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VIDEOCONFERENCES IN THE MODERN WORKPLACE: ASSESSING THE IMPACT OF USAGE, FATIGUE, AND BURNOUT ON EMPLOYEE WELL-BEING

Master Thesis

Curriculum: Human Resources Management

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I declare that I have independently compiled this dissertation and have referenced all significant views, data, and works of other authors used in its compilation. Furthermore, I confirm that I have not previously submitted this work for the purpose of obtaining academic credits.

The length of this dissertation is 14 499 words, from the introduction to the conclusion.

Maarja-Liisa Kärp
(6 May 2023)

TABLE OF CONTENTS

ABSTRACT

The aim of this Master's thesis is to investigate the prevalence and impact of videoconference meetings in the workplace setting, with a specific focus on the relationship between videoconference usage, Zoom fatigue (fatigue related to videoconferencing), and burnout. Additionally, potential strategies and interventions that can mitigate the negative effects of videoconferencing on employee well-being will be explored. The thesis is motivated by the fact that the number of videoconferences used in the modern workplace is higher after the Covid-19 pandemic than it was pre-pandemic and researching Zoom fatigue is in its preliminary stages. A quantitative questionnaire, including the Zoom Exhaustion and Fatigue Scale, was conducted in March 2023. The results show that videoconferences are prevalent in the modern workplace, the average ZEFS score is lower than in previous studies, and there are no gender differences regarding Zoom fatigue. However, as expected, younger respondents experience more general fatigue, implying that they might spend more time using technology outside of the workplace setting. Therefore, when developing strategies for alleviating Zoom fatigue, the needs of different target groups regarding awareness need to be taken into account. The results of the thesis also suggest the need to carry out further post-pandemic studies in order to compare pandemic and post-pandemic usage of videoconferences and the stress caused by it.

Keywords: usage of videoconferences, Zoom fatigue, burnout, ZEFS

INTRODUCTION

Work is an important part of our lives since it offers purpose, meaning and structure in life (Bakker & de Vries, 2021). The Covid-19 pandemic has greatly affected the culture of holding meetings in the modern workplace. The use of videoconferencing platforms grew rapidly; while in March 2019, the number of Zoom users was 19 million, in April 2020 it had already reached 300 million (Wang et al., 2020). After the pandemic, videoconferences are still widely used, the number of meetings has stayed high after pandemic, the number of video conferences held have also increased from 48% on 2020 to 77% on 2022, 83% of the employees spending 1/3 of their time on videoconference meetings (Lindner, 2023). The videoconferencing industry expects a 22% growth from 2022-2025 (Keith, 2022). This in turn has brought a new problem, fatigue associated with videoconferencing, whose long-term effects are not yet sufficiently known or studied (Fauville et al., 2021). In a situation where, as a result of the Covid-19 pandemic, the number of people experiencing anxiety disorders and depression has increased by 25% (Mental Health…, 2022) it is important to understand whether fatigue associated with videoconferencing contributes to stress-related mental health problems.

Work stress occurs as a consequence of repetitive work activities, bureaucracy, role conflicts or work pressure (Bakker & de Vries, 2021). In a situation where the proportion of work-related stress factors at work has increased and more people and employees are experiencing anxiety disorders, depression, and accompanying burnout, it is important to study different risk factors and their prevention methods. In addition, work-related stress plays an important role in determining the level of productivity, ability, and satisfaction of employees. Thus, it is important to deal with work-related stress, as excessive stress can cause illnesses and inability to meet the demands of work. This in turn can lower the effectiveness of employees and, as a result, the ability of the organization to achieve its goals (Armstrong & Taylor 2020, p. 581-582). Many meetings, especially those that do not meet the employee's goals, can increase the employee's work-related stress, fatigue, and perceived workload (Allen et al., 2018). Therefore, it is important to map the videoconference usage and aspects associated to the fatigue to ensure employee well-being and sustainability of the work performance.

Investigating Zoom fatigue is currently in its preliminary stages. Thus far, there are only a limited number of studies that have been conducted to develop the concept of videoconferencing fatigue

and to establish methods for its measurement. The terms "videoconferencing fatigue" and "Zoom fatigue" are synonyms with identical meanings and will be used interchangeably in this study.

The aim of this study is to investigate the prevalence and impact of videoconference meetings in the workplace setting, with a specific focus on the relationship between videoconference usage, Zoom fatigue, and burnout. Also, potential strategies and interventions that can mitigate the negative effects of videoconferencing on employee well-being will be explored. This Master thesis is an empirical study in which the author seeks to address the following questions:

1. How prevalent is using videoconferences in the modern workplace setting?
2. What is the relationship between Zoom fatigue and factors such as meetings length, frequency, and breaks between meetings?
3. Is Zoom fatigue related to the respondent's work position (manager vs specialist) and/or demographic indicators (age, gender)?
4. Does Zoom fatigue contribute to burnout?
5. What causes stress in videoconferencing for employees, and how they tackle it?

Data were collected using an online survey in March 2023. In total, 46 employees from two respondent groups completed the Zoom exhaustion and fatigue scale developed by Fauville et al. (2021b), as well as the abbreviated Copenhagen Burnout Inventory (Kristensen et al., 2005), and answered questions regarding the usage of videoconference meetings in their everyday work.

The thesis consists of three chapters. The first chapter provides an overview of the main concepts and causes of Zoom fatigue and burnout. The second chapter is devoted to the empirical study, while the third chapter concludes and discusses the results of this study.

Overall, this thesis is expected to provide insights into the usage of videoconferences in the modern workplace and the impact of Zoom fatigue on employee well-being. The results can be used to develop policies and guidelines to mitigate the negative effects of videoconferencing and improve the well-being of employees in the workplace.

1. THEORETICAL OVERVIEW

1.1. Digital stress and videoconference meetings

The digitization of the workplace is bringing benefits to organizations, including improved productivity, cost savings, a more mobile and agile workforce, and greater flexibility and adaptability in a complex market. With the ability to collaborate globally and with a diverse, international staff, employees are now able to work from anywhere with a reliable internet connection which brings along new challenges, for example technostress and digital stress. (Buchanan et al., 2016)

Technostress refers to the negative impacts of technology usage on an individual's mental and physical well-being (Ragu-Nathan et al., 2008). Digital stress refers to the negative psychological and physiological effects that result from excessive or prolonged use of digital technology and the constant exposure to digital devices and the internet. This can include symptoms such as fatigue, anxiety, depression, insomnia, and headaches. (Hall et al., 2021) Both terms refer to the challenges posed by technology; however, while technostress specifically focuses on the stress caused by the usage of technology itself, digital stress is a broader concept that encompasses the many different ways in which technology may elicit stress. Thus, in the context of studying the fatigue caused by using the technology, digital stress is a more relevant concept for this paper. There are different types of digital stress, one of which is related to videoconference meetings often labelled as Zoom fatigue (ZF). (Buchanan et al., 2016)

A meeting can be defined as a gathering of at least two individuals who convene simultaneously for a common purpose, which is ostensibly related to the operation of an organization or group. Every gathering serves as a reflection and has a significant impact on the overall work environment. Its effectiveness is determined by three key elements: perception of individuals regarding the nature of their interaction with their colleagues, to which these interactions facilitate the achieving their goals and extent to which these objectives foster constructive relationships. (Johnson & Mabry citing Schwartzman, 1989)

Although participating in meetings is expected from employees and is a routine in organizations, their value is often questioned by the employees (Mroz et al., 2018). According to Keith (2015),

there were 11 million meetings per day in 1976 and 55 million meetings each day in the U.S. with 6 hours per employee per week spent in meetings in 2015. The impact of COVID-19 is that the number of meetings has increased, with over 80 million meetings each day during the lockdown. The statistics regarding the prevalence of meetings or VCMs in 2022 and after the pandemic are not yet available due to the reports being compiled later in the following year of the reporting period. The post-pandemic trend is to have more meetings than in the pre-pandemic period and slightly fewer meetings than during the pandemic, which is supported by the fact that, by the latest available statistics from Zoom, while the unique Zoom visits increased to 1.8 million by January 2022, by May 2022, they had decreased to 1.3 million unique visitors (Flynn, 2023). Different authors agree that the time spent on a meeting has decreased compared to the pre-pandemic times; however, the predicted statistics for 2022 offered by different authors vary (Flynn, 2023; Lindner, 2023). Keith (2022) has predicted that post-pandemic it is estimated that the average increase in the number of meetings is 12.9%, with an average of 7 to 12 meetings per week. However, these meetings were often considered shorter and included more people, resulting in a reduction of the time spent in meetings by 11.5%. (DeFilippis et al., 2022) The increase of the meetings has also affected employees in managerial roles. While different authors provide different statistics, the number of meetings has increased also for CEOs, i.e. Flynn (2023) suggest that CEOs have at least 37 meetings per week and spend 72% of their time on the meetings in 2022, while upper management spends roughly 50% of their time on meetings and middle management 35% of the time on meetings.

Videoconferencing (VC) refers to a type of online meeting that allows two or more participants from different locations to engage in real-time multi-directional audio-visual communication (Döring et al. citing Motamedi, 2022). Currently, there are several VC systems available, which can be accessed using either wired or wireless internet connections on computers and mobile devices, including BigBlueButton, BlueJeans Meetings, GoToMeeting, Microsoft Teams, Cisco Webex, Skype, and the widely utilized system, Zoom. VC is frequently employed in organizational, business, and educational contexts for communication and collaboration, as well as for private use with family and friends. (Döring et al., 2022) This paper studies fatigue caused by any of the videoconferencing software mentioned before.

Microsoft has analysed over 30,000 individuals using their product MS Teams from February 2020 to March 2022 and found in their study that there were 2.5 times more Microsoft Teams meetings in that period compared the period before that, with a 252% increase in meeting time.

Additionally, 62% of the calls were conducted ad hoc or unscheduled in 2020 (The Next Great..., 2021). DeFilippis and Microsoft, in their Work Trend Index, have also found that the workday span has increased over 13% (by 46 minutes) since March 2020 by 2022. It does not mean increased working hours but only the span of work. Despite the difficulty in counting meetings, studies have shown that remote work and increased use of videoconferencing during the pandemic has led to an increase in the number and duration of the meetings. (Nesher Shosan & Wehrt, 2021) Different authors agree that the number of videoconference meetings has gone up and the duration of one meeting has decreased compared to the pre-pandemic times, however they do not agree on the percentage. For example, Lindner (2023) has found that the percentage of videoconference meetings has increased from 48% on 2020 to 77% on 2022 with 83% of the employees spending about 1/3 of their working time videoconferencing.

1.2. Zoom fatigue

The phenomenon of fatigue is complex and multifaceted, with various definitions offered by scholars across different disciplines over a long period of time. A recent literature overview offers the following definition: “Fatigue is a suboptimal psychophysiological condition caused by exertion. The degree and dimensional character of the condition depends on the form, dynamics, and context of exertion, which is described by the value and meaning of performance to the individual; rest and sleep history; circadian effects; psychosocial factors spanning work and home life; individual traits; diet; health, fitness and other individual states; and environmental conditions. The fatigue condition results in changes in strategies or resource use such that original levels of mental processing or physical activity are maintained or reduced.” (Olson, 2007; Phillips, 2015) Fatigue is viewed as a subjective and unpleasant state of tiredness with multiple dimensions felt by individuals after insufficient sleep or rest, physical exertion, mental effort, or a lack of motivation for activity that can be described as feeling of exhaustion accompanied by a reduction in capacity for physical and mental labour. (Fauville et al., 2021a)

Zoom fatigue (synonym: videoconferencing fatigue (VCF)) as a new term became well known during the pandemic in 2020 (Wiederholm, 2020). The concept of ZF is still widely disputed by many authors: i.e. Riedl (2021); Döring et al. (2022); Li & Yee (2022) etc. The definition of it has been discussed in few literature reviews. There is a common understanding among different

authors that ZF deals with negative effect of videoconferencing usage to the physiology, psychology, and emotions. (Nesher Shosan & Wehrt, 2021; Riedl, 2021; Fauville et al., 2022)

This thesis uses Riedl's (2021, p. 157) definition, who developed the definition based on a systematic review of VCF: "ZF is defined as somatic and cognitive exhaustion that is caused by the intensive and/or inappropriate use of videoconferencing tools, frequently accompanied by related symptoms such as tiredness, worry, anxiety, burnout, discomfort, and stress, as well as other bodily symptoms such as headaches."

Nadler (2020) posits that ZF is not solely caused by prolonged screen time, but rather by the complexity of interpersonal interactions in videoconferencing, which is influenced by specific spatial dynamics. Wiederhold (2020) acknowledged the challenges that come with adopting new communication technologies. Nadler theorizes that ZF arises from the concept of the "third skin," where individuals are perceived as a combination of person, background, and technology, resulting in increased cognitive effort in interactions. The "third skin" concept in the context of ZF refers to the idea that when participating in videoconferencing, individuals are perceived as a combination of their physical self, the background behind them, and the technology that they are using. This concept suggests that the presence of the camera and the awareness of one's background and technology can create an additional layer that the individual must navigate and be mindful of in their interactions, which can lead to increased cognitive effort and contribute to ZF. (Nadler, 2020)

Riedl (2021) also discusses the videoconferencing stress as a negative versus positive phenomenon. The concept of ZF is based on the idea of distress, which is stress that creates a threat or hindrance, rather than eustress, which is stress that creates a challenge or opportunity. Riedl refers to studies that has called for more research on eustress, as not all stressors are harmful, and individuals experience digital stress and technostress differently depending on whether they view the characteristics as challenges or threats. This raises the question of what the "eustress" perspective means for videoconferencing stress research. For example, the Riedl (2021) hypothesizes that multitasking during videoconferences is a root cause of VCF, but it's possible that multitasking could reduce work stress for individuals with high workloads.

While there is a little of empirical research on the psychological effects of the increased usage of VCMs, the construct of ZF can be theoretically grounded through the examination of three fields of research: the concept of fatigue, research on social media fatigue, and research on interpersonal interaction and nonverbal communication. (Nesher Shosan &Wehrt, 2021; Fauville et al., 2021b). Johnson & Mabry (2021) argue that ZF can be theoretically grounded in Conservation of Resources Model of Stress as it postulates that stress is not primarily a result of an individual's assessment of events, but rather stems from environmental, social, and cultural factors that exert demands on individuals to secure and maintain the circumstances that promote their well-being. Thus the technical errors, perceived stress in lack of cues in communication and the frequency, duration and lack of breaks in between the meetings can reduce the resources which can lead to fatigue and burnout.

Döring et al. (2022) take this interpretation of the concept even further by offering a four-dimensional model of VCF caused by personal, technological, organizational, and environmental factors or dimensions each of them having several sub-dimensions. While technological factors are acknowledged as the primary cause of VCF, the 4D-model on figure 1 emphasizes also the significance of organizational and environmental factors, which are often overlooked in academic discussions.

The concept of VCF being relatively new, the researchers are still developing the concept and methods for research ZF. Most of the studies carried out include triangulation, i.e. Rump & Brandt, 2020; Fauville et al., 2021a, Nesher Shoshan & Wehrt 2021; Johnson & Mabry 2021; Oducado et al., 2021; Karl et al., 2022 etc. The methods for researching ZF that have been used are quantitative
(questionnaire), i.e. Fauville et al., 2021a; Rump & Brandt, 2020 and qualitative, i.e interviews by Nesher Shoshan & Wehrt (2021) and Meaning Extracting Method and other methods for text analysis by Karl et al. (2022).

1.3. Causes of Zoom fatigue

As mentioned, Döring et al. (2022) suggest a wider approach for the concept and criticize some of the research about VCF and stress carried out so far. Although they do not offer alternative

methods for researching ZF, their conception is probably the most thorough thus far what concerns the causes of ZF.

Figure 1. The four-dimensional model of VCF and its causes Source:
Döring et al. (2022, p. 5)

According to Döring et al. (2022) the first dimension, personal factors, of VCF encompasses individual and social factors that impact the experience of fatigue during videoconferencing. The individual factors dimension includes general individual factors, such as sociodemographic variables, personality traits, and cognitive traits, as well as VC-specific individual factors, such as mental and physical health and fitness, stress management skills, and VC skills. The social factors dimension includes distal social factors, influenced by the person's social network, and proximal social factors, which are influenced by other people participating in the VCMs: effective session management, clear communication norms, and defined participant roles can help reduce the burden of meetings and, thus, reduce fatigue.

The second dimension of the model according to Döring et al. (2022) for understanding the potential fatiguing effects of VC technology use consists of organizational factors. Temporal-organizational factors, such as the number and duration of VC sessions and timing of sessions, can lead to VCF. Studies have shown that an increased number and length of VC meetings, as well as late day VC sessions, can contribute to VCF. Taking micro-breaks during VC sessions is

often mentioned as a strategy to prevent fatigue, but its importance is not based on strong empirical evidence. Context and content factors, such as the anticipated outcome and activity during VC sessions, also play a role in VCF. In work or study-related sessions, the goal and activity are related to tasks to be completed, while in leisure or private context, the goals are motivated by psychological human needs. The activity during the VC session and the task features, such as task complexity and task-technology fit, can indirectly influence the occurrence of fatigue.

The third dimension of the VCF model explores the role of technological factors in determining the experience of VCF. It is divided into four sub-dimensions, which are technology factors related to: presentation, communication, self, and usability. The first sub-dimension, presentation-related factors, encompasses the technology involved in the capture, processing, and transmission of audio, video, and audiovisual information. These technological characteristics can contribute to visual, auditory, and information integration effort and subsequent fatigue. Visual fatigue can occur due to factors such as camera selection, lighting conditions, video resolution, size of the participant's video window, viewing distance, and virtual backgrounds. Auditory fatigue can be caused by audio signal level, background noise, room reverberation, audio quality, and coding and transmission impairments. Audiovisual fatigue can result from audio and video being out of sync and increase cognitive load. The second sub-dimension, communication-related factors, concerns the interpersonal communication aspect of VC. Technical difficulties with nonverbal cues, turn taking, and social bonding and impression formation can increase stress and fatigue. Task switching due to repair activities also adds mental load and can contribute to fatigue. (Döring et al., 2022) Technological factors are also the mainly covered factors in the work-related studies conceptualizing ZF. (Raake et al., 2022)

The fourth dimension of the 4D-model of VCF captures environmental factors that play a role in causing VCF. These factors include two sub-dimensions: micro-environmental and macroenvironmental factors. Micro-environmental physical factors are the setting of a person's work or study space, background noise, and work-home interference. Psychological micro-environmental factors, such as issues and requests related to different social roles, may also contribute to VCF by causing distraction, stress, and fatigue. Macro-environmental factors represent the overall situation of a person in society, including both needs and opportunities. Macro-environmental needs, such as loss of feelings of security and stability (by Maslow model of human motivation), may lead to increased feelings of depression and fatigue, while lack of

macro-environmental opportunities, such as reduced physical activity and social relationships, may also contribute to VCF. The impact of these environmental factors on VCF can vary greatly between individuals, but it is expected to have at least a small impact. (Döring et al., 2022)

A few authors have used Media Richness Theory (MRT) to explain ZF. MRT is a communication theory that was first proposed by Daft and Lengel (1986) for organisational communication for it's richness and clarity. The face-to-face communication is the richest since it allows immediate feedback. The theory explains how different communication media (such as face-to-face communication, email, or phone call) has different levels of richness or capacity to convey information. The theory argues that richer media channels have more cues (such as tone of voice, body language, and visual aids) to help convey meaning and context, making them better suited for tasks that require more personal or emotional expression, or need to convey complex information. (Nesher Shoshan & Wehrt, 2021; Fauville et al., 2021a)

According to the theory, richness is a function of the following four dimensions (Sheer, 2020):

1. Synchronicity: The degree to which the sender and receiver are able to interact simultaneously.
2. Social presence: The degree to which the sender and receiver feel they are in each other's presence.
3. Richness of cues: The degree to which cues, such as tone of voice, body language, and visual aids, are available to convey meaning.
4. Feedback: The degree to which the receiver can provide feedback to the sender.

MRT assumes that the richer the communication is regarding the above-mentioned dimensions, the better the communication is (Karl et al., 2021). ZF, according to MRT is caused by online communication being poor(er) in the aforementioned dimensions which forces individuals to spend more energy to comprehend their communication partner due to lack of cues that help in conveying meaning.

Another widely used theory in the research of VCF is media naturalness theory (MNT). According to biological anthropologists and Darwinian evolutionary principles, face-to-face communication has been the dominant form of interaction for over 99% of human history and suggests that the ability to process information in face-to-face situations is a genetically-determined human trait.

(Karl et al., 2021) Empirical evidence from various studies and theoretical arguments in the scientific literature support this notion. (Kock, 2005) For example, the same author also argues that the human brain is largely hardwired (genetically predetermined) for communication that occurs in the same location and at the same time.

MNT suggests that the level of naturalness of a communication medium is evaluated based on its similarity to face-to-face interaction (Standaert et al., 2021). This includes:

1. Sharing the same context and being able to see and hear each other;
2. Quickly exchanging communicative stimuli in real time;
3. The ability to convey and observe facial expressions;
4. The ability to convey and observe body language, and;
5. The ability to convey and listen to speech.

According to the MNT theory, a decrease in the level of naturalness leads to an increase in communication ambiguity and cognitive effort. This decrease in naturalness also often results in lower satisfaction, performance, and productivity during collaborative tasks (Kock, 2004, 2009) which can contribute to ZF.

According to MNT, adding software features to enhance human interaction can result in information overload (Kock, 2004). VC systems have features that can create these unnatural perceptions, such as a self-view window, a grid-view of participants that can create an unnatural interaction with multiple faces, and features that require multitasking, like processing information simultaneously from the video stream and chat function. Consequently, communication via videoconferencing is less natural and more demanding cognitively. (Karl et al., 2021)

Riedl (2021) has identified six root causes for ZF based on MNT. They are as follows:

1. Asynchronicity of communication - if there is a delay experienced during VCM, even if it is subconscious and only lasts milliseconds, the brain has to work harder to overcome the asynchronicity, resulting in increased cognitive effort and frustration, which can lead to heightened stress.
2. Lack of body language - participants usually only see each other's faces during VCM, not their full bodies, which can impact their ability to quickly and accurately perceive emotions.

3. Lack of eye contact - the lack of eye contact during VCM makes it harder to establish shared attention, which can result in coordination difficulties and an increase in cognitive effort.
4. Self-awareness - if a person's face is displayed on the screen during VCM, the natural flow of communication may be disrupted, leading to a shift towards more deliberate thinking. This can lead to heightened feelings of mental exhaustion and fatigue due to the increased focus and cognitive effort required.
5. Unnatural interaction with multiple faces - This results in stress as noted by Seery (2011), supporting the theory that unnatural interaction with multiple people during VCM, including the sensation of being watched, contributes to increased stress.
6. Multitasking during VCM - the common practice of videoconferencing is participants engaging in multiple unrelated activities while in a VCM, as well as switching between software features and handling instant messages, is a major source of the fatigue and stress that result from VCMs.

Bailenson (2021) elaborated on five distinct nonverbal mechanisms as root causes of VCF based on MRT:

1. Mirror anxiety - anxiety triggered by self-reflection in the screen's view window;
2. Physically trapped – which refers to a sense of physical restriction due to the requirement to remain relatively stationary within the limited camera field of view;
3. Hypergaze, which refers to the perception of having all VCM participants constantly observing oneself throughout the entire meeting;
4. Producing non-verbal cues: an increased cognitive burden associated with the deliberate creation of legible nonverbal expressions in front of the camera;
5. Interpreting non-verbal cues: an increased cognitive burden associated with the interpretation of nonverbal expressions of other meeting participants displayed in their respective windows.

If we compare the work of Riedl and Bailenson, the similarities are visible, i.e. they both bring out the self-perception during the VCMs (self-awareness versus mirror anxiety), lack of cues when interpreting the communication (producing and interpreting non-verbal cues versus lack of body language and eye contact), unnatural communication with multiple people at the same time (hypergaze versus unnatural interaction with multiple faces). There are less differences than

similarities in their approach – while Riedl founds multitasking important, Bailenson concentrates on feeling physically trapped.

MRT and MNT have a lot in common and are both communication theories that explain how different communication media has different capacity to convey information. However, they differ in the focus of their explanation. MRT suggests that the richer the communication the better and the fatigue will appear from the cognitive effort of lack of synchronicity, social presence, richness of cues or feedback, while MNT suggests by focusing on the human biological communication apparatus (such as vocal tract, facial muscles and visual and auditory organs) is challenged during the VCMs which can create fatigue. (Kock, 2004) Both of the theories are widely used in the studies about ZF. While MRT has been used more often and is the basis of ZEFS, the thesis focuses on MRT, however MNT will be taken into account as well.

1.4. Burnout

Burnout is a psychological syndrome caused by chronic workplace stress in any occupation, and the term was first introduced by Freudenberger in 1974 (Lubbadeh, 2020). The symptoms of burnout syndrome typically include emotional exhaustion, feelings of cynicism and detachment from work, and a reduced sense of personal accomplishment (Leiter & Maslach, 2016). The World Health Organization defines burnout as an “occupational phenomenon” not a medical condition: ”a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed" (ICD-11…,2022). Burnout occurs when chronic stress exceeds an individual's ability to cope with it effectively. Over time, this chronic stress can lead to physical and psychological exhaustion, detachment and cynicism, and a reduced sense of professional efficacy. If left unaddressed, burnout can have severe consequences for individuals' physical and mental health, as well as for their job performance and overall well-being. The consequences of burnout can be severe, including increased absenteeism, decreased job satisfaction, and physical and mental health problems. (Lubbadeh, 2020)

The causes of burnout can be divided into three broad categories: individual factors, workplace factors, and societal factors (Maslach & Leiter, 2016). The symptoms of burnout can have a negative impact on an individual's quality of life, as well as their physical and mental health.

(EduValsania et al., 2022). It can be experienced as acute fatigue, persistent exhaustion, mental distancing from work, impaired mood and cognitive problems. (Bakker & de Vries, 2021)

Emotional exhaustion, a crucial aspect of burnout and videoconferencing fatigue, is the most researched aspect of burnout (Lubbadeh, 2020). It occurs when an employee feels overwhelmed and depleted emotionally due to their job (Maslach & Jackson, 1981). It is characterized by feelings of exhaustion, and a lack of energy to handle job demands and interact with colleagues (Maslach et al., 2001). Research has shown that burnout, including emotional exhaustion, is a strong predictor of an employee's intent to leave their job and general productivity thus it is important to pay attention to it also when studying VCF. Burnout syndrome is often considered to be a consequence of prolonged exposure to chronic stress, particularly in the workplace, which can also be produced by VCMs. Factors that contribute to burnout include high workloads, limited control over work, lack of support and recognition, and conflicting demands (Maslach and Jackson, 1981). There are different inventories developed for measuring burnout. The Maslach Burnout Inventory (MBI) is the most widely used research tool that assesses an individual's experience of burnout, which is characterized by feelings of emotional exhaustion, depersonalization, and reduced personal accomplishment. (Aguayo et al., 2011) Another burnout inventory that has been used in context of ZF is Copenhagen Burnout Inventory (CBI). While MBI concentrates on the individual experience, CBI includes a focus on external factors such as working conditions and client interactions (Kristensen, 2005).

Conservation of Resources theory (COR) is a stress and coping theory that was first proposed by psychologist Steve Hobfoll in 1989. (Buchwald & Schwarzer, 2010) COR posits that individuals have a basic drive to conserve their resources and protect them from loss or depletion. This theory serves as a framework for identifying ways to prevent the depletion of resources, retain current resources, and acquire additional resources needed for adequate functioning. The loss or depletion of resources can lead to feelings of stress and anxiety, as the individual perceives that their ability to meet their needs and goals is being threatened. The theory argues that stress results from the imbalance between the demands placed on an individual and the resources available to meet those demands. When demands exceed resources, stress is likely to occur. According to COR, the availability of resources holds significant influence in shaping individuals' assessments of stress and their ability to effectively deal with stressors. According to the theory, individuals endeavour to obtain and maintain resources that are considered valuable. (Johnson & Mabry, 2021)

Additionally, COR suggests that individuals or communities with limited resources are more susceptible to experiencing loss spirals, while those with ample resources have more opportunities for resource acquisition and are thus also more susceptible to fatigue and burnout. As described by Hobfoll (1998), loss spirals occur when resources are depleted, making them unavailable for future challenges, leading to further resource loss. Despite greater resilience among those with abundant resources, ongoing loss can still impact even those with ample resources. Hence, loss spirals represent a formidable force, particularly in individuals and communities already struggling with resource deprivation. (Buchwald & Schwarzer, 2010)

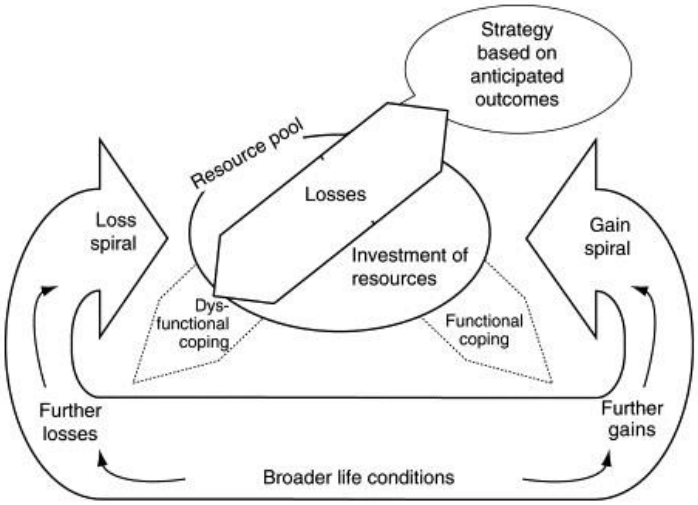

Figure 2. Processes of Resource Conservation
Source: Buchwald, Schwarzer (2010)

As demonstrated in figure 2, the mechanisms of resource conservation stem from both macro-level factors (security and stability), resource pool (family, work, interpersonal and personal resources) and resource-loss occurrences. Circumstances that involve resource depletion often result in further resource loss, sometimes creating a cyclical pattern. COR provides a useful framework for understanding how stress and coping are related to the availability and depletion of resources. The theory highlights the importance of considering both the demands and resources in an individual's life when examining stress and coping. (Johnson & Mabry, 2021) COR postulates that stress is not primarily a result of an individual's assessment of events, but rather stems from environmental, social, and cultural factors that exert demands on individuals to secure and maintain the circumstances that promote their well-being and shield them from harm. Burnout is likely to occur in situations where there is an actual loss of resources, a perceived threat to

resources, a circumstance where one's resources are insufficient to meet the demands of their work, or when the expected benefits are not achieved from an investment of resources. (Hobfoll, 1998, 2001; Hobfoll & Ford, 2007) COR also suggests that people use a variety of coping strategies to manage stress and conserve resources. Some coping strategies are proactive, such as seeking social support or finding ways to acquire additional resources. Other coping strategies are reactive, such as avoiding the stressor or withdrawing from social support.

Studies on the relationship between meetings and burnout have shown that excessive or poorly managed meetings can contribute to burnout in employees. Long or frequent meetings can lead to increased workload, decreased productivity, and a sense of feeling overwhelmed. (Johnson & Mabry, 2021) Research has shown that meetings that lack clear objectives or structure, and those that involve unnecessary or unproductive discussions, can be particularly detrimental to employee well-being. These types of meetings can lead to feelings of frustration, boredom, and disengagement, which are key factors in the development of burnout (Karl et al., 2022). Additionally, studies have shown that remote work and the use of technology for virtual meetings can also contribute to burnout (Rump & Brandt, 2020)

Luong & Rogelberg (2005) discovered that the duration of meetings can have an impact on employee well-being, with excessive meetings and extended meeting times correlating with increased feelings of fatigue and an increase in workload (i.e., depletion of resources). Virtual meetings can present obstacles to psychological safety, such as isolation, loneliness, a feeling of disconnection, and a reduction in trust. (Handy, 1995) Emotional exhaustion is likely to occur when there is a disparity between the individual and the work environment in terms of workload manageability, social interactions, autonomy and control over decision-making, fairness, personal values, and rewards and expectations. (Johnson & Mabry, 2021) Thus, COR becomes relevant when studying the usage of videoconferencing as a source of distress, fatigue and burnout.

To prevent and address burnout, it is essential to identify the underlying causes and develop effective strategies to mitigate their effects. These strategies may include improving workplace conditions, providing social support and resources for coping, and addressing societal pressures around work and productivity. By understanding the causes of burnout and developing effective prevention and intervention strategies, we can promote healthy and sustainable work environments for individuals across a wide range of occupations taking into account also the specific characteristics of VCMs. (Lubbadeh, 2020)

2. EMPIRICAL STUDY

2.1. Aim of the empirical study

The aim of this study is to investigate the prevalence and impact of videoconference meetings in the workplace setting, with a specific focus on the relationship between videoconference usage, Zoom fatigue, and burnout. Also, potential strategies and interventions that can mitigate the negative effects of videoconferencing on employee well-being will be explored. In an empirical analysis the author aims to answer the following questions:

1. How prevalent is using videoconferences in the modern workplace setting?
2. What is the relationship between Zoom fatigue and factors such as meetings length, frequency, and breaks between meetings?
3. Is Zoom fatigue related to the respondent's work position (manager vs specialist) and/or demographic indicators (age, gender)?
4. Does Zoom fatigue contribute to burnout?
5. What causes stress in videoconferences for employees, and how they tackle it?

The hypotheses based on previous studies are as follows:

1. Women and younger employees have higher levels of Zoom fatigue.
2. Employees in managerial roles have higher levels of Zoom fatigue.
3. Zoom fatigue has a high correlation with burnout scores.

2.2. Method

Data were collected using online survey. The questionnaire was compiled using Google Forms software and sent via email to all employees of a small or medium-sized information technology company. The respondents were informed that participation is voluntary and anonymous, and their consent was obtained before exposing them to the questionnaire.

2.2.1. Measures

The questionnaire (see Appendix I) consists of five (5) parts:

1. General demographic questions and questions about the usage of the videoconferences (questions 1-10 and 35)
2. Zoom Exhaustion and Fatigue Scale (questions 11-25)
3. Videoconference related fatigue and awareness questions (questions 26-27) 4. Copenhagen Burnout Inventory (questions 28-33)

The responses were inquired on a Likert-type or Likert scales.

The Zoom fatigue and Exhaustion Scale (ZEFS) was developed and introduced by Fauville et al., (2021b) based on the non-verbal mechanisms suggested by Bailenson (Döring et al., 2022). It is a tool used to assess the severity of VCF. The ZEFS is designed to capture the various nonverbal components of ZF, including visual, audio, cognitive load, social and emotional strain, and physical discomfort, aspects that have been found reliable across multiple studies. (Fauville et al., 2021a, 2021b)

The scale typically consists of five components according to Fauville et al. (2021b):

1. Visual fatigue: the strain experienced on the eyes from prolonged screen exposure and the persistent requirement to maintain eye contact. Visual fatigue has a wide range of visual symptoms, i.e. tiredness, headaches and soreness of the eyes.
2. Audio fatigue: the exhaustion caused by prolonged use of headphones or the necessity to speak in a manner that can be effectively transmitted over the platform.
3. Cognitive load: the increased cognitive demand placed on individuals to process and respond to visual and auditory stimuli in a virtual environment.
4. Social and emotional fatigue: the difficulties associated with nonverbal communication, as well as heightened stress and anxiety levels experienced during virtual interaction.
5. Physical discomfort: encompasses symptoms such as headaches, neck pain, and back pain resulting from prolonged computer use and poor posture.

ZEFS quantifies the severity of these components, providing a comprehensive assessment of the impact of VCF on an individual by asking the individual to answer to 15 questions as per Appendix I. (Ibid)

Copenhagen Burnout Inventory (CBI) consists of three subscales: personal burnout, work-related burnout, and client-related burnout. Personal burnout measures the exhaustion and fatigue that individuals experience in their personal lives, while work-related burnout measures the emotional exhaustion and cynicism that result from workplace stress. Client-related burnout measures the exhaustion and stress that individuals experience when dealing with clients or customers. (Milfont, 2007)

In terms of reliability and validity, both MBI and CBI have been shown to be reliable and valid measures of burnout in various contexts, CBI being more widely checked. However, CBI has been validated in more countries and cultures than MBI, making it more suitable for cross-cultural research. CBI has been used in a wide range of occupations, including healthcare, teaching, and social work. (Kristensen, 2005)

The 6-Question Copenhagen Burnout Inventory (CBI-6) is a further abbreviated version of the original CBI that includes only six items, two items for each of the three subscales measuring personal burnout, work-related burnout, and client-related burnout. It allows quick scoring and is easy to use for the respondents. (Barton et al., 2022)

2.2.2. Sample

The sample for the empirical study was composed of employees of an anonymous company founded in 2012, offering IT software development services to various clients, mainly concentrating on one significant client abroad. It has 130 employees, including 22 in managerial roles (7 in management and 15 team leads). The company was selected because some employees brought it to the management's attention that too many meetings were being held, and no surveys had been conducted regarding the use of meetings or VCMs. The questionnaire was available to the employees of the company from 28 February to 9 March 2023.

The response rate of the employees was lower than expected, only 28% of the employees responded. However, 60 % of the employees in management roles answered. To meet the small

sample rule of 30 respondents for the non-managerial roles (Cohen, 1992) and to achieve a 95% confidence interval with a standard deviation of 5, the questionnaire was also distributed among a group of human resources management students (the size of the group is 42). The questionnaire for the HR specialists' student group was distributed in the dedicated Facebook group from 8 to 17 March 2023. It was answered on voluntary basis and the prior consent of the respondents was obtained.

The total number of respondents was 46, out of which 16 respondents (35% of respondents) have managerial role and 30 have a non-managerial role. Of the 46 participants who responded to the questionnaire, their ages ranged from 24 to 57 years, with 52% of them falling in the 24-34 age bracket.

2.2.3. Data analysis

The responses of the questionnaire were analysed with IBM SPSS Statistics program version 29.0 for statistical analysis of the data. The Meaning Extracting Method (Chung & Pennebaker, 2008) and topic analysis was used prior the statistical analysis for the questions 26 and 27 regarding the awareness of the VCF and measures taken to mitigate them. The author found the reliability of the entire method using Cronbach's alpha. Confidence interval was used to calculate sample reliability.
Descriptive statistical analysis explains the usage of VCMs.

The correlation analysis was conducted between work position, demographic data and different scales used to find significant relationships between them. Analysis of Variance (ANOVA) was conducted to identify statistically significant differences in different groups regarding VC usage and different aspects of ZF.

There were Cronbach's α calculated for ZEFS and CBI separately. The Cronbach's $\alpha = 0.936$ was calculated during the reliability analysis of the ZEFS questionnaire and for the abbreviated version of Copenhagen Burnout Inventory the result is as follows: the Cronbach's $\alpha = 0.803$.

2.3. Results

2.3.1. Prevalence of videoconferences at work

The first research objective is to map the videoconference usage at the workplace, such as meeting duration, frequency, and intervals between meetings. Figure 3 shows that most of the participants (85%) utilize videoconferencing either once or multiple times per day, which aligns with the expected frequency of use. Merely a small proportion of respondents (15%) reported using VCMs less than once per day, thereby highlighting the ubiquity of this modality as a means of conducting meetings.

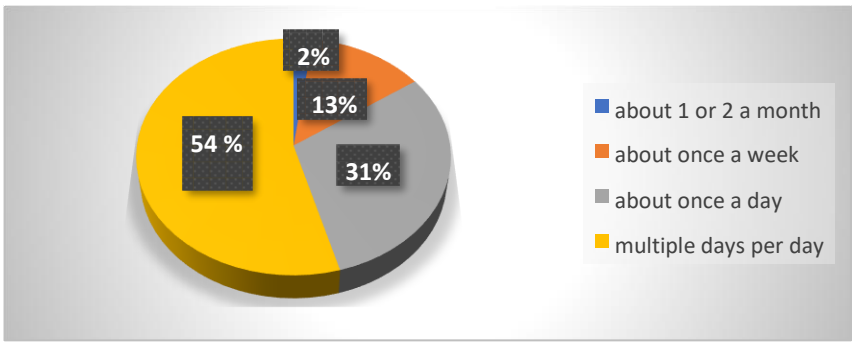

Figure 3. Frequency of usage of the VCMs
Source: created by the author

As can be seen in Figure 4, approximately 63% of the participants allocate up to six hours per week towards videoconferencing (M=6.74, SD=1.98). Notably, research by Johnson & Mabry (2021) indicates that the likelihood of experiencing ZF escalates following seven to ten hours of videoconferencing.

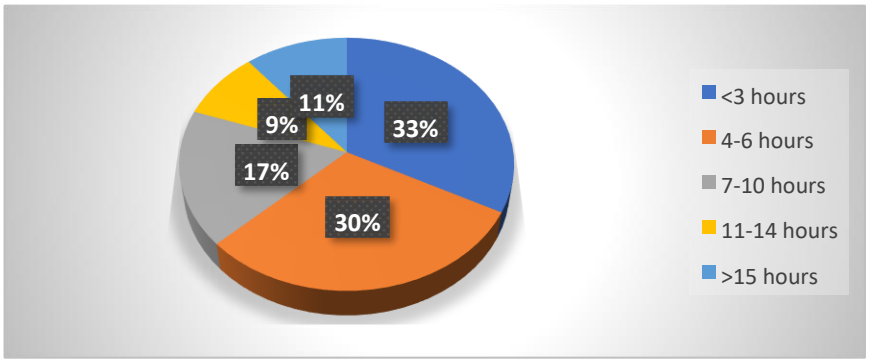

Figure 4. Duration of the VCMs on a typical week
Source: created by the author

Figure 5 illustrates that on a typical day 37% (17 participants) of the participants reported having one VCM a day, 30% (14 participants) have two and 33% (15 participants) have three or more videoconferences a day (M=2.2, SD=1.38).

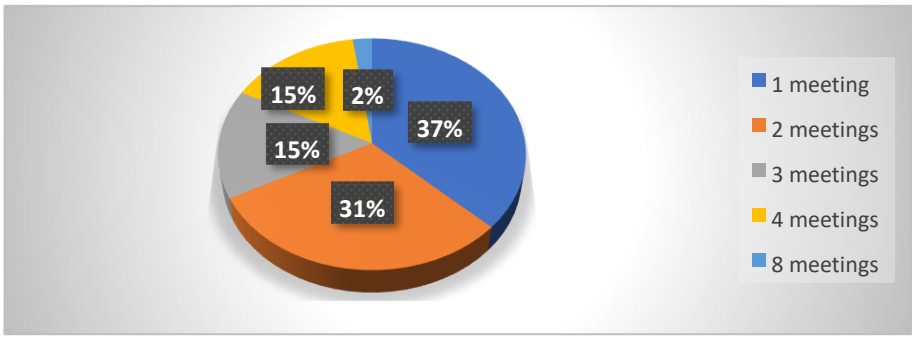

Figure 5. Number of VCMs on a typical day
Source: created by the author

Figure 6 displays that 48% of the VCMs last up to 45 minutes. 46 % of the VCM last 45 minutes to an hour and only 6% of the conferences last more than an hour.

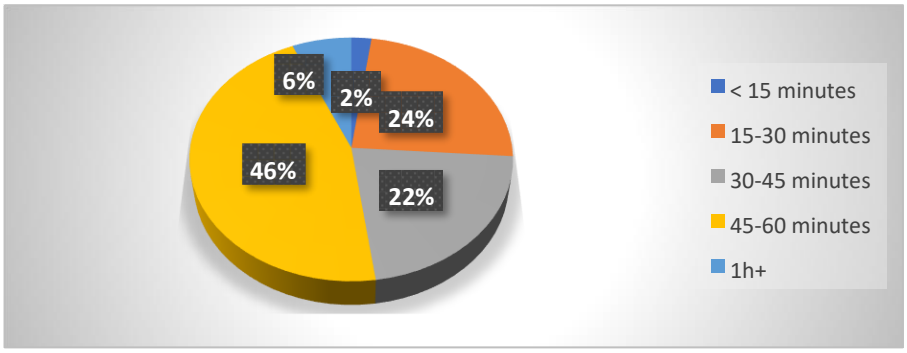

Figure 6. Duration of a typical VCM
Source: created by the author

Figure 7 illustrates that 15% of participants have less than 15 minutes between the meetings and 63% of the respondents have 30 minutes and more time between the meetings, median being 3045 minutes. The rest of participants indicated that a typical interval is difficult to measure.

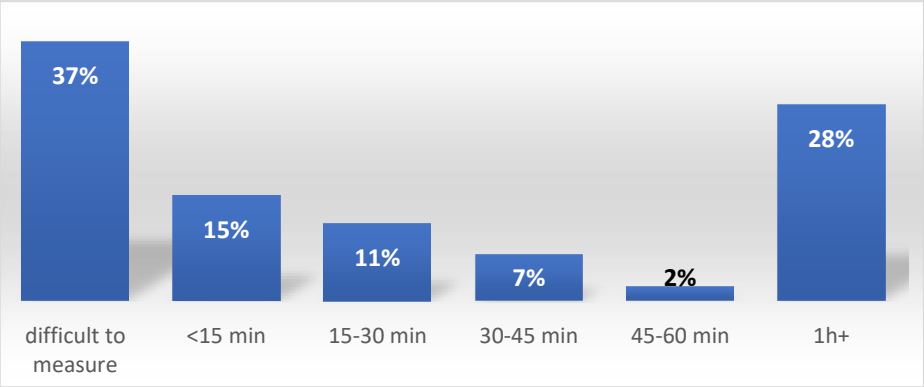

Figure 7. Interval of the breaks between VCMs
Source: created by the author

The adequacy of the breaks in between the meetings was evaluated using a Likert-type scale and is illustrated on Figure 8. Notably, while 63% of respondents deemed the breaks between meetings as "sufficient", 37% of participants regarded them as either "not enough" or "somewhat insufficient". No respondent answered “too many” or “far too many”.

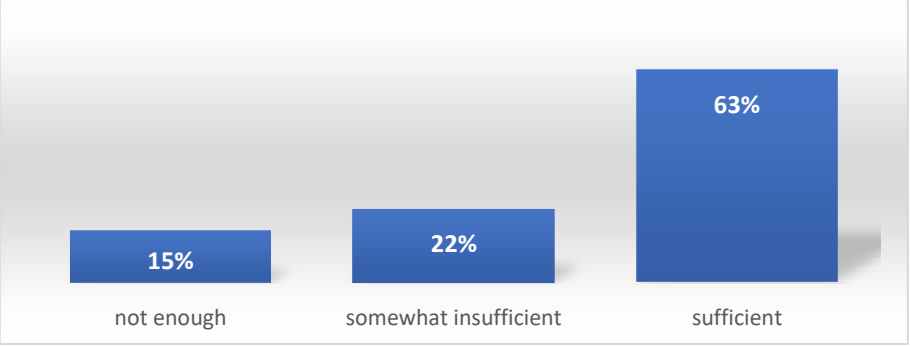

Figure 8. Sufficiency of the breaks between the meetings
Source: created by the author

The results show that the situation compared to previous studies has improved.

As visible from figure 9, during the past week 85% of the respondents did not experience any technical issues or experienced them rarely.

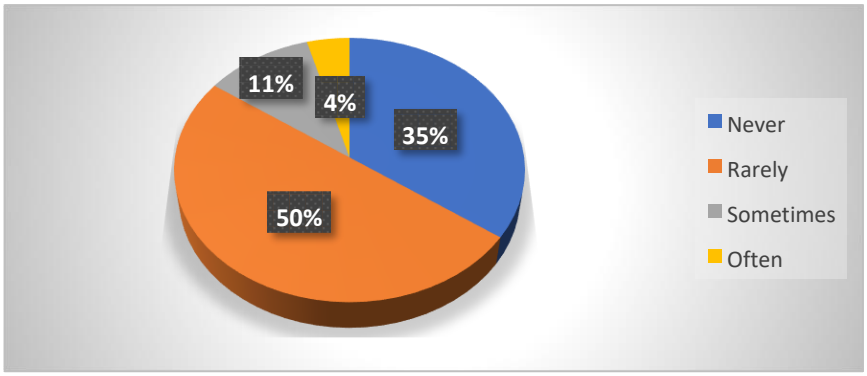

Figure 9. Technical issues experienced during the VCMs
Source: created by the author

It can be concluded that the technical issues are experienced less than during pandemic. 67% of the participants considered that the videoconferencing hours were sufficient to fulfil their job responsibilities and 28% considered the hours to be “too many” or “far too many” which also indicates that the perceived situation for employees has changed after pandemic compared to previous studies.

Figure 10 displays the distribution of responses regarding the perceived usefulness of the VCMs among the respondents, with 54% indicating it was "somewhat useful" or “almost not useful” and 46% indicating it was "useful" or “very useful”.

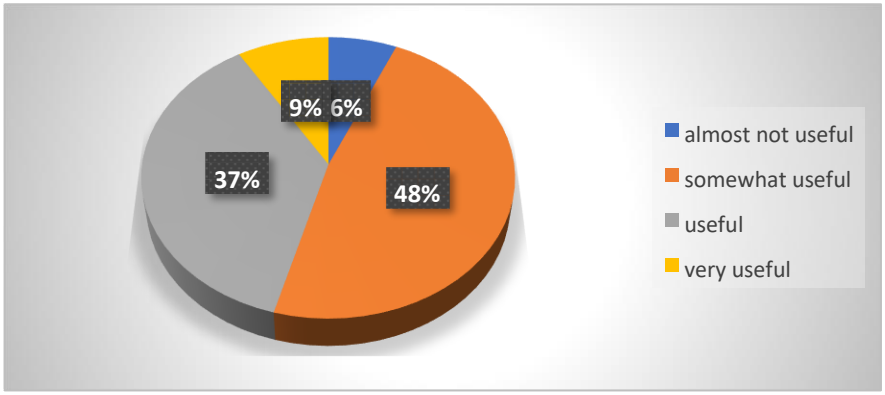

Figure 10. Usefulness of the VCMs
Source: created by the author

No participant indicated that the meetings were “not useful”, thus it can be concluded that the perceived usefulness has improved in general after pandemic (Flynn, 2023).

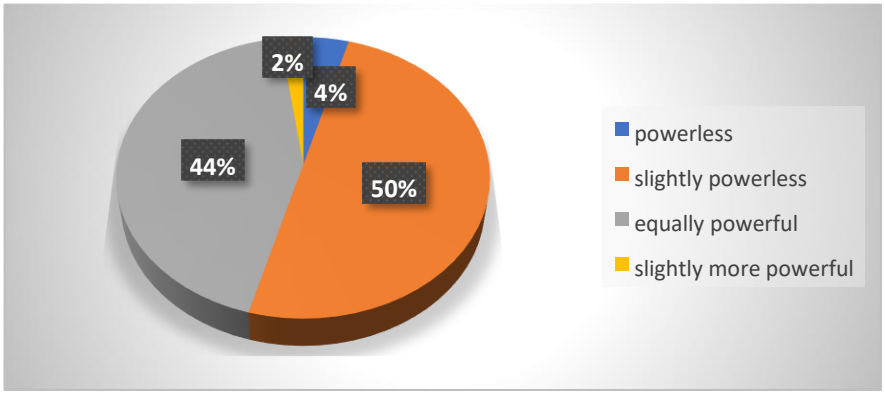

Figure 11. Perceiving own powerfulness at the VCMs
Source: created by the author

Figure 11 illustrates a slight reduction in participants' perceived level of power when attending VCMs compared to in-person meetings. Specifically, 54% of respondents indicated feeling "slightly powerless" or "powerless" during VCMs, a sentiment which was briefly alluded to in the awareness question. None of the participants responded “more powerful” to this question.

2.3.2. Experiencing Zoom fatigue

The second research objective concentrates on the usage of VCMs and ZF.

Table 1 provides an overview of the frequency of responses to ZEFS questionnaire. ZEFS uses a Likert-Type scale ranging from 1.0-5.0, with scores ranging from 1.20 to 4.40. The results were categorized into three groups according to the mean and standard deviation (M=2.41, SD=0.70): "low ZEFS score" for values up to 1.71, "medium ZEFS score" for values between 1.72-3.11, and "high ZEFS score" for values of 3.12 and above. Analysis of the results reveals that 15% of participants reported experiencing ZF "Often" or "Always", while more than half of the respondents indicated experiencing VCF "Rarely" or "Sometimes".

Table 1. Frequency of values of the ZEFS score

N=46	Range of values	Frequency	Valid percent (%)	Cumulative percent (%)
Low	1.20-1.71	7	15%	15%
Medium	1.72-3.11	32	70%	85%
High	3.12 -4.40	7	15%	100%
M	2.41			
SD	0.70		α	Questions
Range	1.00-5.00		0.936	15

Source: calculated by the author

When conducting the dispersion analysis between the usage of VCMs and the experience of ZF, various factors were considered and analysed, such as the frequency, duration, length and burstiness of the meetings and the experience with the technical quality. As a result, a moderate correlation was found between the frequency of the meetings and ZEFS scale (r=0.451). The highest ZEFS score (n=4.40) was reported by the only respondent having eight meetings per day as opposed to the rest of respondents having 1-4 meetings per day. The possible correlation of the "high" scores were analysed considering other indicators. However, no significant correlations were found regarding any other indicator.

As a result, ZF and number of the meetings that the participants had in a typical day were analysed via ANOVA and descriptive analysis. The participants were divided in three groups based on if the participants had one (37% of respondents), two (30% of respondents) or three and more (33% of respondents) meetings on a typical day.

ZF was divided into subscales of motivational, general, visual, social and emotional fatigue, as per Appendix 1, to have a better overview of the different aspects of the VCF. Descriptive and ANOVA analysis were conducted. While there were no significant differences for motivational, general, emotional and social fatigue, there was a significant difference between visual fatigue and number of meetings on a typical day ($F(2, 43) = 3.010$, $p = 0.060$) as shown in Table 2.

Table 2. Differences of the means of the subscales of ZEFS by the frequency of use of videoconferences per day

Subscale of Zoom fatigue	Frequency of use of videoconferences per day	M	SD
Motivational	1 time a day	2.67	0.62
	2 times a day	2.81	0.68
	3 or more times a day	2.96	0.80
General	1 time a day	2.65	0.88
	2 times a day	2.86	0.94
	3 or more times a day	3.18	1.00
Social	1 time a day	2.02	0.62
	2 times a day	2.45	0.62
	3 or more times a day	2.42	1.04
Visual	1 time a day	1.63	0.72
	2 times a day	1.60	0.79
	3 or more times a day	2.18	0.70
Emotional	1 time a day	2.20	0.78
	2 times a day	2.05	0.76
	3 or more times a day	2.60	1.10

Source: calculated by the author

Table 3. Differences between groups by frequency of the VCMs per day (division into three groups: 1 time, 2 times or 3 and more times per day)

Subscale of Zoom fatigue	F-value	Significance (p-value)
Motivational	0.681	0.512
General	1.285	0.287
Social	1.528	0.229
Visual	3.010	0.060
Emotional	1.514	0.232

Source: calculated by the author

An ANOVA analysis was also carried out based on frequency of videoconferencing use per week of participants, which entailed categorizing them into three groups based on their weekly usage: 3 hours or less, 4-6 hours, and 7-15+ hours. Although no significant differences were observed

between groups in terms of motivational fatigue or emotional fatigue, statistically significant variations were found between groups with respect to general fatigue (F(2.43)=2.836, p=0.070), social fatigue (F(2,43)=3.522, p=0.038), and visual fatigue (F(2,43)=3.496, p=0.039) as shown in the following tables 3 and 4.

Table 3. Differences of the means of ZEFS subscales between groups based on the hours of videoconferencing per week

Subscale of Zoom fatigue	Frequency of hours spent on videoconferencing	M	SD
Motivational	3 hours or less	2.53	0.68
	4-6 hours	3.05	0.71
	7-15+ hours	2.84	0.65
General	3 hours or less	2.47	0.83
	4-6 hours	3.26	1.07
	7-15+ hours	2.94	0.82
Social	3 hours or less	1.96	0.55
	4-6 hours	2.69	0.92
	7-15+ hours	2.24	0.75
Visual	3 hours or less	1.40	0.59
	4-6 hours	2.07	0.76
	7-15+ hours	1.92	0.79
Emotional	3 hours or less	2.02	0.7
	4-6 hours	2.57	1.14
	7-15+ hours	2.28	0.82

Source: calculated by the author

Table 4. Differences of groups by the hours of the videoconference usage per week (division into three groups: 3 hours or less, 4-6 hours, and 7-15+ hours)

Subscale of Zoom fatigue	F-value	Significance (p-value)
Motivational	2.132	0.131
General	2.836	0.07
Social	3.522	0.038
Visual	3.496	0.039
Emotional	1.363	0.267

Source: calculated by the author

The third research question examines the relationship between work position, demographics and ZF and burnout, investigating whether certain demographic factors and work position have an impact on levels of fatigue experienced during videoconferencing.

Table 5 displays that the age of the participants ranged from 24 to 57 years old (M=34.80, SD=8.71) and the participants were divided into two groups: 24-34 years and 35-57 years. The gender distribution in the groups was fairly equal, enabling conclusions to be drawn based on gender. One respondent did not specify their gender and was thus excluded from gender-based analysis. Out of the respondents in managerial roles, seven were male (44% of respondents in managerial roles) and nine were female (56% of respondents in managerial roles). An overview of the demographics and work position is provided in the Table below.

Table 5. Demographics and work position of the participants

Demographic or work position	Group	Number of respondents	Percentage (%)
Age	24-34	24	52%
	35-57	22	48%
Gender	Male	26	57%
	Female	19	41%
	Not specified	1	2%
Managerial role	Yes	16	35%
	No	30	65%

Source: calculated by the author

No significant demographic-based correlations were found between the general ZEFS score and age, gender, or managerial role. The general ZEFS score is similarly distributed among female (M=2.35, SD=0.71) and male (M=2.45, SD=0.68) participants. While it was observed that respondents in managerial roles generally have a higher frequency (M=3.06, SD=1.00) and longer duration of meetings (managerial role: M=8.87, SD=1.22; non-managerial role: M=4.2, SD=1.15) than respondents in non-managerial roles. No correlation was found between the role and ZEFS.

To support the study of nonverbal cues as indicated by leading authors in the field (Bailenson

2021; Fauville et al., 2021a, 2021b, 2023; Riedl, 2021 etc.), a question regarding mirror anxiety (looking at one's own image) was added to the questionnaire.

Table 7. Frequency of values of feeling uncomfortable by looking at your own image

Stress due to mirror anxiety	Frequency males	Frequency females	Frequency total
Never	77% (N=20)	58% (N=11)	69% (N=31)
Rarely	15% (N=4)	16% (N=3)	16% (N=7)
Sometimes	4% (N=1)	11% (N=2)	7% (N=3)
Often	4% (N=1)	16% (N=3)	9% (N=4)
Total	100% (N=26)	100% (N=19)	100% (N=45)

Source: calculated by the author

As shown in Table 7, none of the respondents answered "Always." Further analysis was conducted, but no significant correlation was found with ZEFS or its subscales. However, all female respondents who reported feeling stressed when looking at their own image were in managerial roles (N=3, 33% of female managers), while the remaining male and female respondents in managerial roles stated that they never feel stressed when looking at their own image. On average, respondents who feel stressed spend 7-10 hours per week on the VCMs, and the number of meetings on a typical day is M=3.5, which is above the average frequency (M=2.22) of meetings and above the average number of meetings for participants in managerial roles (M=3.09).

To examine possible correlations of the subscales of ZEFS (motivational, general, emotional, visual and social), an analysis regarding the subscales was conducted. Although mean score for visual fatigue was relatively lower in comparison to other types of fatigue, there was no correlation observed between gender or work position and the subscales of the ZEFS as presented on the Tables 8 and 9.

Table 8. Mean scores for different subscales of ZEFS by gender

Subscale	Gender	Mean	SD
Motivational	Male	2.92	0.73
	Female	2.63	0.65
General	Male	2.92	0.82
	Female	2.86	1.12
Social	Male	2.33	0.79
	Female	2.23	0.83
Visual	Male	1.76	0.76
	Female	1.81	0.78
Emotional	Male	2.33	0.94
	Female	2.23	0.90

Source: calculated by the author

Table 9. Mean scores for different subscales of ZEFS by work position

Subscale	Managerial role	Mean	SD
Motivational	Managerial	2.83	0.66
	Non-managerial	2.79	0.72
General	Managerial	2.85	0.79
	Non-managerial	2.90	1.03
Social	Managerial	2.25	0.70
	Non-managerial	2.30	0.85
Visual	Managerial	2.04	0.65
	Non-managerial	1.67	0.79
Emotional	Managerial	2.23	0.76
	Non-managerial	2.31	0.99

Source: calculated by the author

Regarding age, there was a moderate negative correlation indicated between the age and general fatigue (r=- 0.336), the younger respondents experience more general fatigue.

2.3.3. Zoom fatigue and burnout

The relationship between ZF and burnout was examined via fourth research question. To do so, CBI scores, which were measured using a Likert-type scale, were used. The scale was divided into three groups, as indicated in Table 10, based on the scores, standard deviation and mean score (M=2.65, SD= 0.62): "low" scores below 2.03, "medium" scores between 2.04-3.27, and "high" scores 3.28 and above. Most of the participants (72%) fell within the medium range, while only

13% of respondents had higher levels of burnout. Regarding the difference between male and female respondents, female and male participants, 73% of males and females were equally scored in the medium range, while 15% of males and 5 % of women scored in the high range. No other correlations were found between high CBI scores and different demographic and usage related indicators.

Table 10. Frequency of values of CBI

N=46	Range of values	Frequency	Valid percent (%)	Cumulative (%)
Low	1.00-2.03	7	15%	15%
Medium	2.04-3.27	33	72%	87%
High	3.28-4.33	6	13%	100%
M	2.65			
SD	0.62		α	Questions
Range	1.00-5.00		0.803	6

Source: calculated by the author

The study also examined the correlations between burnout and demographic variables using CBI and subscales of ZEFS. The results showed that there were no significant correlations between burnout and most of the variables in the ZEFS, CBI, and demographic variables. However, there was a moderate negative correlation between burnout scores and age (r=-0.353), indicating that younger participants experienced more burnout.

The author hypothesized that there would be a significant correlation between ZEFS and burnout as measured by CBI. To test this hypothesis, the study conducted a correlation analysis between the two scales, as well as between the subscales of the ZEFS and the CBI. The results showed that the ZEFS and CBI were moderately correlated, with a correlation coefficient of r=0.515. Additionally, most of the subscales of the ZEFS were moderately correlated with the CBI, with the highest level of correlation found with the general fatigue subscale, as presented in Table 11, and the lowest correlation found with the social fatigue subscale.

Table 11. Correlations between CBI, ZEFS and ZEFS subscales

N=46 ZEFS	Correlation CBI	Sig (2-tailed)
Motivational	0.461	0.001
General	0.563	<.001
Social	0.297	0.045
Visual	0.334	0.023
Emotional	0.494	<.001
ZEFS	0.515	<.001

Source: calculated by the author

2.3.4. Stressors related to videoconferences and alleviating them

The fifth research question centers on the participants' awareness of challenges related to VCMs. The questionnaire included two open-ended questions about the participants' awareness of stress factors related to videoconferencing, as well as the measures they take to alleviate them. Text analysis was used to analyse the results. Meaning Extraction Helper was used to identify the word frequencies, as the dataset was very small. Topic analysis was conducted.

Topic analysis identified 7 topics presented in Table 12 as main stress factors: usefulness of the meetings (1), self-perception (looking at your own video) (2), cognitive load (3), technical issues (4), no issues (5) communication and engagement issues (6) and concentration and focus issues (7).

Table 12. Overview of the frequencies of stress factors

Stress factor	Frequency N=46	Percent (%)	Cumulative Percent (%)
0 - No answer	2	4%	4%
1 - Usefulness of meetings	5	11%	15%
2 - Self-perception	2	4%	20%
3 - Cognitive load	9	20%	39%
4 - Technical issues	7	15%	54%
5 - Nothing	6	13%	67%
6 - Communication and engagement issues	7	15%	83%
7 - Concentration and focus issues	8	17%	100%

Source: calculated by the author

Two participants did not answer the questions, leaving a total of 44 participants who provided responses. Among those participants, the most reported stress factors related to ZF were cognitive load, which was reported by 20% of participants (N=9), concentration and focus issues, which

were reported by 17% of participants (N=8), and communication and engagement issues, as well as technical issues, which were each mentioned by 15% of participants (N=7).

To conduct further analysis, stress factors 2, 3, 6, and 7, which were related to different subscales ZEFS, were grouped into a single category. The categories were analyzed in relation to the ZEFS and CBI. There was no significant correlation found between the work position and demographic factors of gender and the stress factors reported by the participants. Additionally, there was no significant correlation found between the ZEFS and CBI and the stress factors. There were some differences detected regarding the age groups. The younger respondents (aged 24-34) reported mainly on concentration and focus issues (N=7, 29%) and communication issues and self-perception (both categories N=5, 21% of the younger group). The second age group (aged 35-57) reported on technical issues (N=6, 27% of the group) and cognitive load (N=4, 18% of the respondents of the group). Regarding the work position, in the managerial role the most described problem was cognitive load while changing between topics and meetings (N=4, 25% of the respondents in managerial role), while the respondents on non-managerial roles reported the biggest stress factor to be concentration and focused issues (N=8, 23% of the respondents in nonmanagerial roles).

Table 13. Overview of the frequencies of challenges relieving measures

Stress factor	Frequency N=46	Percent (%)	Cumulative Percent (%)
0 - No answer	2	4%	4%
1 - Getting distracted	8	17%	22%
2 - Acceptance	8	17%	39%
3- Physical activity, recreational activities, family time	8	17%	57%
4 - Nothing	7	15%	72%
5 - Address issues on the meeting	4	9%	80%
6 – VCM stress awareness related activities	9	20%	100%

Source: calculated by the author

The most popular measures, as shown in Table 13, were to take longer breaks or limit meetings out of being aware of the VCF (19%, N=9). It was followed by physical activity and recreational activities; acceptance; and getting distracted, which were each mentioned 8 times (each 17% of the respondents). Further analysis was conducted to identify correlations with the demographic indicators and ZEFS and CBI. While no significant correlations were found between gender, work

position, and any of the above-mentioned scales, there was a moderate significance between the measures taken and the age groups one (24-34 years) and two (35-57 years) (r = -0.345). The differences were supported by the ANOVA dispersion analysis F(1,44)=5.951, p=0.019). The younger group reported more on VCM stress awareness related activities, i.e. taking a break during the workday (N=8, 33% of the younger respondents) and acceptance of the challenges related to videoconferencing (N=5, 21% of the younger group). The older age group reported recreational activities after work the most (N=6, 27% of the older group) and getting distracted (N=5, 22% of the older group) as most used measures. When it comes to gender, women reported most awareness related activities (N=6, 32% of the women) and acceptance (N=5, 26% of female respondents), while the other measures were equally low choice. Male respondents mentioned getting distracted; and physical activity and recreational activities (both N=6, 23% of the males) and doing nothing (N=5, 19% of the respondents) as the most common measures taken to overcome the challenges of videoconferencing.

3. DISCUSSION AND CONCLUSIONS

3.1. Prevalence of videoconferences in the modern workplace

The statistics regarding the prevalence of meetings and VCMs in 2022 and after the pandemic are not yet widely available. The post-pandemic trend is to have more meetings than in the pre-pandemic period and slightly fewer meetings than during the pandemic, which is supported by the fact that, by the latest available statistics from Zoom. Different authors agree that the time spent on a meeting has decreased compared to the pre-pandemic times; however, the predicted statistics for 2022 offered by different authors vary (Keith, 2022; Flynn, 2023; Lindner, 2023).

The results of the study reveal that videoconferencing has become a common practice in the modern workplace (Wang et al., 2020; Keith, 2022), with 54% of the participants using videoconferencing multiple times per day as predicted and only 15% using it once a week or less. Regarding the duration of VCMs, 63% of the participants reported using them for up to 6 hours per week (M=6.74, SD=1.98). However, spending more than 7-10 hours per week on VCMs may increase the risk of work-related stress factors (Allen et al., 2018). On a typical day, 37% of the participants had one VCM, while 33% had three or more VCMs (M=2.22, SD=1.38). The majority of VCMs lasted up to an hour. Only 6% of VCMs lasted more than an hour on a typical day. 63% of the respondents reported that the breaks between the VCMs were sufficient, while 37% suggested they were somewhat insufficient or not enough. The results of the study confirm the trends of videoconference meeting usage, the frequency, and duration of VCMs are lower than in previous studies and lower than the predicted meeting statistics for 2022, with the average time spent on meetings per week being 6.74 hours, and most of the meetings lasting up to an hour (94%). The breaks are on average longer and more sufficient compared to the studies carried out during the pandemic and right after it.

Surprisingly, technical errors using VCMs were less reported than expected, with 35% of participants stating that they never experienced technical issues, 50% stating that they experienced them rarely and only 4% reporting having them often. This result may have been influenced by the fact that compared to pandemic time, the technical errors have been reduced by the IT support personnel and since 78% of the respondents use Google Meet, the reason for the result can also be the software specific.

Johnson & Mabry (2021) found that the usefulness of the meetings is an important indicator that can lead to emotional exhaustion. The finding has been supported by other authors, i.e. Flynn 2023. 67% of the participants considered that videoconferencing hours were sufficient for fulfilling their tasks and 28% considered the videoconferencing hours to be too many. 46% of the respondents considered the VCMs as useful or very useful, and only 6% almost not useful, which is a lower perceived usefulness level reported by previous studies (Johnson & Mabry, 2021; Flynn, 2023) The perceived usefulness of the meetings and the sufficiency of the meetings is higher than expected based on previous studies. It might indicate that the experience of holding videoconferences during the pandemic has led to more effective meetings post-pandemic. Since most of the participants are from an information technology company that practices Agile and Lean principles it can be partly a result of effectiveness of the organisation of the meetings in general. This conclusion is also supported by the overall decrease of duration of the meetings.

3.2. Zoom fatigue and participating in videoconferences

Different authors (Oducado et al., 2021; Fauville et al., 2021a) suggest that the usage of VCMs play a crucial role in the level of the emotional exhaustion experienced at the workplace.

There was no correlation found between perceived usefulness and ZF, as reported in a previous study by Johnson & Mabry (2021) and feeling in one's power reported by Raake et al. (2022) as on of the long-term communication related stressors in VCMs. However, other studies such as Fauville et al. (2021a, 2021b); Oducado et al. (2022) and Queiroz et al. (2021) have reported higher levels of ZF, ranging from M=2.94 (Fauville et al., 2021b) to M=3.82, SD=0.70 (Oducado et al., 2022), compared to the current study's findings of M=2.41, SD=0.70. Correlations between the duration of meetings, frequency, and burstiness have been found in previous studies (Fauville et al., 2021a, 2021b; Johnson & Mabry, 2021).

The results of the study did confirm a correlation between frequency and duration of meetings, as well as a moderate correlation between frequency of meetings and ZEFS scale (r=0.452) which confirms that the duration of the meetings (including frequency) is significantly associated with fatigue (Oducado et al. 2022). Significant variations were found between the three groups (1 meeting, 2 meetings, and 3 or more meetings per day) in terms of ZEFS subscale visual fatigue

(F(2,43)=3.010, p=0.060). The results were also confirmed by the grouping according to the duration of the time spent on meetings. Statistically significant variations were found between three groups of up to 6 hours, 7-10 hours and 11 hours and more, with respect to visual fatigue (F(2,43)=3.496, p=0.039), and also general fatigue (F(2.43)=2.836, p=0.070) and social fatigue (F(2,43)=3.522, p=0.038). Visual fatigue can occur in any prolonged work executed on a PC since the computer screens fatigue ocular muscles in comparison with natural viewing according to MNT. The perceived proximity of the participants in the meeting is closer than they would be in real life. In face-to-face meetings the participants are on average 1.2 m away from their colleagues. Additional stress can occur due to other technical factors such as screen resolution, delay, size of the video window of the participants etc (Raake et al., 2023). Thus the finding is also confirming what MRT suggests - that VCF can result from cognitive effort due to lack of synchronicity between audio and visual information, social presence, richness of cues (such as eye contact), or feedback (Sheer, 2020; Fauville et al., 2023), and can also affect levels of general and social fatigue. General fatigue can also be influenced by the usage of technology in general. Some of the previous studies have found that younger respondents report higher levels of VCM related fatigue due to spending more time behind the computer screen and thus experiencing digital stress that has been caused by other factors than only videoconferences. (Fauville et al., 2021a, 2021b; Oducado et al., 2022).

The current study did not find any correlation with burstiness which can be attributed to lower usage of VCMs thus the participants having enough time between the VCMs which confirms that impact of VCMs on well-being is a more complex phenomenon than the duration alone and having enough breaks between the meetings allow to alleviate the stress caused by VCMs (Fauville et al., 2023).

3.3. Zoom fatigue related to work position and demographics

Multiple studies, such as Bailenson (2021), Fauville et al. (2021a, 2021b), Oducado et al. (2022), and Johnson & Mabry (2021), have indicated differences regarding the usage of VCMs, ZF, and nonverbal cues, as well as different demographic factors such as gender and age, finding significant correlations between females, ZF and mirror anxiety and between fatigue and younger age groups. Concerning the work position, previous research has focused on the relative power of the interaction partner in meetings (i.e., presence of the supervisor), but the usage of VCMs and

fatigue, supported by the fact that people in managerial roles spend more time in meetings in general, has not been studied. The gender differences regarding ZF were studied via ZEFS and an additional question was asked regarding mirror anxiety as it is the most reported aspect of gender differences from previous studies of ZF (Bailenson, 2021; Fauville et al., 2021a, 2021b, 2023). The current study does not confirm the findings of previous studies. Male respondents reported 4% higher ZEFS scores than females (M=2.45 for males and M=2.35 for females). The mean values are lower than in most of the previous studies conducted, thus the results confirm Fauville et al. (2023) finding that if enough breaks are allowed between the meetings, the ZF scores are lower.

However, the results show that all women who reported highest levels of stress while looking at their own image are in managerial roles (N=3, 33% of female managers). The rest of the respondents in managerial roles, whether male or female (N=13, 100% of male managers, 67% of female managers), never feel stressed when looking at their own image. The sample of respondents in managerial roles was small. Further investigation is needed to conclude that women may be more susceptible to fatigue when experiencing high levels of stressors, such as frequency, duration, burstiness, and nonverbal aspects. However, when the level of stressors is low and there is enough time for breaks, managing stress from meetings, and addressing personal aspects, there is no significant difference in fatigue levels between genders.

Regarding age, the moderate negative correlation was shown between the age and general fatigue (r=- 0.336), it was also supported by the negative correlation between the scores of CBI and age (r=-0.353). Thus, it confirms the previous findings that the younger respondents experience more general fatigue (Fauville et al., 2021a) and suggest higher digital stress levels due to spending more time behind the screen.

3.4. Zoom fatigue's contribution to burnout

According to the ZF model between the usage of VCMs, ZF and burnout, ZF should directly contribute to burnout and should correlate to the emotional exhaustion part of burnout. The correlation analysis confirmed it and indicated moderate correlation between CBI and ZEFS (r=0.515) and similar correlation between general fatigue subscale of ZEFS. These findings

suggest that there might be a significant contribution to burnout by ZF, however the phenomenon of burnout is multifaceted and there are other factors that can also contribute to burnout.

3.5. Awareness of the challenges and stress related to VCMs

The literature on ZF suggests different issues, such as reading nonverbal cues, problems with being on camera and cognitive load and multitasking (Bailenson, 2021; Riedl, 2021; Raake et al., 2022), problems with turn-taking and communication, and technical issues (Raake et al., 2022). Previous studies have reported physical symptoms, such as headaches, back, limb, and stomach pain, as well as insomnia (Rump & Brandt, 2020).

In this study cognitive load (reported by 20%), focus and concentration issues (reported by 17%), and communication and engagement issues (15%) were similarly to previous studies highly reported by respondents, i.e Raake et.al (2023) have indicated long-term problems with social bonding and impression formation and mid-term problems with turn taking. These findings are aligned with the MRT and MNT. Due to the lack of synchronicity and richness in communication, the communication process itself is more challenging to the respondents. (Riedl, 2021: Fauville et al. 2021a) The perceived level of usefulness of meetings was mentioned by more than 10% of the respondents, which is supported by COR indicating that if the employees perceived their resources challenged, they will experience the challenges as stress factors. Compared to previous studies (Flynn, 2023; Lindner, 2023), the respondents reported lower levels of stress related to the usefulness of the meetings. The previously mentioned authors also confirm that the time of the VCMs has decreased, thus we can conclude that the since the VCMs are an integral part of the modern workplace, the meetings have also become more efficient.

The younger participants reported struggling most with the concentration and focus, which confirms the previous findings that in general younger participants spend more time using technology in general (Flynn, 2023). There was no correlation between the causes and ZEFS nor CBI scales. However, it supports the moderate negative correlation found between age and the general fatigue subscale, which is also supported by a previous study of Fauville et al. (2021a) by indicating that the younger participants might experience higher levels of digital stress due to using technology more than older participants.

A significant variance was found between the age groups and the measures of mitigating stress $F(1,44)=5.951$, $p=0.019$. The younger respondents reported awareness-related activities the most, such as taking breaks (i.e. having a cup of tea) and longer breaks; and planning fewer meetings, followed by acceptance (33% of the younger age group). The older age group would engage in physical activity and recreational activities after work (27% of the older group) or distract themselves (22% of the older age group).

In conclusion, the employees more aware of the challenges and stressors regarding VCMs than expected and most of them (66% of the respondents) also take measures for mitigating the risks. In order to balance the impact of VCMs to employee well-being a digital hygiene strategy that addresses the different needs of different age groups should be used. The strategy should concentrate on the overall awareness of the time spent using technology related to technostress and for the older age groups raising the awareness of adequate measures for mitigating stress related to videoconferences, in order to decrease the multitasking and distracting oneself (Riedl, 2021, Raake et al. 2022).

In conclusion, compared to previous studies conducted during the COVID-19 pandemic (Fauville et al., 2021a, 2023; Oducado et al., 2022; Johnson & Mabry, 2021), the results of this study show that the usage of VCMs has decreased post-pandemic, though the time spent on VCMs is higher than pre-pandemic, thus the VCMs are an integral part of the modern workplace setting. The breaks between the meetings are longer, ZEFS scores are lower, and so are the reported burnout scores. Some of the hypotheses based on previous studies were not confirmed. It confirms the need to compare the pandemic and post-pandemic usage of VCMs since also no correlations were found between gender or work position. Collectively, these findings suggest that weariness caused by videoconferencing is influenced by how individuals participate in VCMs, besides the usage and richness and naturalness of the meetings as suggested by MRT and MNT and usefulness of the meetings as suggested by COR. Exhaustion may be aggravated by extended and frequent VCMs and the duration of the meetings, but incorporating better digital hygiene and more breaks between such meetings could alleviate some of its unfavourable consequences (Fauville et al., 2023). Furthermore, this implies that ZF is a multifaceted phenomenon, as suggested by the four-dimensional model by Döring et al. (2022) and another holistic view by Raake et al. (2022), which suggests the presence of different environmental, organisational, and personal aspects that ZEFS does not incorporate. Döring et al. (2022) argue that ZEFS addresses Bailenson's mechanisms of

nonverbal cues of mirror anxiety, physical restriction and hypergaze with multiple questions, while the aspects of producing and interpreting non-verbal cues have been covered with only one question. Raake et al. (2022) argue that the initial survey by Fauville et al. (2021b) might have been influenced by the respondents, since some of the specific types of VC usage may not have been well represented by them. Previous studies mention different personal and environmental aspects that were characteristic of the period of COVID-19 pandemic. The correlations between the age and burnout and visual fatigue and the frequency and duration of the meetings suggest that organisations would need to draw the attention of employees to different aspects of digital hygiene that would address specific age groups since the lack of quality of work life is associated with higher levels of work-related occupational stress, anxiety and burnout (Leitao et al., 2021).

SUMMARY

Work is an important part of our lives as it offers a sense of purpose. The Covid-19 pandemic has significantly impacted the culture of holding meetings in the modern workplace (Bakker & de Vries, 2021). The use of videoconferencing grew rapidly during the pandemic, and it has now become an integral part of the modern workplace. According to Flynn (2023), 80% of employees spend one-third of their working time in virtual meetings. These changes have introduced new problems. The term "Zoom fatigue," a synonym for videoconferencing fatigue, emerged in April 2020 (Riedl, 2021).

The aim of this paper was to investigate the prevalence and impact of videoconference meetings in the modern workplace setting, with a specific focus on the relationship between videoconference usage, Zoom fatigue, burnout, and potential strategies and interventions that can mitigate the negative effects of videoconferencing on employee well-being. To answer the research questions, a quantitative questionnaire was carried out in March 2023. It included the Zoom Exhaustion and Fatigue Scale, abbreviated Copenhagen Burnout Inventory questions, and questions regarding the mapping of videoconferencing usage. The study was based on Media Richness Theory, Media Naturalness Theory, and the Conservation of Resources model of stress.

The results revealed that videoconferencing has become a common practice in the modern workplace, with 54% of the respondents using it once or multiple times a day. The phenomenon of Zoom fatigue is multifaceted and not solely determined by the duration, frequency, or burstiness of the meetings. If enough breaks are allowed, the fatigue levels are lower than expected.

There is a significant correlation between the subscale of ZEFS visual fatigue and the number of meetings during the day, which confirms the findings of previous studies. Due to screen resolutions and other technical aspects, such as the size of the video window of the participants and the proximity from the screen, the communication on videoconference meetings is not as rich or natural as in face-to-face communication, which can cause ocular fatigue.

Although various authors have indicated the difference in fatigue levels according to gender, suggesting that women are more receptive to Zoom fatigue, this study does not confirm those findings. The average Zoom fatigue scores were lower than in previous studies, also taking into

consideration the gender aspect (male respondents M=2.45, female respondents M=2.35), which stresses the need to conduct further post-pandemic studies for investigating the changes.

However, a moderate negative correlation was indicated between the age and ZEFS subscale general fatigue (r=- 0.336). Thus, younger respondents experience more general fatigue, which might occur due to the younger respondents using technology more often, also outside the workplace, and thus spending more time behind the screen.

There was a significant correlation between CBI and the general fatigue subscale of ZEFS as predicted (r=0.536), confirming that Zoom fatigue, being a constant stressor, can contribute to burnout, which is also supported by the Conservation of Resources Theory.

The awareness of Zoom fatigue of the respondents was higher than expected, the most reported stressors were cognitive load (20% of the respondents) and communication and engagement issues (17% of the respondents). 66% of the respondents mitigate the challenges of videoconferencing stress, however the measures taken differ by the two age groups. The younger age group tended to take measures that are in line with the recommendations of experts in the digital hygiene field, such as taking longer breaks and planning fewer videoconferences in a day. In contrast, the older age group was more likely to engage in general recreational activities such as exercise and meditation, and to distract themselves from the stress of videoconferencing.

These findings suggest that organisations need to take into account the different needs of different age groups when developing strategies to alleviate the negative effects of videoconferencing. Younger employees may need more information on the risks of digital and technostress, while older employees may benefit from more information on the specific stressors related to videoconferencing and strategies to mitigate them.

Overall, this study highlights the importance of continued research into the impact of videoconferencing on employee well-being, particularly as workplaces continue to adapt to remote work environments. It also emphasizes the need for multifaceted strategies and interventions to support employees of different ages and to mitigate the negative effects of videoconferencing on their mental health.

KOKKUVÕTE

VIDEOCONFERENCES IN THE MODERN WORKPLACE: ASSESSING THE IMPACT OF USAGE, FATIGUE, AND BURNOUT ON EMPLOYEE WELL-BEING

Maarja-Liisa Kärp

Töö on meie elus üks olulistest aspektidest, mis loob tähendust. Covid-19 pandeemia mõjutas koosolekute kultuuri tänapäevases töökeskkonnas. Videokoosolekute kasutamise maht on kiiresti kasvanud ning jäänud ka pandeemia järgselt üsna kõrgele tasemele, mis on kaasa toonud rea uusi probleeme. Termin "videokoosolekute väsimus" ehk „Zoomi väsimus“ võeti kasutusele 2020. a aprillis ning tähendab videokoosolekutega seotud väsimuse ja kurnatuse tunnet. Kroonilise tööga seotud stressi tagajärjel, mida ei ole edukalt maandatud, võib välja kujuneda läbipõlemissündroom. Erinevate uuringute alusel võib läbipõlemise tekkimisse oma panuse anda ka videokoosolekutega seotud stress ja väsimus.

Magistritöö “Videokoosolekud tänapäeva töökeskkonnas: kasutuse, väsimuse ja läbipõlemise seosed töötajate heaoluga” eesmärk oli kaardistada ja uurida virtuaalkoosolekute kasutamist ja mõju tänapäeva töökohal, keskendudes videokoosolekute kasutamise, Zoomi väsimuse ja läbipõlemise omavahelistele suhetele ning andmaks soovitusi võimalikeks sekkumisteks, mis võiksid vähendada virtuaalkoosolekute negatiivset mõju töötaja rahulolule. Uuring põhines meediumi rikkuse ja meediumi loomulikkuse, ning ressursside säilitamise teooriatele.

Magistritöö raames viidi läbi empiiriline uuring, mille käigus autor keskendus järgmistele uurimisküsimustele:

1. Kui levinud on videokoosolekute kasutamine tänapäeva töökohas?
2. Milline on Zoomi väsimuse seos koosolekute pikkuse, sageduse ja koosolekute vaheliste pausidega?
3. Kas Zoomi väsimus on seotud vastaja positsiooni (juht versus spetsialist) ja/või demograafiliste näitajatega (vanus, sugu)?
4. Kas Zoomi väsimus aitab kaasa läbipõlemisele?
5. Mis on videokoosolekutega seotud stressiallikad töötajate jaoks ja kuidas nad nendega toime tulevad?

Andmed koguti veebipõhise küsitluse abil märtsis 2023. Kahe vastajate grupi töötajad vastasid (N=46) Fauville'i jt. (2021b) välja töötatud Zoomi kurnatuse ja väsimuse skaala (ZKVS) ning lühendatud Kopenhaageni läbipõlemise instrumendi (KLI) küsimustele. Lisaks olid küsimustikku integreeritud ka videokoosolekute kasutamist puudutavad küsimused.

Uuringu tulemused näitasid, et videokoosolekud on kaasaegses töökeskkonnas levinud praktika. 54% vastanutest kasutab seda koosolekute läbiviimise viisi vähemalt üks või mitu korda päevas. Magistritöö tulemused kinnitasid ka, et Zoomi väsimuse fenomen on mitmetahuline ja ei sõltu ainult koosolekute kestusest, sagedusest ja pausidest koosolekute vahel, nagu on järeldanud varasemad uuringud. Koosolekute vahele piisavalt pikkusega vahesid planeerides, on võimalik videokoosolekute väsimuse taset alandada.

Uuring tuvastas, et keskmine ZKVS-i tulemus oli, võrreldes eelnevate uuringutega, madalam nii meeste kui naiste puhul (meestel M=2.45, naistel M=2.35). Lisaks sellele selgus, et ZKVS-i visuaalse väsimuse alaskaala ja päevas toimunud koosolekute arvu ning videokoosolekutele kulunud tundide kestuse (F (2,43)=3,496, p=0,039) vahel on märkimisväärne seos, mis näitab, et videokoosolekud esitavad väljakutseid suhtlemise sünkroonsusele ning suhtlemise rikkusele ja loomulikkusele, kuna ekraani resolutsioon ning videokoosolekutel osalejate videopildid on ebaloomulikud loomuliku suhtlemise vaatepunktist.

Kuigi erinevad autorid on järeldanud, et videokoosolekute väsimuse tase on seotud soolise kuuluvusega, ei saa selle uuringu põhjal neid järeldusi kinnitada.

Käesolev magistritöö tuvastas, et noorem vastajate grupp (vanuses 24-34) kogeb rohkem üldist väsimust (ZKVS-i alaskaala) rohkem kui vanem vastajate grupp (vanuses 35-57). Mõõdukas negatiivne korrelatsioon tuvastati vanuse ja ZKVS-i üldise väsimuse alaskaala vahel (r=-0,336). See võib-olla seotud sellega, et noorema vanusegrupi esindajad veedavad väljaspool tööaega arvutit kasutades rohkem aega, ning seetõttu on nende digistressi tase kõrgem kui vanemal vastajate grupil.

Magistritöö raames läbi viidud uuring kinnitas ka, et Zoomi väsimus võib tekitada läbipõlemist. KLI ja ZKVS-i vahel tuvastati mõõdukalt oluline seos (r=0,536). Seda leidu toetab omakorda ka ressursside säilitamise teooria.

Küsimustikule vastanud töötajad on eeldatust rohkem videokoosolekutega seotud stressifaktoritega kursis. Enim nimetatud stressifaktorid olid kognitiivse pingutuse (20% vastajatest) ning kommunikatsiooni ja kaasamisega seotud väljakutsed (17% vastajatest). 66% vastajatest rakendab teadlikult meetmeid, et videokoosolekutega seotud stressi leevendada. Noorem vastajate grupp võtab teadlikult soovitatud meetmeid videokoosolekute väsimuse leevendamiseks kasutusele, nt võtab teadlikult pause või planeerib tööpäeva vähem koosolekuid. Vanem vastajate grupp eelistab tegelemist üldiste rekreatiivsete tegevustega (nagu sport või mediteerimine) või üritab oma tähelepanu mujale juhtida.

Sellest tulenevalt, on oluline organisatsioonide digihügieeni alaste strateegiate välja töötamisel silmas pidada erinevate sihtgruppide vajadusi – noorema põlvkonna töötajate puhul on soovitatav tõsta teadlikkust tehnoloogia kasutamisest ja digistressist üleüldiselt ning vanemate töötajate puhul tuleb juhtida tähelepanu videokoosolekutega seotud stressile ning selle leevendamise meetmetele (nt. pikemate pauside võtmine).

Kokkuvõttes annab käesolev uuring ülevaate videokoosolekute kasutamise kohta töökeskkonnas, nende mõjust töötajate rahulolule ja Zoomi väsimuse mitmetahulisele olemusele ning panusele läbipõlemissündroomi tekkeks. Digihügieeni alaste strateegiate välja töötamisel tuleb tähelepanu pöörata erinevate sihtgruppide vajadustele. Autor näeb magistritöö tulemusena vajadust täiendavate uuringute läbi viimiseks, et võrrelda pandeemia aegseid ja järgseid videokoosolekute kasutamist töökeskkonnas ja sellega seotud väsimuse ning pikaajalise stressi aspekte, kuna enamus siiani avaldatud uuringuid keskendub pandeemia aegsele perioodile.

Märksõnad: videokoosolekute kasutamine, Zoomi väsimus, läbipõlemine, ZKVS

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APPENDIXES

Appendix 1. The Zoom Exhaustion and Fatigue Scale questionnaire

Dimension of Fatigue	Questions
General Fatigue	1. How tired do you feel after videoconferencing? 2. How exhausted do you feel after videoconferencing? 3. How mentally drained do you feel after videoconferencing?
Visual Fatigue	1. How blurred does your vision get after videoconferencing? 2. How irritated do your eyes feel after videoconferencing? 3. How much do your eyes hurt after videoconferencing?
Social Fatigue	1. How much do you tend to avoid social situations after videoconferencing? 2. How much do you want to be alone after videoconferencing? 3. How much do you need time by yourself after videoconferencing?
Motivational Fatigue	1. How much do you dread having to do things after videoconferencing? 2. How often do you feel like doing nothing after videoconferencing? * 3. How often do you feel too tired to do other things after videoconferencing? *
Emotional Fatigue	1. How emotionally drained do you feel after videoconferencing? 2. How irritable do you feel after videoconferencing? 3. How moody do you feel after videoconferencing?

Source: created by the author

All questions are measured on a 5-point Likert-scale ranging from 1 = “Not at all”, 2 = “Slightly”, 3 = “Moderately”, 4 = “Very” to 5 = “Extremely”.

There is an exception for the two frequency questions for Motivational Fatigue (marked with asterisks) from 1 = “Never”, 2 = “Rarely”, 3 = “Sometimes”, 4 = “Often” to 5 = “Always”.

Appendix 2. Questionnaire

Gender: male, female, not specified

Age: _____ years

Manager role: yes, no

Videoconferencing usage related questions:

1. How often did you participate in videoconferences during the last month?
   Never, about once a month, about once a week, about once a day, multiple times per day
2. On a typical week How many hours do you spend on videoconferences: “0 hours” “3 hours or less,” “4–6 hours,”, “7–10 hours, “11–14 hours,”and “15 or more hours,”
3. On a typical day, how many videoconferences do you participate in? 0, 1, 2, 3, 4, 5, 6,7 8, 9, 10
4. On a typical day, how long does a typical videoconference last: 1 = “Less than 15 minutes”, 2 = “15 to 30 minutes”, 3 = “30 to 45 minutes”, 4 = “45 minutes to an hour”, and 5 = “More than an hour”
5. On a typical day, how much time do you have between your videoconferences? = “More than an hour”, 2 = “45 minutes to an hour”, 3 = “30 to 45 minutes”, 4 = “15 to 30 minutes”, and 5 = “Less than 15 minutes”
6. On the previous week how often did you experience technical problems in the VCMs: not at all, sometimes, half of the time, most of the time, every meeting.
7. On the previous week, in order to fulfil your job responsibilities, the videoconferencing hours were:
   1- not enough, 2- somewhat insufficient, 3- enough, 4- too many, 5-far too many
8. On the previous week the video meetings were useful to me: not at all, almost not useful, somewhat useful, useful, very useful
9. When you are participating on a hybrid meeting via videoconference, do you feel powerless compared to the participants on-site? Disagree, slightly disagree, neither agree nor disagree, agree, strongly agree
10. When you are participating on a hybrid meeting via videoconference, how do you feel compared to the participants? Powerless, slightly powerless, equally powerful, slightly more powerful, more powerful

ZEF Scale (Scale for the answers can be found in Appendix 1)

Questions	Likert scale
11. How tired do you feel after videoconferencing? 12. How exhausted do you feel after videoconferencing? 13. How mentally drained do you feel after videoconferencing?	1 = "Not at all" 2 = "Slightly" 3 = "Moderately" 4 = "Very" 5 = "Extremely"
14. How blurred does your vision get after videoconferencing? 15. How irritated do your eyes feel after videoconferencing? 16. How much do your eyes hurt after videoconferencing?	
17. How much do you tend to avoid social situations after videoconferencing? 18. How much do you want to be alone after videoconferencing? 19. How much do you need time by yourself after videoconferencing?	
20. How much do you dread having to do things after videoconferencing? 21. How often do you feel like doing nothing after videoconferencing? * 22. How often do you feel too tired to do other things after videoconferencing? *	1 = "Not at all" 2 = "Slightly" 3 = "Moderately" 4 = "Very" 5 = "Extremely" * 1 = "Never" 2 = "Rarely" 3 = "Sometimes" 4 = "Often" 5 = "Always"
23. How emotionally drained do you feel after videoconferencing? 24. How irritable do you feel after videoconferencing? 25. How moody do you feel after videoconferencing?	1 = "Not at all" 2 = "Slightly" 3 = "Moderately" 4 = "Very" 5 = "Extremely"

26. When you are looking at your own image during the video conference meetings, do you feel stressed: Not at all, Slightly, Moderately, Very, Extremely.

27. What is challenging about videoconferencing for you? What causes stress in videoconferences for you? (Open text)
28. What do you do to overcome the challenges and the stress? (Open text)

CBI - Burnout Inventory

Question	Likert-type scale
29. Is your work emotionally exhausting? 30. Do you feel burnt out because of your work? 31. Does your work frustrate you? 32. Do you feel worn out at the end of the working day? 33. Are you exhausted in the morning at the thought of another day at work? 34. Do you feel that every working hour is tiring for you?	1 = "Never/almost never" 2 = "Rarely" 3 = "Sometimes" 4 = "Often" 5 = "Always"

Appendix 3. Lihtlitsents rektori 27.02.2014 käskkirja nr 60 juurde

Lihtlitsents lõputöö üldsusele kättesaadavaks tegemiseks ja reprodutseerimiseks

Mina, Maarja-Liisa Kärp, (sünnikuupäev: 20.märts 1982)

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06.05.2023