Virtual Meetings and Wellbeing: Insights from the COVID-19 Pandemic

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Structured abstract

Purpose: The purpose of this paper is to examine the relationship between virtual meeting participation and wellbeing. Based on the conservation of resources theory, we hypothesize that participation in more virtual meetings is associated with both negative and positive wellbeing indicators.

Design/methodology/approach: An online survey was sent to 3,530 employees across 5 Belgian universities in April 2020. Useful data from 814 respondents was collected and analyzed to test the hypothesized relationships.

Findings: We find support for our hypotheses, namely that participating in more virtual meetings is associated with negative wellbeing indicators (workload, stress, and fatigue), but also with a positive wellbeing indicator, namely work influence.

Originality/Value: The COVID-19 lockdown provided a unique opportunity to obtain insight on the relationship between virtual meetings and wellbeing at an unprecedented scale.

Research limitations/implications: Given the unique work-from-home context during the pandemic, the generalizability of our findings may be limited. Nevertheless, this study contributes to the literatures on Meeting Science and Virtual Work, as it is the first study to empirically relate virtual meetings to wellbeing indicators, including a positive one.

Practical implications: As virtual meetings and work-from-home are expected to remain prevalent, understanding wellbeing implications is of high managerial importance. Our findings can be useful for (HR) managers that develop flexible work policies for a post-pandemic world.

Social implications: The findings draw attention to the importance of maintaining a healthy balance between productivity and wellbeing in creating a sustainable work(-from-home) context.

Keywords: Virtual meetings; Wellbeing; COVID-19 pandemic; Work-from-home; Meeting Science; Field study.

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1. Introduction

"I really hate attending virtual meetings from home… It feels like these meetings are violating my privacy and disrupting the work-life balance. You have to have stressful and delicate meetings in the same room where you are sleeping, trying to relax, and making love..."

– Anonymous comment from a study participant

The lockdown measures deployed by governments around the world following the COVID-19 pandemic required employees to work from home (WFH). While home-working, organizational communication and collaboration completely shifted to the digital realm, the hallmark of which became the virtual meeting (Richter, 2020). Drawing from Schwartzman (1989), we define virtual meetings as *technology-mediated gatherings between two or more distributed team and/or board members for a purpose explicitly related to the functioning of a project or an organization*. It is of interest to note that during the pandemic, the same technologies used for work-related virtual meetings were also adopted outside work for maintaining personal and leisure activities (Hacker *et al.*, 2020; Marks, 2020). On a more dramatic level, virtual meetings were even used for "socially distanced families to connect with dying loved ones" as in-person farewell visitations were restricted (Billingsley, 2020, p. 375).

The shift to virtual meetings was extraordinary in several ways (Waizenegger *et al.*, 2020). First, this shift was *swift, unprepared*, and *sudden* (Reed and Allen, 2021), as evidenced by the adoption rates of videoconference tools. In April 2020, one month into the pandemic, the number of daily meeting participants in Zoom, Microsoft Teams, and Google Meet was respectively 300, 200, and 100 million, representing more than 20-fold increases relative to pre-lockdown numbers.[1] Second, as these numbers show, the shift was also *massive*, as virtual meetings became mainstream and a symbol of the 'new normal' way of working (Berghout, 2020). Some employees had already obtained experience with virtual

[1] See https://www.theverge.com/2020/4/30/21242421/zoom-300-million-users-incorrect-meeting-participants-statement

meeting technologies prior to the pandemic, as they collaborated across (international) sites or worked remotely, for others it was a complete novelty (Nash, 2020). Third, the shift was *compulsory* (Anderson and Kelliher, 2020), which is different from the situation outside of a pandemic, when there is an option to freely choose the meeting modality (Reed and Allen, 2022; Standaert *et al.*, 2022).

In addition, this shift to virtual meetings happened in a WFH context that was far from ideal for many employees (Fosslien and West, 2020). Indeed, while WFH generally is expected to have a positive impact on productivity, work-life balance, and employee wellbeing (Allen, Golden, *et al.*, 2015; Bloom *et al.*, 2015; Felstead and Henseke, 2017), the pandemic induced a *social, health,* and *economic crisis* across the world. As to the social and health crisis, for parents with kids at school, WFH was also combined with home-schooling their "kids-at-home", as schools were closed at several times in many countries when lockdown measures were in effect (Anderson and Kelliher, 2020). Others needed to take care of (elderly) people that got sick, or faced health issues themselves. As to the economic crisis that many businesses were confronted with, it is important to note that meetings are considered key during a crisis, as they improve organizational resilience, ensure the continuity and quality of service delivery, and offer a vehicle to check in on employees' wellbeing (Lloyd-Smith, 2020).

The amalgamation of these factors provided a unique opportunity for a study that assumes the urgency of learning from people's lived-with experiences during a real-life, worldwide shift of meeting modality from face-to-face to virtual, an experiment with an unprecedented scale and scope (DeFilippis *et al.*, 2020). In particular, questions were raised among both practitioners and academics about the implications of COVID-19 for productivity and wellbeing (Saridakis *et al.*, 2020; Waizenegger *et al.*, 2020). While prior research has examined virtual meetings in relation to productivity (Standaert *et al.*, 2016), there is a gap in the literature on the relationship with wellbeing. Wellbeing is a broad concept that refers to "optimal psychological functioning and experience" (Ryan and Deci, 2001, p. 142) and includes negative indicators such as workload, stress, fatigue, as well as positive indicators such as work influence (Hobfoll, 1989; Ito and Brotheridge, 2003; Rogelberg *et al.*, 2006). The objective of the current study is

to examine the relationship between virtual meeting participation and both these negative and positive wellbeing indicators.

In this paper, we review related work on the notion of wellbeing in both the nascent field of Meeting Science and in the extensive body of knowledge on Virtual Work. We also discuss recent work that focuses on wellbeing during the pandemic, which focuses on videoconference fatigue. In keeping with prior Meeting Science research (Allen *et al.*, 2012), we draw from the conservation of resources theory (Hobfoll, 1989, 2001) to develop hypotheses that relate virtual meetings to wellbeing based on resource gains and losses. We empirically test our hypotheses using data obtained from 814 respondents across 5 Belgian universities through an online questionnaire within one month into the (first) local lockdown.

The study context is higher education, which is considered an essential public service that is highly valuable to society (Parsons, 1939). Many governments decided that higher education, just like the healthcare and food retail sectors, needed to continue its operations during lockdown.[2] However, many events that usually take place on a university campus, such as teaching activities, workshops, conferences, and meetings, were organized in an online environment (Sahu, 2020). While prior experience with virtual meetings may differ across university profiles (Nash, 2020), they all have equal access (Kettinger and Grover, 1997) to technologies for virtual meetings.

This study addresses the void of empirical research on the relationship between participating in virtual meetings and employee wellbeing, and as such contributes to both the body of knowledge on Meeting Science and on Virtual Work. We also contribute to the Information Systems field more generally, in which resource-oriented perspectives have recently gained traction to study both positive and negative wellbeing consequences of technology use (Magni *et al.*, 2022). Although our findings should be interpreted and generalized cautiously, given the unique situation of the pandemic (Richter, 2020), we

[2] For Belgian regulation, see: https://legalworld.wolterskluwer.be/fr/nouvelles/socialeye/covid-19-nouvelle-liste-des-entreprises-essentielles/

also have highly relevant implications from a practice standpoint. Indeed, meetings have implications beyond the direct meeting context (Lehmann-Willenbrock *et al.*, 2016), including on employee wellbeing, which is in turn an increasingly important consideration for employee retention (Bennett *et al.*, 2021). Based on an understanding of the relationship between virtual meetings and wellbeing, a conversation can be started on how to balance productivity and wellbeing in the future, hybrid workplace (Microsoft Research, 2022).

This paper consists of 7 sections. In Section 2, we review literature on wellbeing within the Meeting Science, Virtual Work, and COVID-19 pandemic related literature streams. In Section 3, we draw from the conservation of resources theory to develop our hypotheses. In Section 4, we discuss our research method to test the hypothesized relationships and provide details about our data collection and sample. In Sections 5 and 6, we present and discuss key findings of our study. We conclude this paper in Section 7 by considering implications, limitations, and future research directions.

2. Literature Review

In the sub-sections that follow, we review related work that addresses wellbeing issues from three different viewpoints. We first review research on face-to-face meetings and wellbeing before turning to research on virtual work and wellbeing. In the final subsection, we discuss recent work on wellbeing in the context of the COVID-19 pandemic.

2.1 Participating in Face-to-face Meetings and Wellbeing

Meetings are historically viewed as a research setting, not a research subject (Rogelberg *et al.*, 2006; Scott *et al.*, 2015). In the Information Systems literature for instance, meetings are typically considered as a purposeful collaboration setting in which people, their skills, and knowledge are combined with information for the completion of a specific task or objective (DeLuca and Valacich, 2006; Dennis *et al.*, 1988; Scott *et al.*, 2015). Schwartzman (1989) advocated for studying meetings in their own right, acknowledging that "a meeting is something remarkable in need of explanation, as opposed to something

that is every-day and worthy only of disdain" (Schwartzman, 2015, p. 738). The nascent field of Meeting Science[3] focuses on understanding and improving what happens before, during, and after workplace meetings (Allen, Lehmann-Willenbrock, *et al.*, 2015; Mroz *et al.*, 2018). Also, this field considers meetings as a linking pin (Scott *et al.*, 2015) between organizational level variables such as effectiveness (Kauffeld and Lehmann-Willenbrock, 2012; Luong and Rogelberg, 2005) and individual level variables, for instance wellbeing at work (Rogelberg *et al.*, 2006). Meetings therefore can be considered to be at the meso-level (Ballard and Seibold, 2003), a "product of both micro and macro phenomena" (2015, p. 24). Virtual meetings are still a niche within Meeting Science, as few research so far has focused on the modality of meetings (notable studies include Allison *et al.*, 2015; Standaert *et al.*, 2016, 2021).

Meetings are ubiquitous in everyday life. Practitioners, executives, policy makers, and scholars spend a considerable amount of time in meetings or preparing for meetings. For example, prior research reported that senior executives spend almost 23 hours a week in meetings (Rogelberg *et al.*, 2007) and up to 75% of total managerial time is spent related to meetings (Van Vree, 1999). The pervasiveness of meetings has increased over the past decades as a consequence of globalization and a search for more democratic and horizontal organizations (Allen, Lehmann-Willenbrock, *et al.*, 2015; Kello, 2015). Also, the number of meetings is found to be positively related with the size of the organization (Rogelberg *et al.*, 2007). In fact, there is often a ripple effect of meetings across hierarchical ranks. Consider the example of a weekly status meeting of the executive committee at a large company that directly consumed 7,000 person hours on an annual basis. Yet in preparation of this weekly meeting, 300,000 additional hours were consumed in meetings with employees in lower ranks (Mankins *et al.*, 2014).

Managers are often reported to be dissatisfied with meetings and to find them frustrating and a waste of time (Allen *et al.*, 2016). Also, the more meetings a manager attends, the more likely this person is to have a negative attitude towards meetings (Trevino *et al.*, 2000). Instead, managers hold a more

[3] The recency of the "Meeting Science" field is evidenced by the appearance of the first "Handbook of Meeting Science" in 2015 (Allen, Lehmann-Willenbrock, *et al.*, 2015) and the first "Meeting Science Symposium" held in 2017 (Haug, 2017).

positive attitude towards meetings when they consider them to symbolize teamwork, participation, involvement, or cooperation (Trevino *et al.*, 2000). In addition, setting clear objectives and sharing relevant information generate positive feelings about meetings (Allen *et al.*, 2012). Meeting satisfaction has also been studied as an antecedent, as it is found to be an important predictor of employee empowerment and of job satisfaction (Allen *et al.*, 2016), the effect of which is stronger when more meetings are attended (Rogelberg *et al.*, 2010).

The first study to examine the relationship between meetings and employee wellbeing was by Luong and Rogelberg (2005). These authors drew from the notion that meetings have a disruptive nature for individuals' work tasks and can therefore be considered as occupational hassles or workplace interruptions. Hassles refer to tasks becoming more difficult than anticipated due to social or contextual factors and are found to have a strong negative impact on stress-related outcomes, fatigue, and subjective workload (Luong and Rogelberg, 2005; Zohar, 1999). Interruptions, like meetings or telephone calls, are a related phenomenon and increase cognitive load and fatigue, which in turn impact psychological wellbeing (Luong and Rogelberg, 2005). The negative (wellbeing) effects of hassles and interruptions have been explained by a lack of progress in achieving a primary activity (Zijlstra *et al.*, 1999; Zohar, 1999) and by higher perceptions of workload and cognitive fatigue when attending meetings in-between working on other tasks (Kirmeyer, 1988).

Consistent with such explanations, Luong and Rogelberg (2005) found in their longitudinal study in a university setting that the number of meetings participated in was positively associated with fatigue and workload. Subsequent research has further refined insights on the relationship as follows: the relationship between the number of meetings and negative wellbeing indicators was found to be stronger for employees that work independently, have a high individualistic orientation, experience meetings as low quality, and have low meeting self-confidence (Rogelberg *et al.*, 2006). Notably, more than the total amount of time spent in meetings, it seems to be the number of meetings that is related to measures of wellbeing. Indeed, consider the same amount of time that can be spent in either one or in several

meetings, the cognitive load related to multiple meetings with different people and subjects is likely to be higher (Luong and Rogelberg, 2005).

Subsequently, Allen et al. (2012) found that "30 percent of respondents felt worse about their job because of more meetings" (2012, p. 410), whereas 50 percent was neutral and 10 percent positive. The authors explored the underlying reasons through open questions and found that "meetings as interruptions" were only mentioned by 6 percent of those respondents feeling worse about their job because of more meetings, while "constraining time" (41 percent) and "waste of time" (13 percent) were more prevalent. Finally, Lehmann-Willenbrock et al. (2016) empirically tested a model that relates helpful and harmful meeting behavior to meeting satisfaction and effectiveness, which in turn are related to employee engagement and emotional exhaustion. They found that helpful meeting behavior (e.g., meeting preparation) was positively related to satisfaction and effectiveness, while harmful behavior (e.g., off topic discussion) had a negative relationship. In turn, satisfaction and effectiveness were positively related to employee engagement and negatively to emotional exhaustion (Lehmann-Willenbrock *et al.*, 2016).

2.2 Virtual Work and Wellbeing

Two clusters of research on Virtual Work can be distinguished (Raghuram *et al.*, 2019). The first focuses on virtual teams (Dubé and Robey, 2009; Jarvenpaa and Leidner, 1999; O'Leary *et al.*, 2014), the second on working 'away' from the office (Allen, Golden, *et al.*, 2015). In virtual team research the focus is mostly on the relationships between group dynamics and performance outcomes, not individual working conditions and wellbeing (Raghuram *et al.*, 2019). Moreover, the effective use of technology for communication is considered a key success factor (Jarvenpaa and Keating, 2021; Keating and Jarvenpaa, 2016), but virtual meetings are examined as just one of the synchronous communication technology options that are used alongside asynchronous media (e.g., e-mail, enterprise social media, or wiki pages) (Im *et al.*, 2005; Panteli *et al.*, 2019).

The second cluster of research focuses on remote work, also referred to as telework, telecommuting, or work from home. Similar to the first cluster, this research has not focused extensively on technology-mediated communication as it "has taken technology for granted" (Waizenegger *et al.*, 2020, p. 431). However, this cluster does focus on individual characteristics and outcomes, such as productivity, commitment, work-life balance, wellbeing, flexibility, autonomy, surveillance, and job satisfaction (Allen, Golden, *et al.*, 2015; Gajendran and Harrison, 2007). As to productivity, in a Chinese experiment involving 16,000 employees, Bloom et al. (2015) found that remote work led to increased productivity due to longer working hours and a quieter and more convenient working environment. Remote employees were also more satisfied and less likely to leave the company, however, they were also less likely to be promoted (with equal performance as their peers that remained present in the office) (Bloom *et al.*, 2015).

Work-from-home and the associated temporal and spatial flexibility is generally expected to have a positive impact on employee wellbeing, work-life balance, organizational commitment, and job satisfaction (Allen, Golden, *et al.*, 2015). In combination with the increased productivity and lower costs, which are benefits for the employer, WFH seems to offer a win-win situation (Felstead and Henseke, 2017). This double positive effect can be explained by employees' willingness to put in more effort (e.g., longer working days) when they receive the benefits of WFH (Felstead and Henseke, 2017). However, such benefits are not found when the WFH arrangement is involuntarily (Kaduk *et al.*, 2019). Finally, there are technology-related tensions in the WFH context, as the same technology-based flexibility that offers autonomy, also urges employees to be "always-on" (Waizenegger *et al.*, 2020). This can cause a blurring of work-life balance, in the form of distractions from the home environment and the inablity to unwind or "switch off" (Allen, Golden, *et al.*, 2015; Felstead and Henseke, 2017).

2.3 The COVID-19 Pandemic and Wellbeing

Soon after the COVID-19 pandemic broke out and related WFH measures were imposed, opinion articles and editorials appeared in academic journals referring to advantages and disadvantages of virtual

meetings (e.g., Marks, 2020; Richter, 2020). Subsequently empirical research emerged. For instance, based on calendar data of over 3 million knowledge workers at more than 21,000 firms across 16 metropolitan areas, DeFilippis et al. (2020, 2022) compared the number of meetings in windows of 8 weeks before and since the COVID-19 lockdown. The authors reported a 13% increase in the number of meetings, but a 12% decrease in the total time spent per day in meetings. Hence, since the pandemic, there were more but shorter (virtual) meetings. In addition, the authors found a trend in the sense that each week since the start of the lockdown, the number of meetings had increased, while on average the length of each meeting had decreased. There are multiple possible explanations for an increase in the number of meetings since the pandemic. For instance, scheduled virtual meetings can compensate for the lack of informal face-to-face communication usually taking place ad-hoc in the office (Waizenegger *et al.*, 2020). Furthermore, the crisis situation itself induced an increase in communication as it involves "unplanned, emergent coordination" (DeFilippis *et al.*, 2020, p. 8). Finally, Subel et al. (2022) observed that a part of the increase in the number of meetings since the pandemic consisted of low-quality meetings (during which a person multi-tasks, is double-booked, or accompanied by a colleague in a similar role) and this was especially the case for employees in operations and finance functions.

In addition, a new phenomenon came to the fore during the pandemic: videoconference fatigue,[4] referring to increased levels of exhaustion (at the end of a working day) due to participating in virtual meetings (Bennett *et al.*, 2021; Fosslien and West, 2020). Bailenson (2021) identified four causes of videoconference fatigue: close-up eye gaze; increased cognitive load due to sending and receiving extra, nonverbal cues; physical immobility; and looking at your own video. As to the latter, Abramova et al. (2021) also noted that "self-view engagement depletes participants' mental resources" (p. 1). In addition, Fauville et al. (2021) empirically examined videoconference fatigue and found a gender gap: women were found to be impacted more by the self-view effect. Further evidence was provided by an eye-tracking study that confirmed women looked more at themselves than men (George *et al.*, 2022). In addition to the

[4] For review articles on the topic of videoconference fatigue we refer the reader to (Döring *et al.*, 2022; Li and Yee, 2022).

gender gap, Shockley et al. (2021) found a more severe effect on fatigue of camera usage for employees with less tenure in the organization. Recommendations to reduce videoconference fatigue include: avoiding nonverbal overload by using audio only or by turning off the self-view; taking into account the work schedules of different participants when planning a meeting; enhancing group belongingness by stimulating social interaction; muting microphones when not speaking; and taking breaks during and in-between virtual meetings (Bailenson, 2021; Bennett *et al.*, 2021). Bailenson concluded that "[p]erhaps a driver of Zoom fatigue is simply that we are taking more meetings than we would be doing face-to-face" (2021, p. 5).

Furthermore, while WFH is usually expected to have a positive impact on employee wellbeing (Allen, Golden, *et al.*, 2015), the situation was different during the pandemic (Carillo *et al.*, 2021). Indeed, WFH was an enforced rather than a voluntary measure and it was often full-time instead of part-time in combination with working from the office (Carillo *et al.*, 2021; Yang *et al.*, 2021). As a result, employees were confronted with a "lack of clear delineation between the office and home" (DeFilippis *et al.*, 2020, p. 9). Such inability to distinguish work and personal life along with feelings of isolation, can negatively influence wellbeing (Microsoft Research, 2021). Moreover, many did not have an appropriate workspace or equipment, another cause of physical and mental health issues (Microsoft Research, 2021). The impact of the pandemic has been reported to be especially negative for women (Hjálmsdóttir and Bjarnadóttir, 2021), including in academia (Ashencaen Crabtree *et al.*, 2021), as they are generally more likely to take on more responsibilities in family care (Gabster *et al.*, 2020). Also related to the context, during the lockdown there was generally more focus in society on mental and physical health (Anderson and Kelliher, 2020) and the deprivation of any type of in-person social interaction, including with friends and family, also negatively impacted wellbeing (Nguyen *et al.*, 2021; Waizenegger *et al.*, 2020). In this context, virtual meetings were mentioned as potentially having a positive impact during the pandemic, especially for isolated people, as they may "provide an opportunity for social interaction" (Lal *et al.*, 2021; Scott *et al.*, 2015).

In summary, prior Meeting Science research on the relationship between participating in face-to-face meetings and wellbeing has identified explanatory mechanisms related to individuals, meeting practices, and organizational contexts, but it has largely focused on negative wellbeing indicators and it has not considered the role of the type of meeting (Scott *et al.*, 2015), in particular in terms of the meeting modality (i.e., face-to-face or virtual). In the Virtual Work field, (virtual) meetings have not been a focal topic of inquiry and the research on wellbeing outcomes is inconclusive, as contradictory effects have been identified, also during the pandemic. Finally, while the relationship between virtual meetings and wellbeing came to the fore during the pandemic, the focus has been narrow in terms of one negative wellbeing indicator, namely fatigue. Therefore, the question we aim to address in this paper is: How does virtual meeting participation relate to both negative and positive wellbeing indicators?

3. Virtual Meetings and Wellbeing

In this section, we present the theoretical foundation of our work and develop our hypotheses on the relationships between virtual meetings and four indicators of wellbeing: workload, stress, fatigue, and work influence.

3.1 Theoretical Foundation

In the Meeting Science field, several theories have been used to relate meetings to wellbeing, including the theory of activity regulation, action theory, and theory on attentional capacity (Kirmeyer, 1988; Luong and Rogelberg, 2005; Zijlstra *et al.*, 1999; Zohar, 1999). Likewise, several theories have been used to relate the WFH context to wellbeing, including border theory and social exchance theory (Allen, Golden, *et al.*, 2015; Felstead and Henseke, 2017). Finally, theories that have been used to study videoconference fatigue include social presence theory, media richness theory, media naturalness theory, self-presentation theory, and attention restoration theory (Bennett *et al.*, 2021; Kaplan, 1995; Li and Yee, 2022; Riedl, 2022). Together, these theoretical perspectives point to a variety of explanatory mechanisms at the level of the individual, the meeting, or the work context.

In this paper, we keep with the work of Allen et al. (2012) and draw from the conservation of resources (COR) theory (Hobfoll, 1989, 2001) to relate virtual meeting participation to wellbeing indicators. This choice is consistent with the notion of meetings as stressors (Scott *et al.*, 2015, p. 22), referring to "an imbalance of situational demands and the individual and collective resources needed to manage them." In the COR theory, a resource has been defined as "anything perceived by the individual to help attain his or her goals" (Halbesleben *et al.*, 2014, p. 1338) and the resource concept has been used to refer to time, energy, money, knowledge, status, self-confidence, sense of mastery, cognitive effort, emotional labor, and (physical) workspace (Halbesleben *et al.*, 2014; Hobfoll, 2001). According to people strive to retain, protect, and build resources and that what is threatening to them is the potential or actual loss of these valued resources." In turn, a loss or a perceived lack of (valued) resources is related to negative wellbeing indicators, while a resource gain is related to positive wellbeing indicators (Hobfoll, 2001).

Our choice for COR as a theoretical framework is motivated by two main factors: (1) the concept of resources is broadly conceived, enabling a simultaneously holistic and parsimonious perspective on the relationship between meetings and wellbeing (Allen *et al.*, 2012; Hobfoll, 1989) and (2) the theory considers both positive and negative effects, as resource gains and losses, which is aligned with our general love/hate relationship with meetings as both productive and wasteful (Lehmann-Willenbrock *et al.*, 2016).

3.2 Hypotheses Development

In this study, we consider four established wellbeing indicators: workload, stress, fatigue, and work influence (Hobfoll, 1989; Ito and Brotheridge, 2003; Rogelberg *et al.*, 2006). The first three are negative indicators of wellbeing, also referred to as "ill-being" (i.e., more workload, stress, and fatigue are undesired), whereas the fourth indicator is positive (more work influence is desired). Accordingly, we first formulate a hypothesis about virtual meetings and the negative wellbeing indicators and then a hypothesis about the positive wellbeing indicator.

Workload, Stress, and Fatigue

Prior research has drawn from COR theory to relate face-to-face meeting participation to negative wellbeing indicators (Allen *et al.*, 2012). Indeed, meeting participants spend time, energy, and cognitive resources in meetings, which are moreover often experienced as wasteful, especially when meetings are not properly designed (Lehmann-Willenbrock *et al.*, 2016; Rogelberg *et al.*, 2006). Also, meetings may interrupt other work tasks or inhibit employees from completing tasks by "imposing temporal boundaries on work" (Scott *et al.*, 2015, p. 26), which can again be related to resource losses.

We assert that participating in virtual meetings can similarly be positively associated with workload, stress, and fatigue. Indeed, virtual meetings involve similar and potentially additional efforts and hassle, especially in terms of technological set-up. Many virtual meeting participants have experienced bandwidth issues that cause latency or blurred video images, background noises, or the inability to activate the microphone, camera, or screen to share (Bennett *et al.*, 2021; Hacker *et al.*, 2020) and such "technical challenges resulted in more annoyance and frustration compared to in-person work" (Microsoft Research, 2021, p. 24). Moreover, employees may be switching between multiple videoconference tools during a working day (e.g., Zoom, Microsoft Teams, Google Meet), accommodating for preferences or access to tools of (external) meeting co-participants (Microsoft Research, 2021), which relates to additional technological issues and cognitive resource requirements. All these factors can be related to further difficulties to execute the task at hand and resource depletion (i.e., time and energy). In keeping with COR theory, such resource losses can be related to negative wellbeing indicators.

Moreover, during lockdown, many employees spent the whole day in back-to-back meetings while WFH, enabled by the flexibility in scheduling virtual meetings, without time for recovering or having a (lunch) break (Reed and Allen, 2022). Also, while WFH there are competing resource demands related to household chores in the home environment and such resource competition is a source of stress (George *et al.*, 2022; Karl *et al.*, 2021). Moreover, there are many stories of family members and pets

walking into virtual meetings during the pandemic (Hacker *et al.*, 2020) and while acceptance of such events may have increased, they can still be considered interruptive for virtual meeting participants. Another source of cognitive resource depletion relates to multi-tasking during virtual meetings, which mostly consists of handling emails (Cao *et al.*, 2021; Karl *et al.*, 2021). According to COR theory (Magni *et al.*, 2022), these sources of resource losses can be associated with higher perceptions of workload, stress, and fatigue. Therefore, we formulate the hypothesis:

> Hypothesis 1: *"Participating in more virtual meetings is positively associated with higher perceptions of workload, stress, and fatigue."*

Work Influence

Prior research has also indicated how participating in face-to-face meetings may provide useful resources that facilitate work activities, as Allen et al. (2012) found that "people dread meetings that take away their time but enjoy meetings that provide resources necessary to do their job well" (p. 415). In particular, we consider influence on work, which is an important positive wellbeing indicator (Ito and Brotheridge, 2003). Consistent with the perspective of meetings as instrumental for getting (group) work done, the outcome of resource investment in meetings can be more resources (i.e., a net resource gain). For instance because "meetings provide a place where vital and (hopefully) relevant information is shared and many ideas are exchanged […] employees can learn new information that they may not have learned otherwise" (Allen *et al.*, 2012, p. 414). The chances of a net resource gain through meetings increases when helpful meeting practices are used and harmful practices are avoided (Lehmann-Willenbrock *et al.*, 2016).

Also, consistent with the perspectives of meetings for sense-making purposes (Scott *et al.*, 2015), meetings can help "set the tone for employees' workdays and shape their workplace experiences more generally" (Lehmann-Willenbrock *et al.*, 2016, p. 1294). In relation to the pandemic crisis situation, a series of meetings can be critical in response to the highly equivocal and ambiguous context (Daft and Lengel, 1986; Jarzabkowski and Seidl, 2008; Thunus, 2022). In meetings, "uncertainties and ambiguities

are identified, managed, and reduced" but not necessarily eliminated (Scott *et al.*, 2015, p. 34). Through their ritual function (Scott *et al.*, 2015), meetings impact the participants' understanding of and adhesion to their organizations' values and culture, which may be threatened during a crisis (DeFilippis *et al.*, 2020). Hence, especially during the pandemic, virtual meetings could serve as an important source of resource gains in terms of employees' influence on work. In keeping with COR theory and the above arguments, we formulate the following hypothesis:

> Hypothesis 2: *"Participating in more virtual meetings is positively associated with higher perceptions of work influence."*

4. Research Method

To empirically test the hypothesized relationships, an online questionnaire was developed and distributed at Belgian universities at the beginning of the pandemic. The questionnaire had 31 questions in total and also included variables that are beyond the scope of this study, as it is part of a larger research project. The measures of interests for this study were adapted from prior research: number of meetings attended per week (Rogelberg *et al.*, 2006) and wellbeing (Eurofound, 2015; Hobfoll, 1989; Ito and Brotheridge, 2003; Rogelberg *et al.*, 2006). The online questionnaire, along with the measurement items, is presented in Appendix 1.

Within each university, there was equal access among different hierarchical ranks and organizational roles to the same virtual meeting technologies. The technologies used at these universities offered comparable functionalities and included Zoom, Microsoft Teams, Google Meet, Cisco WebEx, and LifeSize. Email invitations were sent out to three French-speaking universities in the beginning of April 2020 and two weeks later to two Dutch-speaking universities.[5] The datasets from the two Belgian

[5] A French version of the questionnaire was distributed at 3 universities in the French-speaking region of Belgium (Université Catholique de Louvain, Université de Liège, and Université Libre de Bruxelles) and an English version of the questionnaire was distributed at 2 universities in the Dutch-speaking region of Belgium (Ghent University and Hasselt University). The measures included in both questionnaires were identical, except for two of the wellbeing indicators (namely work-related stress and fatigue) that were only included in the questionnaire distributed at the 2 Dutch-speaking universities.

regions were aggregated, since no important differences were observed between them with regards to the variables of interest.

The data collection was carried out in accordance with the General Data Protection Regulations and several measures were taken to ensure the validity and reliability of our study. Given the potential sensitivity of the data, respondents were ensured anonymity, which encourages participation and reduces the potential influence of socially desirable responses (Gioia *et al.*, 2013). Furthermore, it is of importance to highlight that the variables of interest were measured through a larger questionnaire on virtual meetings, which makes it unlikely the respondents would hold a "theory" about the hypothesized relationships. In conclusion, we are convinced that the data provide "a realistic context and point of reference" (Trevino et al., 2000, p. 169).

Using email distribution lists, invitations were sent to approximately 3,530 recipients. Data was obtained from 1,118 respondents, representing a response rate of 32 %. It was not possible to further increase the response rate, as we did not know who of the email recipients had (not) responded to the anonymous questionnaire and we were not permitted to send general reminder emails to the different distribution lists. Nevertheless, this response rate can be considered satisfactory, especially given the potential sensitivity of the subject (Cho and LaRose, 1999). Also, as a proxy for estimating an effect of non-response bias in our data, we compared early with late responses (Armstrong and Overton, 1977). Since no statistically significant differences were found on any of the variables of interest to this study, nonresponse bias did not appear to be a problem.

As 304 responses were deleted because of missing values or suspicious repetition, the final sample includes 814 useful responses. Table 1 reports the means, standard deviations, and number of observations for the key variables and Appendix 2 presents the histograms. The mean of the weekly average of virtual meetings was just above 5, or about one meeting per day. In terms of the wellbeing indicators, the largest means were observed for work-related stress and fatigue. Table 2 presents the Pearson correlations among the key variables of interest.

Table 1. Means, standard deviations, and number of observations[6]

	Mean	s.d.	N
1. Average number of weekly virtual meetings	5.19	4.56	740
2. Workload: The number of hours you work per week has… (Much decreased (1) – Much increased (5))	3.31	1.19	686
3. Work-related stress: The level of work-related stress has… (Much decreased (1) – Much increased (5))	3.47	1.15	127
4. Work-related fatigue: The level of work-related fatigue has… (Much decreased (1) – Much increased (5))	3.43	1.12	127
5. Work influence: The level of influence you have on your work has… (Much decreased (1) – Much increased (5))	2.92	0.86	676

Table 2. Correlations among key variables

	Correlations				
	1	2	3	4	5
1. Number of virtual meetings	1				
2. Workload	0.304	1			
3. Work-related stress	0.170	0.213	1		
4. Work-related fatigue	0.202	0.160	0.784	1	
5. Work influence	0.081	0.320	-0.301	-0.314	1

In addition, we included variables to safeguard against confounding effects. In keeping with prior research (Fauville *et al.*, 2021; Microsoft Research, 2021; Shockley *et al.*, 2021; Subel *et al.*, 2022), we included the following control variables: gender, organizational role, and hierarchical rank. In our sample, 61% of respondents is female. Also, our sample reflects the composition of the staff of a university, as the following roles are represented: scientific (37%), academic (31%)[7], administrative (26%) and IT/technical (6%) employees. Also, the majority of respondents (57%) were of the lowest hierarchical rank with no one working under their responsibility, the second largest group of respondents (29%) was of the middle rank with one or more people working under their responsibility, and the smallest group (14%) was of the highest rank, with responsibility for a service, department, faculty or research institute.

[6] The number of observations is lower than the 814 useful responses due to missing values. In addition, for two of the wellbeing indicators (namely work-related stress and fatigue) the number of observations is much lower, as these measures were only included in the questionnaire distributed at the 2 Dutch-speaking universities.

[7] The difference between scientific and academic staff is that the first group consists of junior or senior researchers or PhD students, while the second group consists of appointed professors.

5. Analysis and Results

In this section, we present our data analysis and results with regards to the two hypothesized relationships. Given our dependent variables (i.e., wellbeing indicators) are ordinal, we have conducted multiple ordered logistic regressions, one for each indicator, and included the number of weekly virtual meetings as independent variable in addition to the control variables. It is important to note that the wellbeing indicators represent respondents' perceptions since the pandemic. In table 3, we present the odds ratios (and the standard deviations between brackets), which represent the odds of observing the outcome variables in the highest category relative to the combined lower categories, when the unit of the independent variable increases with one. Hence, in our study, an odds ratio higher than 1 indicates that there is a higher chance to observe higher values of the wellbeing indicators when more virtual meetings are participated in; whereas an odds ratio between 0 and 1 indicates that this chance is lower. In addition, the odds ratios for the control variables are presented. The reported significance levels are at the 0.1 (*); 0.05 (**); and 0.01 (***) levels.

Table 3. Ordered logistic regression analyses for different indicators of wellbeing[8]

	Workload	**Work-related stress**	**Work-related fatigue**	**Work influence**
Number of virtual meetings	1.125***	1.093**	1.073*	1.047**
	(0.021)	(0.045)	(0.043)	(0.021)
Scientific staff (relative to academic staff)	0.436***	1.300	0.703	0.974
	(0.088)	(0.650)	(0.350)	(0.211)
Administrative staff (relative to academic staff)	0.598**	1.084	0.518	1.225
	(0.125)	(0.513)	(0.240)	(0.274)
IT/technical staff (relative to academic staff)	0.328***	0.812	0.521	0.863
	(0.123)	(0.608)	(0.391)	(0.327)
Gender (male relative to female)	0.731**	0.560	0.545*	0.966
	(0.114)	(0.199)	(0.195)	(0.160)
Hierarchical rank	0.922	1.042	0.932	0.794*
	(0.103)	(0.255)	(0.229)	(0.095)
Number of observations	**650**	**121**	**121**	**642**

[8] The number of observations is lower than in Table 1 because of missing values in the dependent or independent variables.

* p<0.1; ** p<0.05; *** p<0.01

Strong support was found for Hypothesis 1, as significant odds ratios larger than 1 were found for the number of virtual meetings for the negative wellbeing indicators workload, stress, and fatigue. Likewise, support was found for Hypothesis 2, as the odds ratio for the number of virtual meetings for work influence is larger than 1. The pseudo R^2 values for the different regressions are relatively small (all lower than 0.06) and based on a Chi-square test we cannot reject that all regression coefficients are simultaneously equal to zero for three of the models. This might be related to the relatively low number of observations available for stress and fatigue. Moreover, the focus of this empirical study is to investigate the key relationships between virtual meeting participation and wellbeing indicators, and not to propose fully-fledged models for the well-being indicators.

In addition, significant odds ratios were found for the control variables, for different wellbeing indicators. All these odds ratios are smaller than 1, which indicates that the wellbeing indicators tend to be lower for the indicated category relative to the reference category. For organizational role, 'academic staff' is the reference category while for gender, female is the reference category. Since hierarchical rank is an ordered variable, there is no reference category. For this variable, an odds ratio smaller than 1 refers to a negative relationship.

For workload (number of hours worked per week), significant odds ratios, lower than 1, are observed for each organizational role. Hence, scientific staff, administrative staff, and technical/IT staff report lower general levels of workload since the pandemic relative to academic staff. In addition, for both workload and fatigue, an odds ratio smaller than 1 is observed for gender, hence men tend to report lower levels for these negative wellbeing indicators. Finally, a significant odds ratio lower than 1 is found for hierarchical rank for the positive wellbeing indicator work influence, indicating that since the pandemic, the odds of reporting the highest level versus lower levels are lower for higher ranked employees.

6. Discussion

The empirical results of this study provide support for the hypothesized relationships on the number of virtual meetings and both negative and positive wellbeing indicators, demonstrating that virtual meetings can be associated with both resource losses and gains. While these findings are consistent with prior research on face-to-face meetings (Luong and Rogelberg, 2005; Rogelberg *et al.*, 2006), this is the first study to validate such relationships for virtual meetings, to our knowledge. In addition, differences in these wellbeing indicators were observed across hierarchical ranks, organizational roles, and gender.

Consistent with the first hypothesis, which drew from the notion that virtual meetings involve resource drains, we have found that since the pandemic, more virtual meetings can be associated with more negative wellbeing indicators. First, we found that employees that participated in more virtual meetings reported a higher workload. While we cannot infer causality, it seems an important part of the extra time worked since the pandemic, involved time and resources spent in meetings. Moreover, the relationships with organizational role and gender are found to be significant, indicating that the perceived workload (increase) was highest for academic staff and for women. Second, work-related stress was significantly related to participating in more virtual meetings. Consistent with the notion of meetings as stressors (Scott *et al.*, 2015), the crisis situation enacted a sudden shift, which can be an important cause of stress (Pichault and Schoenaers, 2003). Moreover, stress may be related to the hassle and interruptions in virtual meetings, which may especially be experienced by novice users. Third, a significant relationship was found between attending more virtual meetings and work-related fatigue, which can be associated with the notion that virtual meetings are tiring to attend. This finding is consistent with the videoconference fatigue phenomenon, an energy drain due to nonverbal overload, consuming cognitive resources (Fosslien and West, 2020).

Consistent with the second hypothesis, which drew from the notion of meetings as a source of (net) resource gain, we found that participating in more virtual meetings is associated with more influence at work, since the pandemic. Indeed, the flexibility and necessity of virtual meetings seems to allow

employees to participate in interactions in meetings that usually take place informally face-to-face and that enable them to negotiate their working practices (Mintzberg, 1980; Waizenegger *et al.*, 2020). More formally planned virtual meetings may be replacing the informal, unplanned, and unstructured face-to-face sense-making interactions employees usually have in the office (Waizenegger *et al.*, 2020). Moreover, virtual meetings can be used to check in on employees' wellbeing (Lloyd-Smith, 2020) and offer isolated people opportunities for both work-related and social interaction (Lal *et al.*, 2021; Scott *et al.*, 2015).

Our findings provide insight on whether meeting virtually affords organizations to maintain "business as usual" and how it impacts productivity and wellbeing. As such, we provide empirical evidence for earlier observations from study participants who reported about virtual meetings during the pandemic to be "too frequent and unnecessary, affecting their wellbeing" (Waizenegger *et al.*, 2020, p. 437). Taken together, we found that the implications of virtual meetings on wellbeing are paradoxical, as more virtual meetings are associated with both negative and positive indicators of wellbeing. This finding provides further evidence for the usefulness of COR theory in studying meetings and it is also consistent with the literature recognizing that technology use can simultaneously be related to resource losses and gains. The findings on the control variables shed further light on "whether the move to remote work affected certain subsets of people differently than others" (DeFilippis *et al.*, 2020, p. 9). In particular, we found that women experienced more workload and fatigue, which is aligned with prior research suggesting that women were more negatively affected by the work-from-home situation during the pandemic (Anderson and Kelliher, 2020).

Moreover, the massive switch to WFH with virtual meetings provided an occasion for critical reflection. In usual circumstances, the option of working remotely can offer a better work-life balance for employees and meeting virtually can yield significant savings in travel and productivity costs for the participants and organizations involved (Standaert *et al.*, 2016). Apart from productivity considerations, wellbeing is "an emerging professional priority" (Microsoft Research, 2021, p. 50) and is becoming an

increasingly important consideration for employee retention (Bennett *et al.*, 2021). Our findings on the relationship between virtual meetings and wellbeing therefore provide timely and valuable insight. Indeed, "what happens in meetings can have a profound impact on individual workplace attitudes far beyond the actual meeting context," for instance on job attitude and employee engagement (Lehmann-Willenbrock *et al.*, 2016, p. 1295).

7. Conclusion

This study on virtual meetings and wellbeing merges two fields, namely Meeting Science and Virtual Work, at the intersection of which there is a surprising void of research. We have drawn from the conservation of resources theory to develop two hypotheses. The data was collected at a revelatory moment in time, less than one month after lockdown and WFH measures were implemented, which enabled us to empirically examine the hypothesized relationships.

Our findings contribute to different research fields. In terms of Meeting Science, this study provides further insight on the relationship between meetings and wellbeing (Luong and Rogelberg, 2005; Rogelberg *et al.*, 2006), by considering meeting modality and empirically examining a positive wellbeing indicator. Our novel findings indicate that, like face-to-face meetings, virtual meeting participation can be associated with both negative and positive wellbeing indicators. These findings suggest that meeting mode selection should go beyond effectiveness considerations (Standaert *et al.*, 2021). As to the literature on Virtual Work, this paper responds to a call for empirical research that examines individual and organizational aspects related to the COVID-19 pandemic, enforced WFH, and the use of ICT and emergent technologies (Saridakis *et al.*, 2020; Waizenegger *et al.*, 2020). Our findings reveal an important role of virtual meetings in a Virtual Work context, based on which we call for future research in this field that considers virtual meetings as the unit of analysis. Finally, prior Information Systems research considers meetings as a collaboration context, but our findings point to the relevance of also considering (virtual) meetings as stressors or sense-making vehicles (Lehmann-Willenbrock *et al.*, 2016; Scott *et al.*, 2015).

This study also has important practical implications. For decades, virtual meeting technology has been expected to disrupt the workplace, but it took a pandemic to suddenly make it happen (Bailenson, 2021). Industry experts expect a long-lasting shift to virtual meetings, even as countries relax pandemic-related restrictions (Gartner, 2020). On a related note, we are likely at an inflection point for remote work (Blanchard, 2021), as this is expected to remain at higher levels than before the pandemic, enabled by flexible working policies (Reed and Allen, 2022). Hence, the 'next normal' way of working will include combinations of virtual and face-to-face meetings (Richter, 2020). Hybrid work policies, in which employees mix presence at the office with remote working, are considered to be lasting outcomes of the pandemic and it is important to avoid gender or other inequalities when they are deployed (Standaert and Thunus, 2022). Indeed, our findings related to the control variables suggest that different employees were in different contexts, resulting in different or even opposing preferences for virtual communication (e.g., synchronous vs. asynchronous). Therefore, organizations and teams should have meta-conversations about (virtual) communication to come up with tailored solutions for such "preference paradoxes" (Jarvenpaa and Keating, 2021; Kavanagh *et al.*, 2021).

Our findings point to the importance of developing social practices related to virtual meeting use and for designing videoconference tools that maximize positive productivity and wellbeing outcomes, while minimizing negative outcomes (Abramova *et al.*, 2021; Blanchard, 2021). Given the associations with negative wellbeing indicators, companies are advised to try to reduce the number of meetings by simply walking out of meetings where they do not add value (as business and tech mogul Elon Musk commented: "*It is not rude to leave, it is rude to make someone stay and waste their time*"[9]) or by encouraging alternative means of communication (cf. "*this meeting could have been an e-mail*"). Moreover, companies are encouraged to introduce (virtual) meeting-free days.[10] As to the latter, an

[9] Quote taken from "Elon Musk: Just walk out of bad meetings," https://www.bbc.com/news/business-43809674, accessed June 27, 2022.

[10] See for instance: Clarke, P. 2021. "Citigroup CEO Jane Fraser introduces 'Zoom-free Fridays' as pandemic takes toll on staff," Financial News. https://www.fnlondon.com/articles/citigroup-ceo-jane-fraser-introduces-zoom-free-fridays-as- pandemic-takes-toll-on-staff-20210323.

optimum for balancing productivity and wellbeing has been suggested to be three days out of five without meetings (Laker *et al.*, 2022). More drastically, companies can declare "calendar bankruptcy," which refers to an elimination of all (recurring) meetings from the calendar (Elliott *et al.*, 2022). Such a hard reset generates intentionality for employees to only set up meetings that are likely to add positively to productivity and wellbeing.

The research design has several limitations that are important to take into account when interpreting the findings. First, the empirical study was conducted in extreme conditions and some of the findings may not be generalizable to a situation when WFH is not enforced but voluntary (Kaduk *et al.*, 2019). Second, the data was collected in a university setting, in which meeting behavior may differ from other sectors. For instance, work is more individual-based in universities and meetings may therefore have a more disruptive effect than in other sectors (Luong and Rogelberg, 2005). Third, the study was cross-sectional in design, which limits the ability to infer causality. Fourth, collecting information on all the measures via a single questionnaire introduces the possibility for common method bias (Podsakoff *et al.*, 2003). However, using a different response format to measure independent (i.e., count of meetings) and dependent variables (i.e., wellbeing perception) creates a methodological separation, which reduces the likeliness of common method bias (Podsakoff *et al.*, 2003).

Furthermore, using self-reported measures for the count of meetings is common in the Meeting Science literature (Rogelberg *et al.*, 2006), but can be questioned in terms of reliability. Possibly better approaches, which are also more laborious or obtrusive, are to request respondents to keep a diary or share their calendars (Luong and Rogelberg, 2005; Standaert *et al.*, 2016). More generally, a different approach could be to ask respondents to provide data on a single, specific, and recent virtual meeting (Leach *et al.*, 2009). This could be more reliable and would also allow to capture and analyze more (specific) data at the level of the meeting, such as whether the respondent was the meeting organizer/facilitator, what the meeting goal, size and duration was, etc. Moreover, such set-up would offer the possibility of collecting data from multiple participants in a single meeting. This would not only help

to further alleviate common method bias concerns (Podsakoff *et al.*, 2003), but could also provide additional insight into the relationship between meeting dynamics and wellbeing. Addressing these issues offer interesting avenues for future research.

A longitudinal study would also be highly relevant, allowing to analyze how the relationship between participating in virtual meetings with wellbeing indicators evolves, given increased levels of experience and digital literacy (Nash, 2020). It would be of interest to include whether the employee mostly works on-site or remote, as a longitudinal study showed that sustained stress levels were higher for on-site workers (Michel *et al.*, 2021). Also, future research can validate our findings on virtual meetings and wellbeing in other contexts, including industries beyond academia, and in other countries. Indeed, both meeting practices and wellbeing indicators may vary according to organizational and country cultures (Hobfoll, 2001; Köhler and Gölz, 2015).

Finally, future research, in a post-pandemic world, could compare the relationship between meeting participation and wellbeing across modalities (face-to-face and virtual) in a single study. As to negative wellbeing indicators, we would expect a stronger effect of virtual meetings because of additional resource drains relative to face-to-face meetings. As to positive indicators related to work influence through sense-making, we expect a stronger relationship for face-to-face meetings, as for highly equivocal objectives, such as problem solving and maintaining relationships, face-to-face meetings are found to be more appropriate than virtual meetings (Standaert *et al.*, 2021). In addition to face-to-face and virtual modalities, yet another type of meeting is emerging, namely hybrid meetings in which face-to-face and virtual interaction are mixed (Cichomska *et al.*, 2015). Coming out of the pandemic, such hybrid meetings are expected to become more prevalent (Standaert *et al.*, 2022) and, as Reed and Allen (2022) suggest, the necessity to follow conversations through multiple modalities at the same time is expected to increase the cognitive (resource) load. Future research can build on the theory-based arguments developed in this study to hypothesize and compare wellbeing indicators for in-person and remote participants in hybrid meetings.

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Appendix 1: Questionnaire

Could you tell us whether, since the start of the lockdown:

	1 : Much decreased	2: Slightly decreased	3 : Not changed	4: Slightly increased	5 : Much increased
The number of hours you work per week has	○	○	○	○	○
The level of work-related stress has	○	○	○	○	○
The level of work-related fatigue has	○	○	○	○	○
The level of influence you have on your work has	○	○	○	○	○

Since the lockdown, how many virtual business meetings did you attend per week on average?

0 2 4 6 8 10 12 14 16 18 20

In your University, you are part of:

- ○ Academic staff
- ○ Scientific staff
- ○ Administrative staff
- ○ IT and technical staff

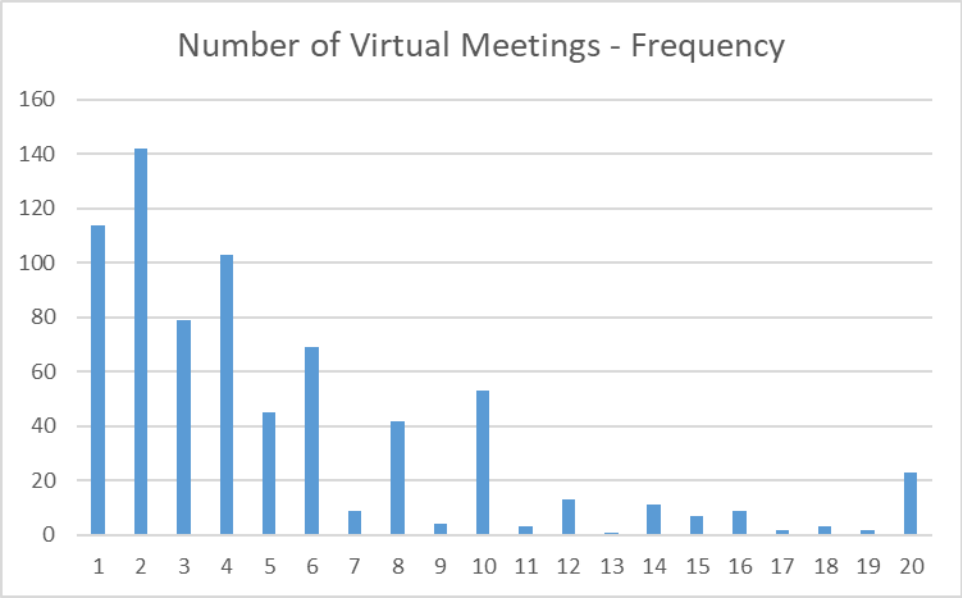
You identify yourself as:

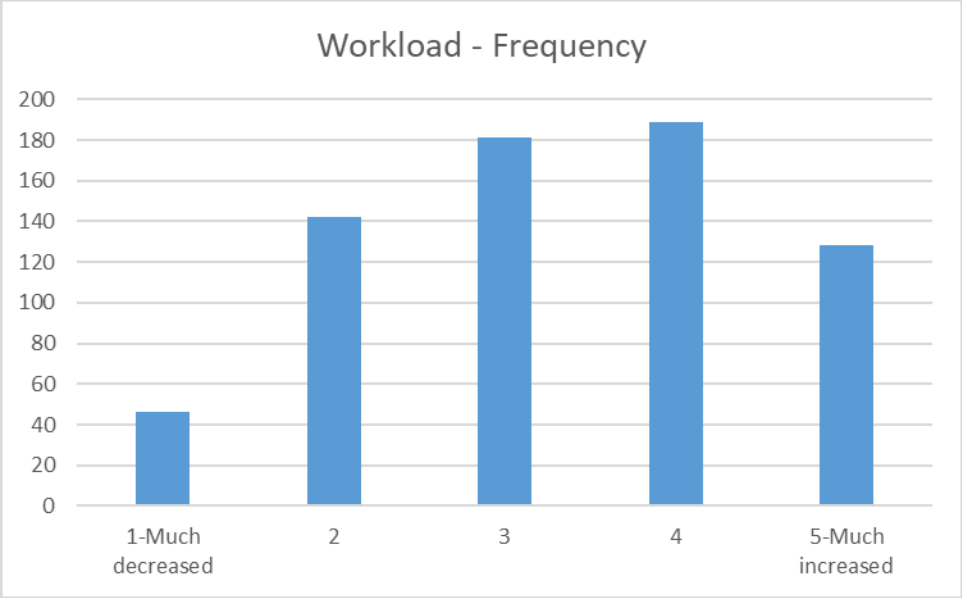
- ○ Female
- ○ Male
- ○ Other

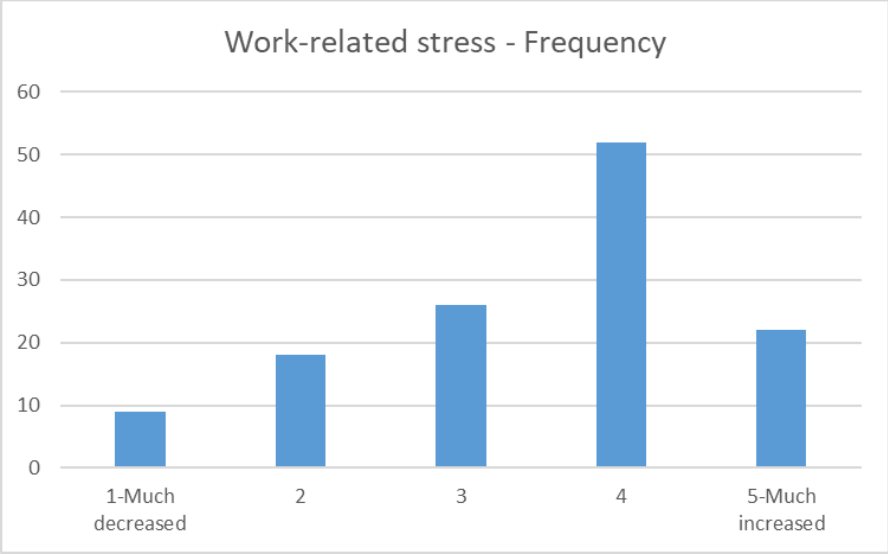
As to your managerial responsibilities:

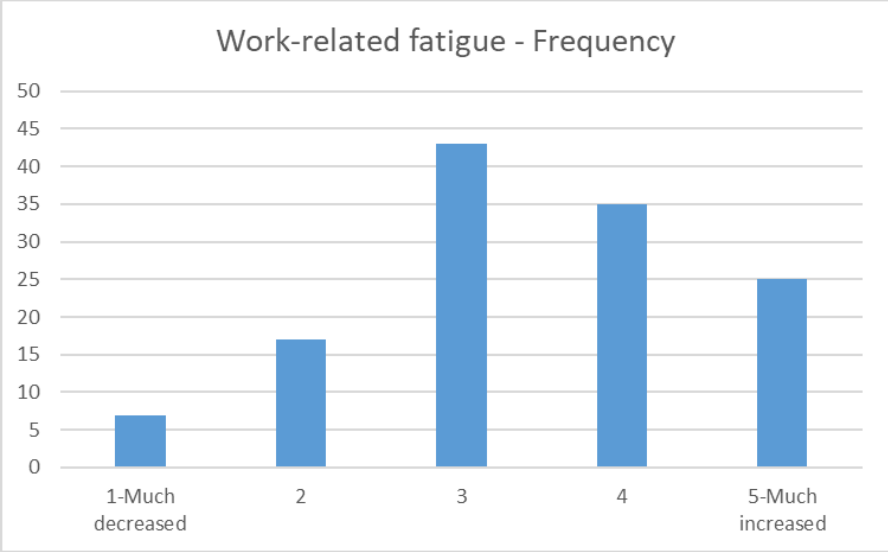
- ○ No one works under your responsibility
- ○ One or more people work under your responsibility and you yourself have one or more managers
- ○ You are responsible for a part of the Institution, for example a service, a department, a faculty or a research institute

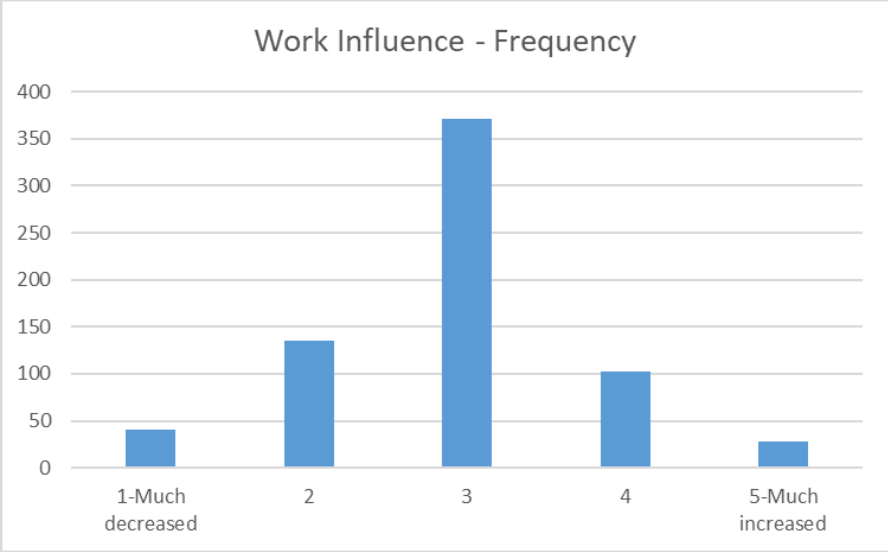
Appendix 2: Histograms of Key Variables






Work-related stress - Frequency
60
50
40
30
20
10
0
1-Much decreased
2
3
4
5-Much increased


Work-related fatigue - Frequency
50
45
40
35
30
25
20
15
10
5
0
1-Much decreased
2
3
4
5-Much increased


Work Influence - Frequency
400
350
300
250
200
150
100
50
0
1-Much decreased
2
3
4
5-Much increased