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Leader's Social Presence and Work Engagement in Virtual Teams: The Moderating Role of Media Richness

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Leader's Social Presence and Work Engagement in Virtual Teams: The Moderating Role of Media Richness

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Acknowledgment

This thesis is the final product of our Master of Science degree in Leadership and Organizational Psychology at BI Norwegian Business School. We wanted to research a topic that was relevant and new. As a result, we chose something that affects organizations and employees today, inspired by the ongoing Covid pandemic and remote working, which ended up being an obvious choice for us. It has been rewarding and educational, yet challenging, to write about something that genuinely sparks our curiosity.

We want to thank our supervisor, Sut I Wong, Head of the Department of Communication and Culture at BI Norwegian Business School, for her devotion to our study. She supported and helped us develop our idea and showed an equal passion for the topic. Her knowledge of virtual teams, digitalization, and not at least multilevel data analysis has been crucial in this process. Her guidance is deeply appreciated.

We are genuinely grateful to all the organizations and individual teams who agreed to participate in our study. We thank every one of them for taking the time to complete our questionnaire. This thesis would not have been possible to achieve without their collaboration. In particular, we want to direct a thank you to the company that has awarded us with their scholarship.

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Mona Yaghmai and Thea Kristine Bøe

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Abstract

The increase of research on remote working and virtual teams in recent decades has been undeniable as the world has been changing into a more virtual one. The Covid-19 pandemic has also forced organizations into virtual teamwork, bringing on issues surrounding employee motivation, considering the substantial amount of insecurity and pressure, which again may negatively influence performance. As such, this research paper will investigate how the role of a leader's social presence can influence work engagement in virtual teams.

The research includes responses from 85 leaders and 420 employees from nine different organizations. The results of a multilevel analysis show that both psychological involvement and behavioral engagement have significant relationships with work engagement, but not copresence. Further, we found behavioral engagement to have a significant relationship with media richness. The statistical analysis found no support for a relationship between work engagement and copresence, neither between media richness and psychological involvement or copresence. Although none of the correlations were strong, we believe that this contributes to research on the respective topics and hope that it will inspire more researchers to investigate something that will potentially be very important in the coming years. We have considered limitations and future research, as well as practical and theoretical implications.

Keywords: *virtual teams, social presence, leadership, work engagement, media richness.*

1.0 Introduction

The virtual way of working is continuously disrupting the business environment of the 21st century (Gilson et al., 2015). Research on the topic has consistently shown that virtual teams (VTs) are more challenging to lead than face-to-face teams, creating new demands for leaders and how the workforce is structured (Bell & Kozlowski, 2002; Duarte & Snyder, 2001; Gibson & Cohen, 2003; Hinds & Kiesler, 2002; Lipnack & Stamps, 2000; Liao, 2017; Tyran, Tyran, & Shepherd, 2003; Zigurs, 2003). Additionally, relationship development and social connections are a natural part of the life cycle in traditional teams, while leaders in VTs need to reinforce and maintain several different team processes (Liao, 2017). This can be connected to communication, coordination, and intrateam processes, which refers to the interactions between team members (Kozlowski et al., 1999 cited in Bell & Kozlowski 2002). Leadership in VTs needs to be further explored, as leadership styles that are usually associated with fostering emergent states and outputs such as high performance, motivation, work engagement, are not proving the level of efficiency in VTs as with face-to-face interactions (Bell & Kozlowski, 2002; Hoch & Kozlowski, 2014; Bakker & Demerouti, 2008; Panteli et al., 2019).

This deficiency in theoretical concepts for leadership in mediated settings, although it has traces of research further back, has become more popular in the last two decades. Introduced by Lombard and Ditton in 1997 was the concept of leader presence and its six dimensions. One of these was social richness, which focused on a leader's presence in mediated settings. Recent research by Biocca et al. (2001; 2003) developed classifications of presence and social richness in addition to presenting the concept of social presence, which may be defined as: “The psychological sense of being with others in the mediated environment” (Sivunen & Nordbäck, 2015, p.2). This concept was divided into the three dimensions, copresence, behavioral engagement, and psychological involvement, which has been an important contribution to research, showing that a definition of such requires more than one dimension.

The Covid-19 pandemic has led to a sudden change in most organizations, and the long-term effects of the event are impossible to predict (Fenwick et al., 2021).

Several issues can be connected to the insecurity brought forward by sudden change, which leads the authors of this paper's attention to work engagement. The concept of work engagement has been widely researched and has been defined as "a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption" (Schaufeli & Bakker, 2004a, p. 295). This definition and the research by Schaufeli & Bakker (2004a) on work engagement have been important for this research paper. Although heavily researched, the concept of work engagement has mainly focused on work engagement in physical teams with face-to-face interactions. Among many well-known and used theories on the concept of work engagement is the job demand-resources (JD-R) model by Bakker and Demerouti (2008). The framework measures work engagement in different situations. Bakker and Demerouti (2008) summarize that "engaged workers are more creative, more productive, and more willing to go the extra mile." (p. 209). Thus, the existing research indicates that work engagement is a positive contribution in most work contexts. Since working in VTs is becoming a widespread working method (Gilson et al., 2015) makes it an important contribution to investigate work engagement concerning VTs.

To the knowledge of this paper, existing literature on work engagement in VTs is scarce. One research project, performed by Panteli et al. (2019), conducted qualitative research on work engagement in asynchronous VTs, referring to VT members who work independently with different tasks on their own schedule. Our study differentiates itself by using a quantitative research method and focusing on organizations that work synchronously, which refer to teams working with instantaneous interaction between leader and employee (Panteli et al., 2019). Similarly, a VT leader will need to encompass the appropriate skills of communication, understanding of collaborative technology, an appreciation for cultural diversity, the ability to influence and facilitate team member engagement, and the ability to influence and build trust and relationships with their geographically dispersed team members (Liao, 2017; Kayworth & Leidner, 2002). Thus, the findings of this paper will hopefully contribute to mapping out more about the leader role in VTs, and how their social presence can affect work engagement in VTs.

Although the relationship between a leader's social presence (Biocca et al., 2001; Biocca et al., 2003; Bulu, 2012) and work engagement (Bakker & Demerouti, 2018; Bakker & Demerouti, 2008; Sundaray, 2011; Kataria et al., 2012) has been previously researched, it does not exist much research that combines the two constructs. The current paper will also examine the role of media richness as a moderator when investigating the relationship between leaders' social presence and work engagement in VTs. The concept of media richness can be defined as the extent to which a media channel can promote shared meaning (Daft et al., 1986). It has been critical in understanding how different communication tools may influence communication in mediated settings (Daft et al., 1987; Biocca et al., 2001; 2003; Panteli et al., 2019; Sivunen & Nordback, 2015). As such, we have chosen to examine media richness and communication tools as a moderating variable in our research on a leader's social presence and its influence on work engagement.

As we have augmented, the concepts of work engagement, virtual teams, and media richness are well researched, whereas social presence has emerged more recently. However, the existing literature on the concepts is deficient, and to our knowledge, there is no current research on it today. As a result, this leaves a gap in the literature on the relationship between social presence and work engagement in virtual environments. It has been found that work engagement contributes to increased effectiveness in VTs and that leaders in VTs can promote, sustain and nourish work engagement throughout (Panteli et al. 2019). As such, we aspire to fill not only a theoretical gap but also a practical one. Our research is beneficial for organizations for whom the transition from face-to-face interactions to virtual interaction has been difficult, as seen in the Covid-19 pandemic (Fenwick et al., 2021). Expanding the knowledge on work engagement and social presence is essential, as working from a home office during the Covid 19 pandemic can leave employees feeling unmotivated or suffering from the loss of social interactions (Waizenegger, 2020). Additionally, the findings of this paper have important implications for the understanding of leadership in mediated settings, especially considering that many companies are contemplating whether the virtual work style can be the new normal, also after the pandemic (Waizenegger, 2020; Blanchard, 2021; Kniffin et al., 2021).

Based on this, we have formulated the following research question:

To what extent does a leader's social presence influence work engagement in virtual teams?

2.0 Theory and Hypotheses

The literature selected for this research paper provides a theoretical background for understanding each of the constructs included in this research project, namely VTs, work engagement, social presence, and the moderating role of media richness. The hypotheses we have formulated are based on current and past research on the constructs and are presented accordingly.

2.1 Virtual teams

In the last decades, different industries have had to become more adaptable and solution-oriented, and cooperation has become something of a global, dynamic, and complex situation (Fenwick et al., 2021). As a result, working in VTs has become an increasingly important work style. VTs rely on technology-mediated communication to bridge these boundaries (Bell & Kozlowski, 2002; Lipnack & Stamps, 1999; Lurey & Raisinghani, 2001). We define VTs as "groups of geographically and organizationally dispersed coworkers that are assembled using a combination of telecommunications and information technologies to accomplish an organizational task" (Townsend et al., 1998, p. 17). Commonly, the characteristics of VTs usually include geographically dispersed teams that are working towards a common goal.

Bell & Kozlowski (2002) defined four characteristics that distinguish different types of VTs, namely 1) temporal distribution, which concerns the ability to work across boundaries of space and time, 2) boundary spanning, which concern the ability to work across boundaries that are functional, organizational and cultural, 3) lifecycle, which concerns the timeline the team spends working on their common goal, 4) and lastly, member roles, which concerns the different roles of the team members in and outside of the VT. Thus, VTs allow organizations to access the most qualified employees for complex jobs/projects which require particular skills, regardless of their geographical location. It also increases their ability to be agile and flexible when the organization's environment demands it

(Bell & Kozlowski, 2002). A challenge related to leading VTs is that teamwork often is characterized by "behavioral invisibility," which refers to the challenge of managing team tasks and social dynamics when unable to observe team member behavior (Wilson et al., 2006, p. 16; Eseryel et al., 2020). Certain characteristics of a VT can be considered to increase behavioral invisibility, e.g., neglect of others' interests and misinterpreting others' actions (Wilson et al. 2006). These can be considered as inputs that are being moderated by the ongoing processes and can therefore be considered as a team input (Dulebohn & Hoch, 2017). A framework that has been applied to study VTs is the Input-Output (IPO) framework (e.g., Hoch & Kozlowski, 2014; Webster & Staples, 2006). The framework presumes that input and output factors are mediated by team processes and emergent states, such as work engagement, and moderated by virtuality (Dulebohn & Hoch, 2017).

For the time being, research on how the Covid-19 pandemic has influenced traditional ways of working is still in the beginning stages. The effects of the situation are still presenting their consequences for how organizations are coordinating their teams and other resources (Fenwick et al., 2021). However, researchers agree that working in VTs has become the new normal for many and may even continue to be the best working practice for some even after the pandemic (Blanchard, 2021; Kniffin et al., 2021; Waizenegger 2020). In their research, Kniffin et al. (2021) have identified multiple consequences of the change's organizations have been forced to make due to the pandemic. Although working virtually may be cost-efficient for organizations, utilize less office space and other initiatives that are no longer needed when working from home, Kniffin et al. (2021) emphasize that the virtual workstyle may negatively impact the employees because the long-term consequences are unknown. For instance, they mention emotional expression, communication, and prosocial behaviors as being at risk when working in VTs (Kniffin et al., 2021). Waizenegger et al. (2020) also stress the difference between working virtually pre-Covid-19 and during the pandemic. Their research highlights the involuntary aspect of change, the difference in motivation, less preparation, and social interactions as essential dimensions to consider as virtual teams were introduced during the Covid-19 pandemic (Kniffin et al., 2021).

Taking possible consequences caused by the Covid-19 pandemic into consideration, such as pushing organizations to transition into a virtual setting (Waizenegger 2020), research should be focusing on how positive employee behaviors and states, such as work engagement, can produce positive consequences in VTs. As seen in the IPO framework, work engagement is an essential motivational state to consider when transforming team inputs into outputs such as team level performance and effectiveness (Dulebohn & Hoch, 2017).

2.2 Work engagement

The concept of engagement was first introduced by Kahn (1990). He stated that engagement enables physical, cognitive, and emotional expressions during work performance, connecting employees to their work roles. In more recent research, Schaufeli & Bakker (2004a) have further developed the concept and defined work engagement as "a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption" (Schaufeli & Bakker, 2004a, p. 295). They stated that work engagement is considered the opposite of burnout, a concept first introduced by Maslach and Leiter (1997). According to Schaufeli & Bakker (2004b) burnout is characterized by "a low level of energy combined with poor identification with one's work" (Schaufeli & Bakker, 2004b, p. 5). However, they specified that measuring burnout does not necessarily indicate the level of work engagement, as was first believed by Maslach and Leiter.

The first characteristic, vigor, focuses on the individuals' high energy levels and motivation to devote effort to work, even when faced with obstacles. The second characteristic, dedication, is characterized by "a sense of significance, enthusiasm, inspiration, pride, and challenge" (Schaufeli & Bakker, 2004a, p. 295). The first two characteristics are considered to be the direct opposites of cynicism and exhaustion. The last characteristic, absorption, focuses on the feeling of being strongly concentrated and happily occupied in one's work, so much that "time passes quickly, and one has difficulties with detaching oneself" (Schaufeli & Bakker, 2004a, p. 295). The JD-R model can also be utilized to study work engagement (Schaufeli and Bakker, 2004; Bakker and Demerouti, 2017; Bakker and Albrecht, 2018). The framework suggests that having the right job resources and personal resources can predict work engagement. At the same time, the

resources are also impacted by job demands, which will have an effect on perceived work engagement. The model displays that work engagement can lead to high performance, which again may influence one's personal resources (Schaufeli & Bakker, 2004a). However, when demands outweigh resources, the employee may be led to experience burnout (Bakker & Demerouti, 2008). Although this study will not examine resources, changing rapidly from a face-to-face environment to a mediated setting may be considered a job demand, which makes it relevant for examining work engagement in VTs.

2.2.1 Work Engagement in Virtual Teams

According to Panteli et al. (2019), cultivating work engagement in a VT proposes a different set of demands because most communication happens through mediated communication tools. They state that "as work engagement is a motivational concept that draws on self-involvement, an understanding of VT members' engagement in the geographically dispersed setting will contribute towards improving VT effectiveness" (Panteli et al., 2019, p. 3). Thus, fostering work engagement should be an ongoing effort that must be monitored and encouraged throughout the process, encompassing essential factors such as appropriate information, financial provision, and feedback. Support from the leader during the working phase is vital because the pressure for completion is exceptionally high in this period (Panteli et al., 2019). Furthermore, this ensures that members are motivated, interested in, and informed about the progress of the work (Panteli et al., 2019). The positive effects of leader support are consistent with a study by Madlock (2013), where findings indicated that empathetic and motivating language used by team leaders influenced positive employee attitudes. Furthermore, Panteli et al. (2019) found that constant feedback when giving direction and showing empathy strengthens the positive relationship between social support and work engagement. They also found that all forms of work engagement: vigor, dedication, and absorption, were present but that they presented themselves in different phases of the project lifecycle (Panteli et al.,2019). For instance, during the setting up phase, team members were dedicated to getting started, whereas, towards the concluding state of the project, vigor also appeared. Absorption was detected in both phases whenever team members were highly focused on details.

2.2.2 Leadership in Virtual Teams

A VT environment places new demands on both team leaders and leaders in the organization. Researchers agree that VTs are more challenging to lead than face-to-face teams (Bell & Kozlowski, 2002; Gibson & Cohen, 2003; Hinds & Kiesler, 2002; Lipnack & Stamps, 2000) because the requirements of the team members differ from those who are working in a physical environment. For example, Purvanova & Bono (2009) revealed that VTs require more of a team leader to function equivalently to face-to-face teams and that the most influential leaders were those who increased their transformational leadership in VTs. Additionally, they found that the effect of transformational leadership on team performance at the team level was stronger in VTs compared to face-to-face teams. Research on leadership and support systems that influence team performance in VTs, as displayed in the IPO Model, found that structural support and shared leadership were positively associated with team performance (Hoch & Kozlowski, 2014).

Hierarchical leadership, like transformational leadership and leader member exchange (LMX) on the other hand, which typically have been found to enhance team performance in a face-to-face environment, was found to have a weaker effect on team performance in VTs. Transformational leaders are usually defined as displaying: “behaviors.. aimed at inspiring follower motivation and stimulating them to stretch their capabilities and to go beyond typical performance” and LMX leaders are “concerned with the nature and the quality of the dyadic relationship between the team leader and each member” (Hoch & Kozlowski, 2014, p. 392). The latter is usually developed through face-to-face interactions. However, their findings showed that behaviors typically associated with such leaders were harder to display in a virtual setting (Hoch & Kozlowski, 2014). As a result, a conclusion may be drawn that VTs should focus less on leadership types such as transformational leadership and LMX, which are easily exerted in a face-to-face setting, and rather focus on features that are effective in VTs.

2.3 Social presence

As previously mentioned, leadership is harder to exert in mediated settings and virtual teams because leadership types which are usually associated with motivating high performance, are heavily based on face-to-face interactions (Hoch & Kozlowski, 2014). However, what is generally successful with leadership styles

such as transformational leadership and LMX, is the dyadic relationship between the employee and leader, i.e., the level of presence shown by the leader in the relationship with the employee (Hoch & Kozlowski, 2014). As a result, it calls for defining leader presence in VTs.

Leader presence, more predominantly known as social presence in research, can be challenging to define when working in a virtual setting where face-to-face communication is limited, and physical distance creates new obstacles (Sivunen & Nordbäck, 2015). Sivunen & Nordbäck (2015) suggested a definition for social presence as being: “The psychological sense of being with others in the mediated environment” (Sivunen & Nordbäck, 2015, p.2). A commonly used classification of presence was made by Lombard and Ditton (1997) and divided presence into six dimensions, where one of them was social richness. According to this dimension, people evaluate presence in their ability to express intimacy and immediacy in different mediums. For instance, this dimension defines social presence as the extent to which a medium is perceived as warm, sociable, personal, or intimate when used to communicate with someone else.

Research by Biocca et al. (2001) found that social presence is a multidimensional construct composed of three dimensions: (1) Copresence, which refers to the degree of a person's feelings of inclusion and mutual awareness with others. (2) Psychological involvement, which refers to the degree of a person’s feelings of mutual attention, empathy, and mutual understanding of each other’s emotional states, intention, and motivation. The third dimension, (3) Behavioral engagement, refers to the degree to which a person believes their actions are interdependent, connected to, or responsive to others and the perceived responsiveness of the other’s (Biocca et al., 2001, p. 2). Similar findings can be found in research done by Bulu (2012) but differ in the separation of social presence and co-presence as two different constructs. Co-presence differs from social presence in that social presence relates to the quality of the medium and user’s perception of the medium as defined in the research done by Biocca et al. (2001), whereas copresence addresses more psychological interaction of the individuals. Sivunen & Nordbäck (2015) based their research on the definitions made by Biocca et al. (2001; 2003) and Bulu (2012) among others. Their findings indicated that the media richness of the communication tools had little impact on social presence in general. Stating

that “the occurrences related to high and low social presence were extensively communicational in nature, indicating that interaction and level of participation play a significant role in the achievement of social presence within a dispersed team.” (Sivunen & Nordbäck, 2015, p.13). Biocca et al. (2001) found that there were significant differences in dimension copresence, as well as the sub-dimensions mutual attention and understanding in psychological involvement, when comparing face-to-face interaction compared to in a virtual environment.

Based on the findings we support the definition of social presence provided by Biocca et al. (2001; 2003) and Sivunen & Nordbäck (2015), and the three dimensions, coprescence, psychological involvement and behavioral engagement. As their research is focused on social presence in mediated settings, we find the definition suitable for our research on VTs. Furthermore, we base our definition of work engagement on the one provided by Schaufeli & Bakker (2004a) and their three dimensions, vigor, dedication, and absorption. The IPO model highlights the importance of the right practice of leadership to promote performance (Hoch & Kozlowski, 2014) whilst the JD-R framework stresses the influence of job demands and resources, which in this instance may be the change from face-to-face to VTs and leader social presence, on work engagement (Bakker & Demerouti, 2008). This is also supported by Panteli et al. (2019) which called attention to the importance of leaders fostering work engagement in VTs. Based on this, we hypothesize the following relationship between social presence and work engagement:

H1: A leader's display of copresence positively influences work engagement in virtual teams.
H2: A leader's display of psychological involvement positively influences work engagement in virtual teams.
H3: A leader's display of behavioral engagement positively influences work engagement in virtual teams.

2.4 The Moderating Role of Media Richness and Communication Tools

Daft and Lengel (1984) introduced media richness as a concept that could be used in managerial information behavior, stated as “media richness reflects the capacity to convey information between managers, and we propose that media are selected

based on manager information requirements." (Daft & Lengel, 1984, p. 4). They argue that mediums of low media richness have a lesser capacity to transmit information on expressions, gestures, and vocal cues, and these characteristics enable technologies to convey socially richer information, and ultimately, the perception of social presence (Daft & Lengel, 1984). Later, Daft and Lengel (1986) presented the Media Richness Theory (MRT), which posits that the outcomes of communication build upon each media channel's ability to fulfill specific requirements. Five media classifications were identified: (1) face-to-face communication, (2) telephone, (3) personal documents like letters and memoirs, (4) impersonal documents, and (5) numeric documents (Daft & Lengel 1986). The classification criteria are based on the different medium's capacity for immediate feedback, access to social cues and channels, personalization, and language variety (Daft & Wiginton, 1979 cited in Daft & Lengel 1986). For instance, communication that includes seeing another person provides access to facial expressions and body language, revealing more information than talking on the phone (Biocca et al., 2001).

By communicating with media of low richness, leaders may restrict feedback and decrease the probability of resolving equivocal issues. In contrast, media of higher media richness will increase the likelihood of processing complex and personal messages (Daft & Lengel, 1984). Zmud et al. (1990) expanded the media richness channels by identifying three different channel attributes: information acquisition, information richness or social presence, and new computer-mediated channels, in addition to six differentiating channels: channel accessibility, information quality, immediate feedback, receiver accessibility, message personalization, and receiver accessibility. MRT has been a popular field of research ever since it surfaced in the 1980s. Yet, it has received criticism for lacking concise empirical results and technological advancements challenging the original concepts (Ishii et al., 2019). The different media channels also bear other functions. Modern tools such as Teams and Slack provide organizations with the possibility to, for example, share documents and work simultaneously. Boehlefeld (1996) early pointed out that understanding different media attributes can lead to more efficient communication. Panteli et al. (2019) found in their study that email was the primary communication tool used by the team leader in a VT to keep team members informed, updated, and motivated, which kept them engaged, despite

task complexities and uncertainties. In contrast, Biocca et al. (2001) posit that face-to-face interaction is presumed to have the highest effect on social presence when people are physically present and can pick up on each other's social cues and provide immediate feedback.

Previous research has attempted to determine the relative effectiveness of different media channels for social communication (Short et al., 1976; Biocca et al., 2003). Short et al. claim that social presence "is conceived of as unidimensional but considered to be a perceptual or attitudinal dimension of the user . . . [and thus is] a subjective quality of the medium" (Short et al., 1976, p. 650). For VT leaders, displaying social presence is being present with their employees in a mediated environment (Sivunen & Nordbäck, 2015). In virtual spaces, social presence can often be restricted to specific communication channels. Thus, a leader's use of different media channels with other attributes will have different levels of media richness (Daft et al. 1986). Previous research has found that leaders can nurture and sustain work engagement in VTs (Panteli et al., 2019). Thus, media richness might moderate the relationship between leaders and the work engagement of their VT teams. We hypothesize that media richness will have a moderating effect on the relationship between social presence and each of the three dimensions of work engagement:

H4: Media richness will positively moderate the relationship between leaders' copresence and work engagement in virtual teams.
H5: Media richness will positively moderate the relationship between leaders' psychological involvement and work engagement in virtual teams.
H6: Media richness will positively moderate the relationship between leaders' behavioral engagement and work engagement in virtual teams.

2.5 Conceptual Framework

The conceptual model displayed in Figure 1 investigates the relationship between a leader's social presence and its influence on employee work engagement. The three different dimensions by Biocca et al. (2001), copresence, psychological involvement, and behavioral engagement, are investigated in separate hypotheses because previous research shows that they may react differently to other variables.

To further explore the effect of social presence, the model looks at how media richness and communication tools moderate the relationship mentioned above.

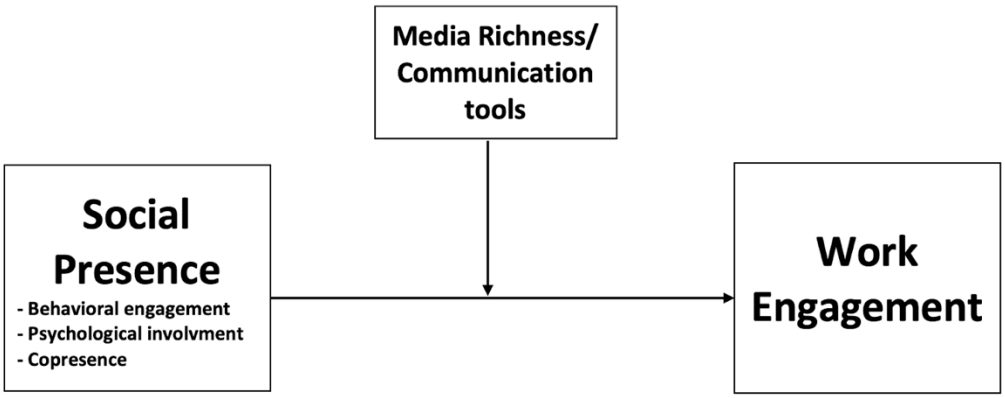

Figure 1: Conceptual framework

3.0 Methodological Framework

This section contains a description of how the data has been collected and our statistical procedures. The measures for work engagement, social presence, and media richness are also reviewed, along with the control variables.

3.1 Data collection

To investigate our hypotheses further, we construct a quantitative research design. Quantitative research design enables the researchers to explore a large sample, making it possible to draw a more generalized conclusion on the degree to which a leader's social presence affects work engagement in VTs (Bell et al., 2019). Opposed to qualitative research designs, quantitative designs allow the research project to contain a much larger participation sample. In addition, a quantitative research design is especially applicable when it comes to physically dispersed teams and participants that are working remotely. In this setting, it was pressing that we could collect data without being in the same physical area as our respondents due to the Covid-19 pandemic. The pandemic would have made quantitative research methods as interviews and observations more complicated to implement (Bell et al., 2019). By selecting a quantitative research design, we have been able to distribute surveys to many employees and leaders. Thus, the responses are collected from a broad group of participants working in different sectors and organizations. Finally, the qualitative method is efficient when comparing two separate respondent groups, such as leaders and their employee

team members, and what factors affect the relationship between a leader's social presence and the team members' level of work engagement.

3.2 Procedure

The process began with contacting potential subjects. We were positive to include respondents across industries, if the employees in the organizations were working virtually and working in teams. To increase the number of respondents we decided to collaborate with two other master thesis groups, who also aimed their focus at the virtual aspect of organizations. On the one hand, our survey became longer and took more effort for respondents to answer, but on the other hand, we secured more respondents in a short period of time than we would have been able to do by ourselves. To be able to measure the leader group against the employee group, we did one separate survey for each respondent group. Qualtrics (Version May, April 2021) was utilized to distribute the surveys, which is a digital program. The responses were collected over two weeks and included responses on the topics of work engagement, the leader-employee relationship, and media richness.

Each respondent received an initial email that ensured their confidentiality, in addition to an information letter about consent, processing of data, and the research project, in general, was to be found on the survey's first page. The initial email also contained a personal link that directed them directly to the survey. Reminder emails were sent out only to participants who had not responded and included the same unique link for each respondent. The personal link enables us to establish which respondents belong in what team and compare leader-employee responses within the same VT.

Due to the General Data Protection Regulations (GDPR), Thea Kristine Bøe was chosen out of the six students who made up the three master thesis groups to handle all personal data. Her responsibility was to collect all personal data from each respondent and code them according to which organization and team they were part of. She also oversaw the distribution of the surveys and sent out reminders to ensure enough responses.

3.3 Sample

Employees from nine organizations participated in this research project. The respondent groups include companies from several different sectors: sales,

communication, marketing, telecommunication, real estate, and recruitment. Some of the companies participated with their entire workforce, while others participated on an individual team basis. Since the research question is connected to how a leader affects their team, we still wanted to include these "single" teams to increase the number of matches between leaders and teams. This is because it is vital that leaders and employees of the same teams respond so that the leader's social presence and the employee's level of work engagement can be measured within each symbiosis. In total, we distributed The Remote Leadership Survey to a number (N) of 132 leaders. 95 leader respondents started the survey, while we received 85 responses, whereas the completion rate is 89 %. We distributed The Remote Working Survey to 797 subordinates. 462 employee respondents started the surveys, while we received 420 responses, giving a completion rate of 91 %. The Remote Leadership Survey had a response rate of 62.50%, and the Remote Working Survey had a response rate of 52.82%. The level of non-responses can be considered to be fairly low (Bell et al., 2019). The results gave 49 leader-subordinate dyads. This number is relatively lower than the number of responses in total, because SPSS removed several responses due to missing items in the responses and subordinates missing a leader or vice versa to create a dyad.

3.4 Measures

All research performed in Norway must be approved by the Norwegian Social Science Data Services (NSD). Thus, we submitted a collective application for all three master theses since we shared surveys. Getting approval from NSD took one month, and we started distributing the surveys in late February 2021. All variables were measured using a Likert scale, except for demographic items such as gender, age, and organization tenure. These variables can also be detected as control variables. In this way, reliable and valuable measures were ensured. Measures connected to work engagement, which is the dependent variable, were adopted from existing literature, ensuring that these were tested. Items related to the leader role, which is the independent role, and virtual setting, which is the moderating variable, were not found in previous research. This means that, to the knowledge of the authors of this thesis, the measures are not previously tested, which will be elaborated on in chapter 5.4.

3.4.1 Work Engagement

Work engagement is measured using the Utrecht Work Engagement Scale (UWES) developed by Schaufeli & Bakker (2004). This part of the questionnaire was only sent to employees, as it was their level of work engagement we wanted to measure. For this paper, the short version of the UWES was utilized. It contains the most characteristic items of each concept. For vigor, the values of Cronbach's α vary from .75 to .91 (median: .84) across the 25 studies. For dedication, the values of Cronbach's α vary from .83 to .93 (median: .89) across all studies. Lastly, for absorption, the values of Cronbach's α vary from .75 to .94 (median: .79). The Cronbach's α is .871, which is reliable, considering the accepted threshold of 0.7, or 0.5 for measures with less than ten items (Pallant, 2013).

3.4.2 Social Presence

This thesis explores a leaders' social presence in VTs as the independent variable. To be able to measure it, we have selected items from a scale developed by Biocca et al. (2001) on social presence. This was included in the questionnaire sent to the leaders. The original scale is divided into the three dimensions, copresence, psychological involvement, and behavioral engagement, which again are divided into subdimensions, mutual awareness, mutual attention, empathy, mutual understanding, behavioral interaction, and mutual assistance. Two subdimensions, isolation/inclusion, and dependent assistance were not included in the study as they were insignificant in the study by Biocca et al. (2001). In total, the scale consists of 38 items which are dispersed among the different dimensions, aimed towards measuring social presence in teams. Biocca et al. (2001) do not offer a short version of their scale. For this paper, a shortened version of the scale was developed, considering respondent satisfaction regarding time use, in addition to reducing the risk of 'respondent fatigue' (Bell et al., 2019). When shortening a scale, the scale's psychometric properties will change, along with the total score number, mean, standard deviation, validity, and reliability. However, scales are not necessarily set in stone. We developed a short version of the scale, containing a total of five items, maintaining the ratio of questions for each sub-dimension consistent with the original scale, including two items from behavioral engagement, one item from copresence, and two items from psychological involvement. We mirrored the chosen items so they could be directed towards leaders. Elimination and moderating of items can be done as long as necessary

modifications and assessments of the psychometrics are performed (Parasuraman 2005, p. 229). These modifications were made because the existing scale was too lengthy to be utilized for the purpose of this paper, and the selected variables were considered to measure the correct variables in social presence. The reliability of the scale was examined through Cronbach's α, giving .862 for social presence, which also is considered the accepted threshold of 0.7, or 0.5 for measures with less than ten items (Pallant, 2013). The validity of the scale is measured by performing an exploratory factor analysis (EFA), as explained in chapter 4.3.

3.4.3 Media Richness and Communication Tools

The moderating variable in this paper is media richness. This part was included in the questionnaire sent to the leaders, as it is their communication methods we investigate. It influences both the direction and magnitude of the relation between the dependent and the independent variable (Baron & Kenny, 1986). There are different requirements and differentiating channels used for identifying media classifications (Daft & Wiginton, 1979 cited in Daft & Lengel 1986; Zmud et al. 1979). This paper is limited to virtual channels. Thus, the classifications are moderated to fit virtual channels, and face-to-face communication is removed. Five items are constructed to measure the leader's level of media richness: video calls, email, phone, or chat, using a 5-point scale (5=to a very great extent, 1=not at all). We have classified the items based on mediums capacity for immediate feedback, access to social cues, language variety, channel accessibility, information quality, receiver accessibility, message personalization, and receiver accessibility (Daft & Wiginton, 1979 cited in Daft & Lengel, 1986). On this basis, we conclude that: (1) email has low media richness, phone and chat have medium and video calls (e.g. Teams or Slack) have high levels of media richness. For instance, email has a low capacity to transmit social cues and immediacy, and therefore the media richness is low, whereas mediums that offer visuals, e.g., video calls, have higher media richness because social cues are easily interpretable and immediate feedback is possible (Daft & Wiginton, 1979 cited in Daft & Lengel, 1986; Zmud et al. 1990). The Cronbach's α for our moderating variable has a score of .521, which is approved although very close to the threshold of 0.5 for measures with less than ten items (Pallant, 2013).

3.4.4 Control Variables

We conducted the statistical analysis using SPSS version 27. The variables age, gender, education, tenure, time spent working virtually, and time spent working virtually in a team were selected as control variables. These variables ensure that the results are not affected by alternative explanations and affect prior relationships. Previous research shows that age and gender can predict attitudes (Chan et al., 2008; Spreitzer, 1995). In addition, age has been shown to predict work engagement, whereas older employees are more engaged than younger (James et al., 2011). The respondents plotted their age, as open questions can capture more of the spread in the spread of age. For gender, the options were female: coded 1, male: coded 2, and other: coded 3. Education has also been shown to affect work engagement (Beckers et al., 2004). We divided the level of completed education into the following categories: 'middle school,' 'high school,' 'bachelor's degree,' 'master's degree,' 'doctorate.' Additionally, we included tenure because it might also affect work engagement. To report how many months they had been working virtually and in their respective VT, the respondents could plot how many months, sanctioning an accurate representation.

4.0 Results

This section provides an overview of all the results of our statistical data analysis. The analysis is performed in several steps, starting with descriptive analysis and Pearson's correlation coefficient, where we mention relevant means (M), standard deviations (SD), and correlations between the variables. We also conducted reliability analysis, using Cronbach's α, to ensure the reliability and EFA to ensure the validity of our results. Finally, we conducted a multilevel analysis to examine the results from the questionnaires and to be able to test the six hypotheses.

4.1 Descriptive Statistics and Correlation Matrix

Table 1 displays the descriptive analysis. It contains estimated means (M), standard deviation (SD), and the correlation between variables using Pearson's Correlation Coefficient. The table entails an overview of demographic variables such as age, gender, and education, how long they have been working remotely and working remotely in teams. The three dimensions of social presence: behavioral engagement (M=4.66, SD=0.33), copresence (M=4.47, SD=58), and physiological involvement (M=3.48, SD=.64), display relatively high means,

especially copresence, while the standard deviation (SD) is at an acceptable level. As work engagement was measured on a five-point scale, this suggests high levels of all three levels of work engagement. We created three constructs for media richness, where high media richness (M=4.04, SD=.64) is video calls, medium media richness (M=3.65, SD=.63) is phone and chat, and low media richness (M=3.37, SD=1.09) is email. For work engagement (M=3.68), the mean is relatively high. The results provide us with a sufficient starting point for our analysis. It confirms that the leaders are using different levels of media richness, and the employee work engagement is measured at relatively high levels in our statistical analysis.

Table 1 displays that psychological involvement positively correlates with work engagement (.89). The correlation between the variables exceeds 0.70, which can suggest multicollinearity. Multicollinearity can pose an issue in statistical analysis, as "the major problem with multicollinearity is that the least squares estimators of coefficients of variables in- volved in the linear dependencies have large variances." (Mansfield & Helms, 1982, p. 159). Thus, we performed a linear regression analysis measuring each independent variable against the other, calculating the variance inflation factors (VIF). VIF indicates how many times larger Var ($\hat{\beta}$) will be for multicollinear data than orthogonal (Mansfield & Helms, 1982). In our analysis we found that all VIF statistics connected to each independent variable were below 3.70. Multicollinearity is not a problem if the VIF's are not uncommonly larger than 1.0, as only VIFs above 10 can confirm multicollinearity (Mansfield & Helms, 1982). Thus, our findings do not suggest multicollinearity.

We find a negative correlation between copresence and the number of months a leader has been working remotely (r=-.41, p <.01). Copresence is also positively correlated to behavioral engagement (r=.41, p <.01). We find that medium media richness correlates negatively with high media richness (r=-.45, p <.01), indicating that the more phone calls and chat are being used, the fewer video calls are being used.

Table 1: Descriptive Statistics and Correlation Matrix

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		18	19	20
1. Age (E)	3.01	2.27	1.00																				
2. Age (L)	3.35	.89**	-.03	1.00																			
3. Gender (E)	1.53	.50	.00	.08	1.00																		
4. Gender (L)	1.65	.48	.08	-.10	.07	1.00																	
5. Education (E)	3.11	.69	.03	-.09	-.06	.03	1.00																
6. Education (L)	3.33	.63	-.09	-.37*	-.13	-.16	.41**	1.00															
7. Tenure (E)	2.74	1.05	.15	.36*	.21**	-.14	-.20*	-.04	1.00														
8. Tenure (L)	4.17	4.11	.08	.39**	-.11	.28	-.05	-.31*	.44**	1.00													
9. Supervisory Level	2.58	1.16	-.23	.00	-.09	.07	-.04	-.04	-.16	.03	1.00												
10. Remote Work Months (E)	4.15	1.18	.03	.05	-.02	-.02	.04	.24	.23**	.05	-32*	1.00											
11. Remote Work Months (L)	5.54	2.76	-.03	-.34*	-.05	.14	-.13	.07	-.07	-.12	.24	-.09	1.00										
12. Remote Teamwork Months (E)	3.65	1.70	.03	.09	-.12	-.19	.03	.15	.16*	-.09	-.19	.63**	-.15	1.00									
13. Remote Teamwork Months (L)	5.43	3.16	-.05	-.33*	.07	.04	-.16	.03	-.14	-.24	.32*	-.22	.94**	-.24	1.00								
14. Work Engagement	3.68	.52	-.07	-.02	-.03	.11	-.09	-.24	-.06	-.10	.11	-.10	.03	-.08	.10	1.00							
15. Behavioral Engagement	4.66	.33	.15	-.11	.19	-.21	.07	-.19	.07	-.05	-.17	.13	-.19	.19	-.15	.13	1.00						
16. Copresence	4.47	.58	.15	.09	-.02	-.32*	.15	-.14	-.01	-.01	-.06	.03	-.41**	.25	-.26	-.01	.41**	1.00					
17. Psychological Involvement	3.48	.64	-.09	.08	-.09	.06	-.05	-.15	-.08	-.05	.09	-.11	-.12	-.05	-.07	.89**	.23	.06	1.00				
18. Media Richness	3.55	.49	-.12	.20	-.20	-.19	-.25	-.01	-.11	-.11	.25	-.12	.06	-.02	.16	.11	-.15	.03	.05	1.00			
18. High Media Richness	4.04	.64	-.01	-.06	-.14	-.02	-.02	.22	.22	-.27	-.03	.31**	-.05	.36*	.22	.05	.07	.11	.19	.24	1.00		
19. Medium Media Richness	3.65	.63	-.06	-.06	-.22	-.27	.06	.24	-.08	-.28	-.04	.31**	.00	-.40**	.13	-.05	-.02	.20	-.19	.68**	-.45**	1.00	
20. Low Media Richness	3.37	1.09	-.05	.16	-.08	-.13	-.32	-.13	-.16	.05	.35*	-.44**	.22	-.43**	.03	.08	-.17	-.21	.01	.68**	-.20	.14	1.00

Note: See appendixes 2 and 3 for questions on each variable. (E): Employee; (L): Leader; Age: 1 =18-24, 2 = 25-34, 3 = 35-44, 4 = 45-54, 5 = 55-64, 6 = 65+years; Gender: 1 = female, 2 = male, 3 = other; Education: 1 = 'middle school', 2 = 'high school', 3 = 'bachelor's degree', 4 = 'master's degree', 5 = 'doctorate's degree'; Tenure: 1 = 0-1, 2 = 2-3, 3 = 4-6, 5 = 7+years; 1 = team leader, 2 = first line supervisor, 3 = manager, 4 = executive, 5 = senior executive; Remote Work Months: 1 = 0-2, 2 = 3-5, 3 = 6-8, 4 = 9-12, 5 = 13-15, 6 = 16+months; Remote Teamwork Months: 1 = 0-2, 2 = 3-5, 3 = 6-8, 4 = 9-12, 5 = 13-15, 6 = 16+months; High Media richness: video calls; Medium Media Richness: phone, chat; Low Media Richness: email; SD = Standard Deviation, *p<.05, **p<.01; *: Correlation is significant at the 0.05 level (2-tailed); **: Correlation is significant at the 0.01 level (2-tailed).

The number of months employees work remotely in teams correlate negatively with medium media richness (r=-40, p <.01), but positively with high media richness (r=36, p <.05), suggesting that the more remote teamwork increases in months, phone and chat are being used less, and video calls are being used more. Further, months employees work remotely (outside teams), correlates positively with both high media richness (r=.31, p <.05) and medium media richness (r=.31, p <.05). At the same time, we find weak and non-significant correlations between media richness and all independent variables. Correlation cannot equal causation. Thus, the correlation matrix can only suggest indications of the different relationships in the dataset. The means, standard deviations, and correlations provide us with valuable insights, but a multilevel analysis will be performed to test the hypotheses further.

4.2 Reliability

Our two primary constructs, work engagement, and social presence, that we examined in our questionnaires are based on measures that have previously been tested and proven reliable, referring to the UWES developed by Schaufeli & Bakker (2004) and the scale developed by Biocca et al. (2001) on social presence. However, we performed reliability tests to substantiate the constructs further. Cronbach's α showed that all measurements performed above what is considered the accepted threshold of 0.7, or 0.5 for measures with less than ten items (Pallant, 2013). We calculated Cronbach's α for three constructs, namely work engagement, social presence, and, lastly, media richness as the moderator. The work engagement construct was reliable with a Cronbach's α of .871. For social presence, the analysis indicated a score of .862. Lastly, for our moderator, media richness, the score was .521, which is accepted because the construct only consists of 4 items (Pallant, 2013).

4.3 Exploratory Factor Analysis

An Exploratory Factor Analysis (EFA) can be used for establishing the structural validity among a set of variables (Pallant, 2013). The two scales we have used for our concepts work engagement and social concept, have been developed and proven to be both valid and reliable. However, since we have shortened the scale for social presence, we wish to test that the structural validity is still intact, considering that the reliability analysis checking for Cronbach's α gave good results. We ran the EFA (employees n=171 and leader-team dyads n=48) in SPSS,

conducting two rounds to validate our scales. Promax and direct oblimin rotation were chosen as the factors correlated with one another, and as we are dealing with a larger dataset (IBMa, n.d.). Firstly, the results from the KMO and Bartlett's test may indicate whether it is appropriate to use a factor analysis for the items in the matrix (IBMb, n.d.). We see that the Bartlett's test is in fact significant ($p < .001$), giving a value smaller than .05, which is preferred because it indicates that the correlation matrix is significantly different than an identity matrix, where correlations are zero (Pallant, 2013). The analysis gives a KMO score of .565. Although this is a little low, it is above the accepted threshold of .5 (Field, 2013), and is therefore accepted.

The EFA was performed on the following variables: work engagement, social presence and media richness. The analysis gave a seven-factor loading, showing seven factors above the eigenvalue of 1 (Pallant, 2013). The seven-factor solution accounted for 76.5 percent of the total variance explained. This result coincided with our expectancy of seven factors, as two of the constructs are three-factor structures: work engagement (vigor, absorption, and dedication), social presence (copresence, psychological involvement, and behavioral engagement), and media richness representing one factor. Work engagement loaded on factors 1-3, respectively vigor (factor 1), dedication (factor 2) and absorption (factor 3). Social presence loaded on factors 4-6, respectively behavioral engagement (factor 4), copresence (factor 5) and psychological involvement (factor 6). Although we could identify all three factors, the loadings were weaker, which is a limitation for our shortened scale. Media richness loaded on factor 7, however there are differences in media richness, ranging from low to high, which we have classified in chapter 3.4.3. Lastly, based on the correlation matrix for all items, we chose to eliminate one item in the social presence scale. One of the items in the dimension's psychological involvement, (consisting of items 4,5,6, and 7), item 5, correlated weakly (.214, .051, and .262) with the other items within its sub-dimension. Based on this, we chose to remove this item.

4.4 Multilevel Data Analysis

To examine the results from the questionnaires, we performed a multilevel analysis using SPSS to test the six hypotheses that have been proposed (see Table 2). This statistical analysis allows for examining data when interested in exploring

the relationship between an individual and a group, in this instance, leader and team (Snijders & Bosker, 2011). In our analysis, we have examined the relationship between the dependent variable (work engagement) with the independent variable (social presence) and the moderator (media richness). The results are presented above in Table 2.

Table 2: Multilevel Analysis - with work engagement as the dependent variable, social presence as the independent variable and media richness as the moderator.

Parameter	Estimate	Std. Error	Sig.
Intercept	5.279	.893	<.001
[Gender (E)=1,00]	-.203	.068	.005
[Gender (E)=2,00]	0^b	0	
[Gender (L)=1,00]	-.037	.074	.618
[Gender (L)=2,00]	0^b	0	
Age (E)	.009	.007	.209
Age (L)	-.198	.050	<.001
Education (E)	-.046	.051	.373
Education (L)	-.103	.067	.133
Tenure (E)	.084	.039	.040
Tenure (L)	-.022	.022	.335
Organization (E)	.044	.023	.066
Organization (L)	0^b	0	
Remote Work (E)	.013	.043	.763
Remote Teamwork (E)	.062	.027	.031
Remote Work (L)	-.117	.040	.006
Remote Teamwork (L)	.107	.037	.007
Behavioral Engagement	-.746	.037	<.001
Copresence	-.049	.067	.465
Psychological Involvement	.679	.051	<.001
Media Richness	-.712	.189	<.001
Social Presence x Media Richness	.192	.044	<.001

Note: Dependent variable: Engagement; df = 39; Employee: (E); Leader: (L)

First, the multilevel analysis was run, testing the constructs without breaking them down into their subdimensions (see chapter 3.4.2), thus testing the relationship between work engagement and social presence and then adding media richness as the moderator. This initial analysis did not give any significant results. To test the proposed hypotheses, the variables were divided into subdimensions to test each level. For social presence, that is copresence, behavioral engagement, and psychological involvement. To further research if there are any differences for work engagement, the subdimensions vigor, absorption, and dedication were also tested separately. Multiple multilevel analyses were run to examine each variable of social presence to each dimension of work engagement. The analysis revealed that psychological involvement ($p < .001$) and behavioral engagement ($p < .001$)

both have significant relationships to all dimensions of work engagement. Copresence ($p < .465$) did not show a significant relationship with any dimensions of engagement, and as such, hypothesis 1 must be rejected.

The analysis also showed that the moderating variable, media richness, also has a significant relationship with work engagement ($p < .001$), both alone and in combination with social presence. Thus, having a moderating effect on the level of work engagement when social presence is exerted. However, hypotheses 4-6 set out to examine the influence of media richness for each dimension, and as such, the analysis was performed including this variable for each dimension. The results showed that with the impact of media richness, only the dimension of behavioral engagement was significant ($p < .005$), whereas psychological involvement ($p < .541$) and copresence ($p < .917$) were insignificant. Thus, we have support for hypothesis 6, but hypotheses 4 and 5 must be rejected.

5.0 Discussion

The current paper presents a conceptual framework investigating the proposed relationship between social presence and work engagement, including media richness's moderating role. Several relevant patterns were discovered, which will be the main topic of this section.

5.1 The effect of Social Presence on Work Engagement

The research question: "*To what extent does a leader's social presence influence work engagement in a virtual environment?"* investigates the relationship between employees' work engagement, leaders' social presence, and the moderating effect of media richness. This research paper has examined whether there is in fact an existing relationship between these variables. In chapter 4.4, the results from the multilevel analysis are presented and indicate that there was not found support for hypothesis 1 on copresence and it must be rejected. On the other hand, the results indicated that there is support for hypotheses 2 and 3, which examined the relationship between work engagement and behavioral engagement and work engagement and psychological involvement. Although this study failed to prove a significant result for the dimension copresence, it does provide some theoretical contributions.

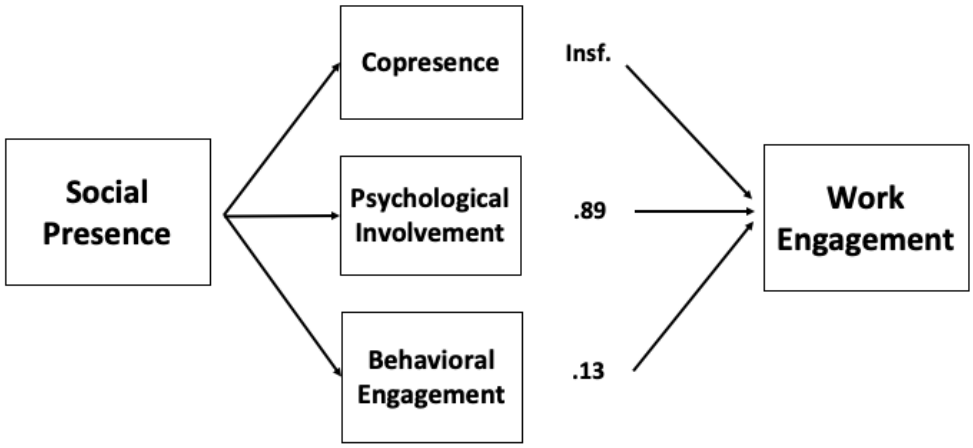

Figure 2: Relationship between social presence dimensions and work engagement.

Firstly, this research paper contributes to the limited research on social presence and its effect on work engagement among employees in virtual teams. This research paper has found one similar and a recent study by Panteli et al. (2018), which examined the fostering of work engagement by leaders in geographically asynchronous teams. However, the study was qualitative and longitudinal, and social presence was considered a minor topic. This study differs on mainly two points, (1) social presence is not researched as a contributing factor, and (2) the teams in this study were all synchronous. Furthermore, considering the four different characteristics defined by Bell & Kozlowski (2002), the teams in our study were all distributed, although geographically reasonably close. The three other remaining characteristics, boundary span, lifecycle, and member roles, were generally not an issue considering these teams were not working on any specific time-limited project that demands cooperation across teams and even organization. The only difference was moving from a face-to-face environment to a virtual one, which may present issues like the involuntary aspect of change, difference in motivation, less preparation, and social interactions (Waizenegger, 2020), which should be further researched. The results in chapter 4.1 suggested that the employees in our study were engaged to some extent. Similarly, the means for social presence showed that leaders were exerting presence in teams functioning in a mediated setting. This supports our argument for this study, providing a valuable aspect to research on these three constructs together.

Secondly, this study contributes to extending research on social presence by confirming its relationship with moderated environments. The research by Biocca et al. (2001) compared the effect of social presence in mediated versus face-to-face settings. Their findings showed that of the three dimensions, some were presented stronger depending on the environment they were being exerted. For instance, of all sub-dimensions, mutual awareness, which was the only sub-dimension measured in copresence, was the one that showed the biggest difference in effect, being much stronger in a face-to-face environment compared to a moderated environment. This can be a possible explanation for the lack of significance in our result for copresence as it is more strongly presented in face-to-face settings, rather than mediated, according to both the studies by Biocca et al. (2001) and Sivunen & Nordbäck (2015). However, for the one sub-dimension presented in copresence, it was not the weakest in Biocca et als. (2001) study, and therefore, more research should be conducted on the scale and its dimensions to be further able to conclude. Similarly, Sivunen & Nordbäcks (2014) study found that psychological involvement and behavioral engagement were exerted more frequently and of a more substantial effect than copresence. Our analysis found one contrasting element in that copresence presented a relatively higher mean than the two other dimensions, the difference almost being 1, showing that the level of copresence exerted was seemingly higher.

These two studies, in addition to our findings, may indicate multiple notions: (1) Copresence is a dimension that is difficult to measure, either through qualitative or quantitative research. This can be a possible explanation seeing as only one of the two sub-dimensions was found significant in Biocca et als. (2001) study. (2) Copresence is exerted but is harder to capture than the other two dimensions, or (3) the items developed for copresence in Biocca et al's (2001) study does not capture the concept of the dimension adequately, thus affecting findings for the dimension. This should be further researched. However, this study confirmed the notion of social presence is divided into three dimensions. The confirmatory factor analysis found three factors for social presence, and both proved when the analysis was run for all constructs and the construct by itself. Equally, the results from the multilevel analysis indicated that the items in the scale for social presence gave different results, i.e., not all had significant relationships with work engagement. Thus, this study proves that differentiation is needed as social

presence is not a single dimension concept but rather a multidimensional construct if not three.

Thirdly, as mentioned in chapter 3.4.2, a shortened version of the scale does not exist to the knowledge of this paper. Sivunen & Nordbäck (2014) based their study on "Social presence as a multi-dimensional group construct in 3D virtual environments" partly on the scale by Biocca et al., although their research was also heavily based on qualitative methodology. In their study, they presented results through a coding scheme where each dimension was divided into high and low, e.g., high psychological involvement and low psychological involvement. In this study, we have presented a shortened version of the scale to accommodate our participants with a more 'user-friendly' scale, such as the short version of UWES scale by Schaufeli offers. Our results indicate that we have been successful in providing this, confirmed in our reliability analysis and confirmatory factor analysis. However, more research is needed. Lastly, this research shows that there is in fact an existing relationship between a leader's social presence on the dimensions of behavioral engagement and psychological involvement and work engagement, thus confirming that a leader's social presence may influence work engagement among employees.

5.2 The Moderating Effect of Media Richness

The current paper split a leader's social presence into three dimensions, based on Biocca et al., (2001) theory. We have created one hypothesis for each dimension to capture potential significant findings between media social presence and work engagement via the moderating effect of media richness. Hypotheses 4-6 were built on each dimension, and the results are shown in the multilevel analysis in chapter 4.4. The conceptual framework and hypotheses set expectations that media richness would have a significant effect on the relationship between social presence and media richness. After performing the multilevel analysis, we found support for hypothesis 6. However, we did not find support for hypothesis 4 or hypothesis 5, which therefore was rejected. The findings by Sivunen & Nordbäck (2015) indicated that the level of media richness does not have an impact on social presence. This can be a possible explanation for the lack of a significant relationship between psychological involvement and media richness, despite finding a significant relationship between the first and work engagement.

Hypothesis 6 suspects that media richness will positively moderate the relationship between leaders' behavioral engagement and work engagement in team members. The findings support the hypothesis and its suggested relationship, proposing that media richness moderates the relationship between social presence and behavioral engagement. In this setting, behavioral engagement refers to the degree to which an individual believes their actions are interdependent, connected to, or responsive to others and the perceived responsiveness of the other's (Biocca et al., 2001). Considering the IPO framework (Hoch & Kozlowski, 2014), this finding suggests that a leader's social presence through behavioral engagement could be an input when the goal is to influence work engagement. According to the JD-R model, job characteristics can be placed in either job demands, which are linked to physiological and psychological costs, or job resources, which are linked to stimulating personal growth and development (Demerouti et al., 2001). To the knowledge of this paper, the JD-R model has yet to be applied to VTs. One assumption can be made based on these findings, that behavioral engagement can be considered as a resource as it is related to work engagement which is regarded as a resource (Demerouti et al., 2001).

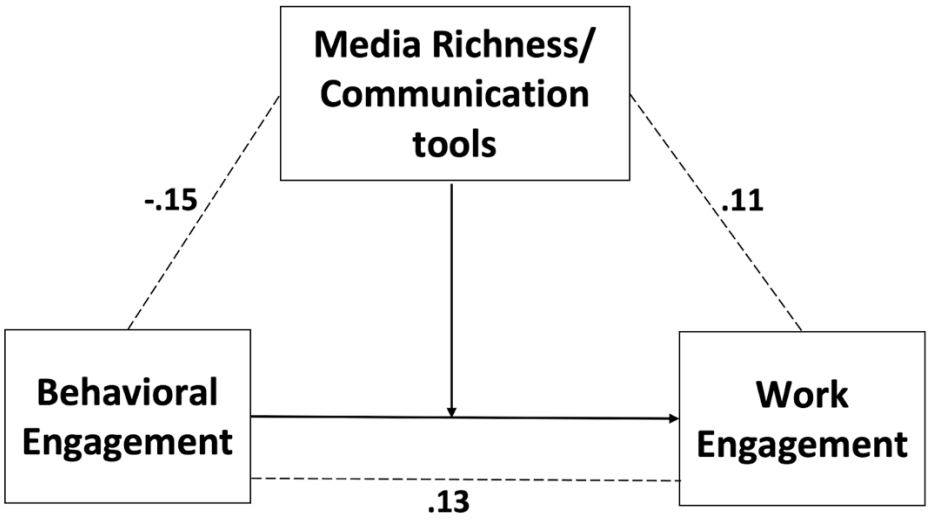

Figure 3: The moderating effect of media richness on the relationship between behavioral engagement and work engagement

Hypothesis 4 suspected that media richness will positively moderate the relationship between leaders' copresence and work engagement in team members, while hypothesis 5 suspects that media richness will positively moderate the relationship between leaders' psychological involvement and work engagement in team members. However, the statistical analysis did not find support for the

moderated link between copresence and social presence or the moderated link between psychological involvement and social presence. Thus hypotheses 4 and 5 are rejected. The current paper refers to copresence as the degree of a person's feelings of inclusion and mutual awareness with others. In contrast, psychological involvement refers to the degree of a person's feelings of mutual attention, empathy, and mutual understanding of each other's emotional states, intention, and motivation (Biocca et al., 2001). The results are surprising, as we expected to find links between media richness and copresence, in addition to media richness and psychological involvement. At the same time, existing literature entails how VTs are characterized by behavioral invisibility and the challenges of social dynamics and managing team tasks (Wilson et al., 2016; Eseryel et al., 2020). The absence of significant relationships can be caused by contextual factors. This research study was initiated while the Norwegian society was going through major challenges, and several parts of the country were in lockdown for a long time. This may have caused the participants' level of work engagement to be influenced by external factors such as isolation or fear of the Covid-19 virus in general. In other words, no evidence was found that the leaders' social presence influenced work engagement in VTs through media richness. In summary, our research provides grounds for the significant relationship between behavioral engagement and work engagement.

5.3 Theoretical and Practical Implications

Although we did not find full support for our conceptual framework, our research adds important implications to the theoretical field. Firstly, this study complements the existing research on the relationship between social presence and work engagement and VTs and media richness in general. As mentioned, the current research only found one existing article on work engagement in VTs focusing on work engagement in asynchronous and geographically dispersed teams (Panteli et al. 2019), which also concludes that VT leaders can promote, sustain, and nourish work engagement in VTs. More in-depth, the current paper fills the identified research gap by investigating the effect of social presence and communications on work engagement within VTs. The findings contribute to a better understanding of the relationship between leaders' social presence and work engagement in VTs through the moderating role of media richness.

We spent much time reaching out to companies and organizations through email, LinkedIn, and our network. While it was challenging to make connections, the ones we managed to get through to were interested in this field of research. The response strengthens our belief that the topic of this thesis will have important practical implications for the organizational industry. The Covid-19 pandemic has kept people out of their typical working habitats and created a new work environment in several sectors, and many workspaces have been changed, most likely forever (Fenwick et al., 2021). Even before Covid-19, the workplace was becoming more and more digitized. Disrupted by the pandemic, most organizations were abruptly forced into virtual everyday life. Employees have become accustomed to the flexibility the home office provides. In this view, the current paper's research question can provide valuable insights on how leaders can facilitate and nurture work engagement in their VTs and increase awareness of how they communicate with their virtual employees.

5.4 Limitations and Future Research

Whereas the research presented in this study provides meaningful contributions to the theoretical and practical field, certain limitations must be examined when interpreting the results. The first limitation listed is our selected items from Biocca's (2001) scale on social presence. Our scale will, as mentioned, have different psychometrics, and it will not be comparable to the original scale. A direction for future research is to include all the items from the original questionnaire or to develop and utilize a short version of Biocca's scale.

Secondly, the size of our sample size is a limitation. The sample size could have been larger, notably the sample size of leader respondents, as larger sample sizes increase precision and decrease sampling errors (Bell et al. 2019). Even though both questionnaires in our study have a satisfactory response level, including 95 responses from leaders and 420 from employees, not all the items were filled out. Thus, the number of responses differs on different items, mainly demographic items, as we left these non-mandatory. We did not want to force the respondents to provide us with personal data, as the consequence could be losing their entire participation. Another topic that could be interesting for future researchers is to compare age groups or levels of education or experience and conduct a comparable analysis, which lies outside of the aim of the current paper.

Thirdly, we directed our study towards individuals who work in VTs, where we have emphasized that the reason for them working in a virtual setting is the corona pandemic. We must be aware that employees and leaders might have spent time working physically together during this period. Thus, our results may be harder to replicate because of the amount spent virtual versus face-to-face. It could be fruitful for future researchers to investigate the moderating role of media richness on how a leader's social presence affects work engagement in teams that constantly work in a virtual space. Other factors connected to continuous virtual work, such as asynchronous work, could be incorporated. The fourth limitation connected to the remote working style is other contextual factors that may contribute to the VT member's level of work engagement, other than the leader's social presence. A factor contributing to this is working from a home office, where the employee's day-to-day life probably has a more considerable impression on them than in a typical office situation. Another aspect is that the leaders are being placed in an entirely new position, having to lead teams and departments virtually.

A fifth limitation is that the data collected from our questionnaires are based on the self-reporting respondents. For example, there are different complications related to this, the social desirability bias, meaning that respondents might alter their responses to what they assume is more socially acceptable (Bell et al., 2019). In addition, there is a chance that the respondents either have misunderstood or filed out the questionnaire wrong. E.g., the questionnaire involves two items asking respondents how long they have been working remotely and how long they have been working remotely in teams, measured in months, which can be difficult to get right after many months or remote work. To reduce the risk of social desirability bias and misunderstandings, we informed the respondents about their rights and control of their data, answered their questions, and provided a clear and neat questionnaire. Finally, there can be limitations connected to the language of the questionnaires. For example, the respondent groups wished to receive the questionnaire in their native language, Norweigan. We, therefore, provided them with the option to choose if they wanted to complete the questionnaires in English or Norwegian, ensuring that as many respondents as possible understood as much as possible. On the other hand, translating the items can harm the items, which is a

risk we had to take with the scales that were not available in Norwegian (Berkanovic, 1980).

6.0 Conclusion

In summary, this research paper contributes to the literary and practical field in regard to leadership in VTs. It investigates social presence as a construct of its own, in addition to the relationship between social presence and work engagement in VTs and the relationship between social presence and media richness. The question of how a leader's social presence can affect work engagement in VTs posed as a gap in the existing literature, and the ambition behind this thesis is to fill the gap, both with our findings and to inspire other researchers to investigate the topic further. The presented literature provides the reader with a background for understanding the different concepts, combining research on VTs, work engagement, social presence, and media richness. At the same time, we are looking at these topics in light of the Covid-19 pandemic, and it is uncertain how the current situation will develop. We know that the pandemic is changing how we work, but we do not know precisely how – which is the primary reason why we chose our research question. Besides extending the literature by investigating the social presence and its effect on work engagement, we have also researched the moderating effect media richness has on synchronous teams.

In conclusion, several significant findings appear in the multilevel analysis. The study provides evidence for a positive relationship between the dependent variable work engagement and two out of three dimensions of social presence, namely behavioral engagement, and psychological involvement, although not very strong. For the moderator media richness, we could only prove a significant relationship with the behavioral engagement dimension. Alas, the relationship between copresence and psychological involvement was insignificant. Nevertheless, our findings supplement and further substantiate existing theory and previous research, although some of our hypotheses were rejected. As a result, we present fruitful arguments for focusing on further research on social presence as both a construct and a scale, in addition to the effect of social presence on work engagement in moderated settings. The findings of this current paper contribute to the theory on VTs and can provide a direction for future research.

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Appendices

Appendix 1: Cover Letter

Invitation to participate in a research project "Effective home working and digital team functioning"

Research Background and Purpose

The pandemic has forced teams to work remotely. Digitalization of teams changes how employees interact with others in their field, their teams, and their organization. Such forms of work are associated with beneficial outcomes such as increased productivity and superior access to global markets. However, digital work teams also present employees with more ambiguous climates and less accessibility to information.

The Nordic Center for Internet & Society at BI Norwegian Business School is conducting a research project to gain a deeper understanding of the contextual factors that influence effective home working and digital team functioning. The results of this study would provide important implications for employee's and organization's well-being in the long-term. This research project is part of a master's thesis by students from the master's program Leadership and Organizational Psychology at BI Norwegian Business School.

Why are you invited to participate?

You are asked to participate because your employer has agreed to participate in this research study, to gain a better understanding of your organization's current situation regarding remote working. Your participation is, therefore, very important to better understand leadership and team dynamics in teams using computer-mediated communication tools.

What will participation in the study involve?

The survey will be accomplished using an online poll tool – Qualtrics. The survey consists of a series of questions. It will take approximately 15 minutes to answer the survey. Please be reminded that there is no 'right' or 'wrong' answer, and it is important for you to express what you "have in mind".

It is voluntary to participate

It is voluntary to participate in the project. If you choose to participate, you can withdraw your consent at any time without giving any reason. All your personal information will then be deleted. It will not have any negative consequences for you if you do not want to participate or later choose to withdraw.

Your privacy - how we store and use your information

We will only use the information about you for the purposes we have described in this letter. We treat the information confidentially and in accordance with the privacy regulations. Only the two contact persons mentioned below will have access to your data. They are responsible for ensuring that no information is lost, and that all information is kept strictly confidential throughout the project period – the data will be encrypted. In addition, all direct personal data in the project will be stored separately from the answers given in the survey.

What happens to your information when we end the research project?

The information is deleted when the project ends / the assignment is approved, which according to the plan is 30th September 2021.

Your rights

As long as you can be identified in the data material, you have the right to:

• access to which personal information is registered about you, and to receive a copy of
the information,
• have personal information about you corrected,
• to have personal information about you deleted, and
• send a complaint to the Data Inspectorate about the processing of your personal data.

What entitles us to process personal information about you?

We process information about you based on your consent.

On behalf of The Nordic Center for Internet & Society at BI Norwegian Business School, NSD - Norwegian Center for Research Data AS has assessed that the processing of personal data in this project is in accordance with the privacy regulations.

Where can I find out more?

If you have questions about the study or want to exercise your rights, please contact Professor Sut I Wong by email: sut.i.wong@bi.no or phone +47 46410723, or the master student Thea Kristine Bøe: Email: theaboe@hotmail.com // Telephone: +47 99489384

Sincerely,

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Appendix 2: The Remote Working Survey

Consent

I have received and understand the information about this project on effective home working and digital team functioning. I have had the opportunity to ask questions, I consent to:

Participating by answering the survey

That the administrators can provide information about me to the project That my personal information is kept until the end of the project

The first part consists of 21 statements about your level of engagement at work and how your leader communicates with you. Please read each statement carefully and try to answer as honestly as possible.

Following are some statements about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your work situation. If you have never had this feeling, choose "0" (zero). If you have had this feeling, indicate how often you feel it by choosing a number (from 1 to 6) that best describes how frequently you feel that way.

Engagement

1. At my work, I feel bursting with energy

(0) Never (1) Almost never (2) Sometimes (5) Very often (6) Always

2. At my job, I feel strong and vigorous

(0) Never (1) Almost never (2) Sometimes (5) Very often (6) Always

3. I am enthusiastic about my job

(0) Never (1) Almost never (2) Sometimes (5) Very often (6) Always

4. My job inspires me

(0) Never (1) Almost never (2) Sometimes (5) Very often (6) Always

5. When I get up in the morning, I feel like going to work

(0) Never (1) Almost never (2) Sometimes (5) Very often (6) Always

6. I feel happy when I am working intensely

(0) Never (1) Almost never (2) Sometimes (5) Very often (6) Always

7. I am proud of the work that I do

(0) Never (1) Almost never (2) Sometimes (5) Very often (6) Always

8. I am immersed in my work

(0) Never (1) Almost never (2) Sometimes (5) Very often (6) Always

9. I get carried away when I'm working

(0) Never (1) Almost never (2) Sometimes (5) Very often (6) Always

Demography

1. What is your age?
(open question)

2. What gender do you associate yourself with?
(1) Male (2) Female (3) Other

3. What is the highest degree or level of school you have completed?
(1) Middle school (2) High school (3) Associate's degree (4) Bachelor's degree (5) Master's degree (6) Doctorate's degree

4. How long have you been working in the company?
(1) Less than 1 year (2) 1-3 years (3) 3-5 years (4) 5-10 years (5) More than 10 years

5. What is your current employment status?
(1) Full-time (2) Part-time

6. What is your work domain (unit/department in the organization)?
(open question)

7. How long have you been working remotely at your current workplace?
(open question)

8. How long have you been working remotely?
(open question)

9. How long have you been working remotely with your current team?
(open question)

Appendix 3: The Remote Leadership Survey

Consent

I have received and understand the information about this project on effective home working and digital team functioning. I have had the opportunity to ask questions, I consent to:

Participating by answering the survey
That the administrators can provide information about me to the project
That my personal information is kept until the end of the project

This part contains 12 statements about how your social presence relates to your employees and how you communicate. Please read each statement carefully and decide if you ever feel this way about your work situation. If you have never had this feeling, cross the "0" (zero) in the space after the statement. If you have had this feeling, indicate how often you feel it by crossing the number (from 1 to 5) that best describes how frequently you feel that way.

Social Presence

1. My behavior affects my employee's behavior
(1) Strongly disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly agree
2. I help my employees when they need it
(1) Strongly disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly agree
3. I am aware of my employees in the virtual work environment.
(1) Strongly disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly agree
4. I easily relate to my employees' emotions
(1) Strongly disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly agree
5. I pay close attention to my employees
(1) Strongly disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly agree
6. I never ignore my employees
(1) Strongly disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly agree
7. I understand my employees
(1) Strongly disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly agree

Media richness

8. I communicate with my employees face to face

(1) Not at all (2) Little (3) Moderate (4) High (5) To a very great extent

89. I communicate with my employees through video-calls

(1) Not at all (2) Little (3) Moderate (4) High (5) To a very great extent

910. I communicate with my employees through email

(1) Not at all (2) Little (3) Moderate (4) High (5) To a very great extent

101. I communicate with my employees through phone

(1) Not at all (2) Little (3) Moderate (4) High (5) To a very great extent

112. I communicate with my employees through chat

(1) Not at all (2) Little (3) Moderate (4) High (5) To a very great extent

Demography

1. What is your age?
(open question)

2. What gender do you associate yourself with?
(1) Male (2) Female (3) Other

3. What is the highest degree or level of school you have completed?
(1) Middle school (2) High school (3) Associate's degree (4) Bachelor's degree (5) Master's degree (6) Doctorate's degree

4. How long have you been working in the company?
(1) Less than 1 year (2) 1-3 years (3) 3-5 years (4) 5-10 years (5) More than 10 years

5. What is your current employment status?
(1) Full-time (2) Part-time

6. What is your work domain (unit/department in the organization)?
(open question)

7. How long have you been working remotely at your current workplace?
(open question)

8. What is your level of supervisory responsibility?
(1) Team leader (2) First line supervisor (3) Manager (4) Executive (5) Senior Executive

9. How long have you been working remotely?
(open question)

10. How long have you been working remotely with your current team?
(open question)