sectors and positions: four from private enterprise, three from the public sector, two from higher education, and one from the not-for-profit arena. Six individuals were mid-level managers in their organizations (four women and two men), one individual (female) was mid-senior level, and another (male) was a company executive. The remaining two female participants were junior level staff (p84)
# of years in job teleworking : The length of time participants spent working as a teleworkers with their current organizations spanned a range of 6 months to 8 years (p84).
Ethnicity: three individuals from ethic minority groups participated: a female of Hispanic heritage, a female of South Asian background, and a male of Southeast Asian roots.
Any other sociodemographic factors identified (e.g. living alone or with family)
Theoretical Frameworks Identified:
Exposure information
Full-time or Part-time work: performing full-time work at home for at least 3/5 days in a traditional 5-day work week Four participants worked from home 3 or 4 days a week; six participants worked from home on a full-time basis.
Virtual work from home Yes/No: Yes
Type of home work space: no mention
If not virtual work, type of remote work/definition used (e.g. remote work; telework): Telework
If not virtual work – shared characteristics with virtual work:

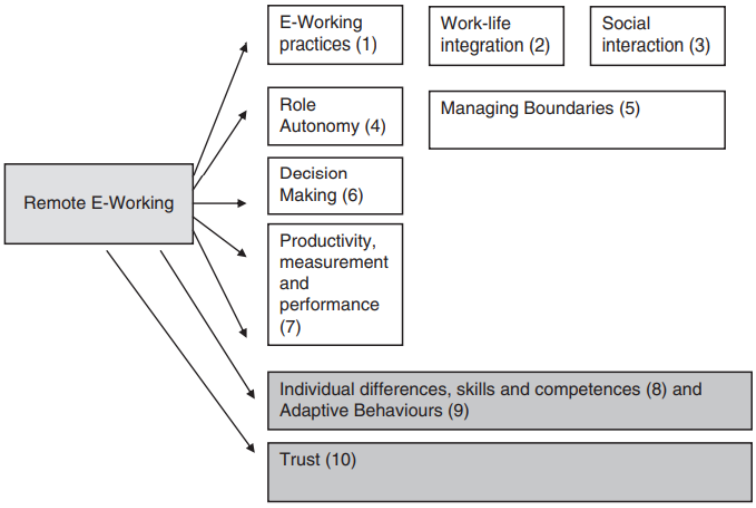
Identified challenges of working from home (e.g. increased interruptions): no other factors mentioned
Identified Challenges related to which National Standard Risk Factor (e.g. work family balance, workload management):

Outcome Information
Outcomes identified & terms used (e.g. mental health, mental well-being, social well-being):
Intermediate Outcomes identified & terms used (e.g. job stress, workplace isolation): Organizational belonging
Analysis Methods: Data collected in this study were analyzed using Colaizzi's(1978) formulated meaning and exhaustive description approach. Colaizzi's(1978) method of data analysis
Results Data:
Findings: Not belonging is apparent where there is a lack of credibility, conflict, loss of stability and exclusion from ownership. Organizational belonging definition: experiencing an acknowledgement of one's talents, interests, and experiences, and finding whole acceptance of oneself expression of these. On the individual level, participants reported being able to identify with others who share their social or leisure interests, and who give attention to the daily occurrences that form part of their personal lives.
Illustrations from the publication (e.g. frameworks, work clouds): High-intensity teleworkers' development of a sense of organizational belonging (Figure 3 p91): 
Quotations from research participants: Table 2 (p85-86) provides 10 quotations provided for both narrative description of belongingness and exhaustive description of organizational belonging (table 2, P85)
Conclusions: Findings from this study convey the importance of high-intensity teleworkers possessing notions of organizational identification, desire to be included, and demonstrating communal qualities such as empathy, care for each other, and self=sacrifice.
Limitations:

Loss to follow-up and the ability of the researchers to receive feedback from all participants during the validation phase of the study. Issues of organizational culture may have been missed due to structure of the question, though researchers probed when the subject arose. A more direct inquiry into organizational culture may have provided further insight
Citation Information: Record #; Grant CA., Wallace, LM, Spurgeon, PC. An exploration of the psychological factors affecting remote e-worker's job effectiveness, well-being and work-life balance. Employee Relations 35(5): 527-546
Review Information: May 14, 2021
Study Methods: Study Objective, Setting, Study design, Number of Participants, Follow-up/study duration **Objective**: To explore the impact of remote e-working on the key research areas of work-life balance, job effectiveness and well-being. **Study Design** – Qualitative exploratory study using thematic analysis **Participants:** Eleven e-workers across five organizations and three sectors (private, public and voluntary); all working remotely using technology independent of time and location for several years and consider themselves to be experts; one to two years' experience as a remote e-worker and proficiency using technology remotely to communicate with work.
Demographic Information:
Age: 22-25: n=4 36-45: n=2 46-55: n=4 56-65: n=1
Sex: Female n=7 Male n=4
Geographic Location: United Kingdom
Education – not collected
Job: Professional n=4 Managerial n=3 Administrative n=4
Marital Status: 3 Married; 4 singles; 2 co-habituating, 2 not given,
Any other sociodemographic factors identified (e.g. living alone or with family) Five participants had one or more children, and two looked after elderly dependents.
Theoretical Frameworks Identified: Figure 1: thematic diagram illustrating the relationship between the research areas (job effectiveness, work life balance and well-being) and 10 emerging themes
Exposure information
Full-time or Part-time work: Both – Seven full-time, 4 part-time workers ; hours spent remote working – all contracted hours for 4 participants
Virtual work from home Yes/No: Yes
Type of home work space: no mention
If not virtual work, type of remote work/definition used (e.g. remote work; telework): e-working

If not virtual work – shared characteristics with virtual work: n/a
Identified challenges of working from home (e.g. increased interruptions): work-life balance challenges

Outcome Information
Outcomes identified & terms used (e.g. mental health, mental well-being, social well-being): well-being : Communication ; Support from colleagues ; Social interaction
Intermediate Outcomes identified & terms used (e.g. job stress, workplace isolation): Work-life balance & job effectiveness also explored in this paper (not part of this review)
Analysis Methods: Inductive qualitative method; data coded according to Braun & Clarke's thematic approach (2006); themes were elicited by searching for commonality, relationships and differences; Thematic analysis was employed to explore themes across data; themes were elicited by searching for commonality, relationships and differences (Gibson and Brown, 2009).
Results Data:
Findings: Communication and support from colleagues emerged as two critical success factors to ensure successful remote working and to balance the psychological aspects of well-being. The themes of building relationships and interacting, including where boundaries could be crossed over, where both important themes seen to affect psychological well-being. Managing boundaries –the collapsing of boundaries between work and private lives and the impact being able to work 24 hours a day, seven days a week has on other family members and health was a common theme: "[y] the blur between work and home is badly affected. I work 12-14 h days as a norm and it is impacting my well-being. Clients can always reach me [y] I don't think I'm as productive because I'm so exhausted" raw strict boundaries to get my life back". Social interaction: building relationships and maintaining communication channels both at work with colleagues and relationships outside of work emerged as a common theme for maintaining the psychological well-being of the interviewees. One interviewee indicated that they would prefer to be in the office to maintain social contact: "I'm probably a person who would enjoy coming more into the office rather than staying at home"
Illustrations from the publication (e.g. frameworks, work clouds): Figure 1 P 536 Thematic diagram illustrating the relationship between the primary research areas and the ten emerging themes: Managing Boundaries (5) and Social interaction (3) found to be related to well-being.



Quotations from research participants:

Working from home can relieve stress from travel and child-care issues;

Social interaction may be limited to family and local friends; office grapevine may be missed and important information missed.

Conclusions:

The current research was novel in that it explored the psychological and practical implications of technology and identified a set of generalisable themes that can be used to inform the study of the psychological aspects of remote e-working. The research has raised some clear implications for e-workers and their managers. E-workers should not be allowed to become "invisible workers", they may be very skilled at their job but they do still require support to be effective remote workers. It is recommended that managers communicate regularly with remote workers, not just about work matters but also psychological issues such as over-work, managing work and home boundaries and their stress levels. This current study found that trust, working practices, skills and competencies were important but so were considering the mental health issues of e-workers

Limitations:

The current study was limited in generalisability by the small qualitative sample. However, Gibson and Brown (2009) indicate that it is important that the sample is representative of the topic being studied. Remote e-workers for this current study self-selected by years of experience and remote working capability for their specific qualities and experiences. Interviews were in-depth providing a richness to the data collected.

Appendix F: Project Timeline

Date	Activity
January 11	**Thesis Submitted to Committee (2 week review period)**
January 12-20	Begin Trial Search Strategy, finalize slide deck
January 21	Practice Proposal Presentation (Kristman Research Team Meeting)
January 25th	**Expected committee comments returned**
January 25-28th	Edit Proposal as per committee comments
January 29th	**Book Defense and submit final copy to Department of Health Sciences**
February 1st-4rd	Search Stage 1
February 5-8th	Search Stage 2
February 8th-11th	Search Stage 3
Feb 12th-16th	**Proposed Defense Date Deadline (subject to scheduling)**
February 15th-21st	Screening and Selection
February 22nd- March 14th	Phase 2: Critical Appraisal
March 15-April 4th	Phase 3: Data Extraction
April 5-19th	Phase 4: Data Synthesis
April 20 – June 1st	Writing Phase
June 14th	**Draft to Supervisor**
July 5th	Supervisor comments returned
July 15th	Final Draft Submitted to Committee
August 20th	**Thesis Defense Date**