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Introduction

Remote working has seen a steady rise since the beginning of widespread technology use at the end of the 20th century. The Covid-19 pandemic immensely amplified this trend. A global Gartner survey found that 88% of organizations incentivized or demanded from their employees to start working remotely during the first coronavirus outbreak (Baker, 2020). The increase of virtual work is gaining institutional recognition due to the necessity of ensuring adequate work-life balance. For example, a recent European Council directive (2019/1158) protects parents working remotely by requiring employers to justify rejecting alternate working mode requests. Advantages of remote work include reduction of costs related to providing office space, the ability to work from distant locations and thereby minimized costs of travelling to work (Schulze and Krumm, 2017). In addition, an increasing number of technological resources as well as employee abilities to utilize them autonomously, have contributed to the faster transition towards virtual work (Brotherton, 2012). It is therefore not surprising that more and more employers opt for telecommuting as a part of an efficient business model.

The change of working environment redefines the way employees perceive relationships with their managers and co-workers. In particular, delays and restrictions caused by technology have the potential to aggravate the depth of said relationships (Peters and Manz, 2007). Hence, it is safe to assume that employee communication becomes one of the most important factors when it comes to large-scale organizational changes (Dolphin, 2005), one of them being the transition to virtual collaboration. With emails, text messages, and video conferencing solutions increasingly replacing traditional face-to-face communication, managers could face challenges while trying to adjust messages to the context of a technological medium (Reinsch and Turner, 2016) and keep organizational activities running

smoothly, especially if all tasks are carried out online. Virtual collaboration can be equally challenging for employees and ways of coping with social isolation, which can affect remote work satisfaction (Toscano and Zappalà, 2020), especially if they are used to communicating with their supervisors and team members in a highly contextual physical environment. Acknowledging that virtual collaboration can be exigent for both employees and managers, and subsequently reflect on communication practices on different organizational levels, this study examines both vertical and horizontal dimensions of employee communication. The importance of vertical communication, otherwise known as strategic information provided by top management (Postmes et al, 2001), lies in its power to create and maintain good organizational structure, which consequently affects relationships with external stakeholders (Ozaeta and An, 2014). More recently recognized and researched by scholars is horizontal communication, which is used in informal everyday information exchange between employees working on the same level of the organizational hierarchy (Bartels et al, 2010; Postmes et al, 2001). Both levels of communication not only reflect the heterogeneity of the different roles within organizations, but they also facilitate different means of achieving specific communication goals, which are far from simple and one-dimensional.

Supportive and well-structured communication practices in organizations have been linked to numerous benefits, including employee engagement and job satisfaction (Kang and Sung, 2017; Saks, 2006; Walden et al, 2017), organizational identification and commitment (Bartels et al, 2010; Postmes et al, 2001; Welch and Jackson, 2007), and the feeling of togetherness among employees (Kegel et al, 2012; Palovac, 2020). However, the majority of organizational communication research concerns itself with traditional, face-to-face working environments. When it comes to collaborative virtual environments, communication has been researched predominantly concerning task-oriented outcomes such as job performance (Payne, 2005) or team effectiveness (Ziek and Smulowitz, 2014). Relational outcomes of

employee communication in virtual work settings, such as commitment, engagement and togetherness are lacking concrete theoretical description as well as empirical assessment. Indeed, social relationship establishment and maintenance is often neglected by the top management and supervisors in virtual teams (Purvanova and Bono, 2009). In that sense, there is a need for a comprehensive theoretical approach to the complex circumstances of maintaining employee relationships in hybrid or completely virtual contexts.

RQ: To what extent can relational goals of affective commitment, togetherness, and job engagement be fostered with virtual and horizontal communication in virtual environments?

The present study aims to address this question and contribute to the theoretical understanding of employee relationships in virtual environments as well as to deliver concrete and pragmatic implications to practitioners and those responsible for communication in organizations. Assuming that a lack of physical presence and interpersonal communication can have a profound impact on the intergroup relationship dynamics, it is examined how relevant vertical and horizontal levels of communication become for employees in a virtual context. In doing so, a mixed approach of social identity theory and social presence theory will be undertaken to gain a comprehensive understanding of the relevant predictors of relational goals in virtual environments. While social identity theory has so far been successfully utilized in explaining the relationship between individuals and social groups, including organizations (see Postmes, 2003), social presence theory has proven its usefulness in relationship-building processes through means of technology by leveraging communication resources and adapting them to mediated work environments (Biocca et al, 2003; Gunawardena, 1995). Integrating these two approaches may therefore provide insights as to which factors are necessary for quality employee relationships in the virtual context.

Literature Review

Social Identity Theory and Vertical Communication

Human social needs and tendencies to form and belong to groups is a phenomenon that attracted a lot of attention from social psychologists and scholars from other related disciplines. While there are various theories about intergroup relations and group identification, the work of Henri Tajfel remains one of the most influential approaches to studying social identity. He postulated that group identification, as a foundation of intergroup behavior, is dependent on a person's awareness of group membership and emotional connection of values to that membership (Tajfel, 1982). Emphasizing both the internal aspect of mutually shared values as well as the external aspect of self-differentiation from other groups, Hogg (2018) further defined the applicability of the theory to different types of groups: "Social groups, whether large demographic categories or small task-oriented teams, provide their members with a shared identity that prescribes and evaluates who they are, what they should believe and how they should behave." (p. 6)

Consequently, the social identity approach has been recognized by communication scholars. The focal point of interest seems to be the communication processes that have the potential to influence one's identification with their group and the possible outcomes of those processes (Postmes, 2003). In other words, social identity theory in organizational context posits that communication is the necessary factor in binding organizational structures and individuals and that social interactions are the key to addressing the gap between the two.

Previous research (Bartels et al, 2010; Postmes, 2003; Postmes et al, 2001) confirmed that different levels of communication carry different meanings to both internal stakeholders and organizational structures, hence they should be properly demarcated. The social identity approach helps to explain how individuals are exhorted to align their personal values with the

organizational values, which in turn leads to distinguishing the organization from others in terms of brand, image, reputation and identity among stakeholders (Argenti, 2009; Postmes, 2003), which would consequently encourage continuous effort in terms of keeping the organization successful. The result comes out to be twofold – boosting productivity and achievements within the organization and building relationships that can extend outside of a strictly working environment.

Vertical communication as a catalyst of strategic goals. Vertical internal communication sometimes referred to as internal corporate communication, can be defined as the “communication between an organization’s strategic managers and its internal stakeholders” (Welch and Jackson, 2007, p. 186) that aims to align organizational values with the values of its employees by emphasizing sharing common goals (Harkness, 2000; Smith and Mounter, 2008). In order to be perceived as credible, messages from the top management must be plausible, directions have to be unambiguous and clear, and communicated decisions aligned and consistent with what is being said to the staff (Whitworth, 2006). The success of change and stakeholder adaptation to it is highly dependent on internal communication (Hume and Leonard, 2014). Moreover, transparency in communication with employees is especially important when crisis and change are overlapping, as seen in the Covid-19 crisis. Since the uncontrollable spread of the virus introduced a change in the working environment for the majority of organizations, it is not surprising that providing timely and factual information together with communicating appreciation and encouraging participation can facilitate positive outcomes for organizations while on remote work arrangements (Einwiller et al., 2021).

Today’s workplace conditions, characterized by frequent changes, longer working hours, and bigger workloads require special attention from communication managers. In

particular, they have to keep in mind that what they are communicating, how they are communicating, and whether the messages are aligned with the organization's objectives. At the same time, communicated messages have to be appreciative of the staff as all of these factors impact employee's perceptions of the top management as well as their role within the organization (Argenti, 2009). Furthermore, top management has to take into account employee feedback, and employees should feel heard in the sense of being able to make suggestions or to raise concerns to their supervisors and managers (Constantin and Baias, 2015). Well-communicated messages between the management and internal stakeholders have been linked to increased job satisfaction (Adler et al, 2012) and better job performance (Kulachai et al, 2018). Therefore, shifting communication practices from reactive and inert to strategic should be a priority for all organizations, especially in times of increased virtual collaboration.

The effect of vertical communication on affective commitment. One of the most important goals of internal communication is commitment (Welch and Jackson, 2007), which can be generally described as an employee's loyalty to the company. According to the widely adopted Meyer and Allen (1997) classification, there are three types of commitment: (1) affective, where employees stay with the company because they feel positive about it and because they are emotionally attached to it; (2) continuance, which is present among employees who are opportunistically committed as leaving would introduce e.g. financial setbacks; and (3) normative, which refers to an obligatory feeling that employees associate with their organization, making them feel like staying is necessary. Relevant to this study is affective commitment because of because it represents the most desired type of commitment overall. It has also been linked to better job performance (Meyer et al, 1989), hence the managerial and practitioner interest should be focused on maximizing its level among staff. Using the social identity approach, Postmes et al (2001) found that better perception of

vertical communication positively predicts commitment. Another study by Bartels et al (2010) found a positive correlation between vertical communication and organizational identification, which is arguably a very similar concept to commitment. Therefore, it is assumed that a better perception of the communication from the top management will positively influence affective commitment.

H1: Employees who more positively evaluate vertical communication will have higher affective commitment.

Job engagement as the ultimate organizational goal. Kahn (1990) first coined the concept of personal engagement as the devotion to the performed work role in three ways – physically, emotionally, and cognitively. Another, more recent definition by Macey and Schneider (2008) describes engagement as an intuitive perception internal stakeholders have about work motivation, whereas Schaufeli et al. (2002) conceptualize it as “a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication, and absorption” (p. 74). Further narrowing the scope of what engagement is and what it is not, Shuck and Wollard (2009) highlight that the aforementioned state of mind is “directed toward desired organizational outcomes.” (p. 103)

Engagement is valuable not only for the functioning of an organization but also because it can be considered a crucial binding agent through which employees positively contribute to their organizations. Saks (2006) found that engagement can increase job satisfaction, whereas Albrech (2011) studied engagement outcomes and found positive correlations with staff well-being, productivity, higher levels of creativity and innovation, and better job performance. In a similar vein, Rich et al. (2010) found that engagement is a crucial factor of job performance.

This study draws upon the definition by Roberts and Davenport (2002) who specify that engagement should be delimited in terms of the performed job, thus the construct scope narrows to job engagement. They further accentuate that organizational commitment closely relates to job engagement, however, individuals can still be highly engaged in their job while not feeling committed to their organization (Roberts and Davenport, 2002). Indeed, previous studies have shown that those employees who have higher levels of commitment are more likely to be engaged in their work roles (Cesário and Chambel, 2017; Choi et al, 2015; Jung and Yoon, 2016; Liu, 2019). As indicated by the theory as well as empirical studies, the consistency between affective commitment and job engagement is giving grounds to hypothesize the relationship between the two.

H2: Higher affective commitment increases job engagement.

When deciding on what to communicate to the staff, top management usually plans around increasing or maintaining job engagement. Job engagement can be considered a direct goal achievable by a means of transparent participatory communication as well as timely and accurate information updates on the organizational processes. In the literature, effective and positive vertical communication practices have been directly linked to increased job engagement (Karanges et al, 2015; Verčič, 2021; Walden et al, 2017). Extending previous findings to a virtual working environment context, a more positive perception of vertical communication can lead to higher job engagement as the workforce can be highly dependent on the top management's information as a valuable resource while not working in the office (Altınöz, 2009). Hence, an additional hypothesis directly connecting vertical communication and job engagement is postulated.

H3: Employees who more positively evaluate vertical communication will have higher job engagement.

Social Presence Theory and Horizontal Communication

Relative to interpersonal communication, communicating virtually requires additional efforts in establishing and maintaining employee relationships. While face-to-face (FTF) communication allows for physical presence and relationship development, social presence theory has been developed as a response to the challenges imposed by an increasingly mediated communication environment. Social presence can be defined as “the degree to which a person is perceived as a “real person” in mediated communication.” (Gunawardena, 1995, p. 151)

The initial, widely accepted notion of social presence was carried by Short et al. (1976) who defined it as an affordance of a medium that determines the degree of immediacy and intimacy, achieved through both verbal and non-verbal cues. Consequently, these two arguments are (1) immediacy, meaning the proximity of nonverbal interaction, and (2) intimacy, which relates to closeness as a byproduct of nonverbal cues (Cui et al, 2013). Acknowledging the transformative mediating impact technology has on immediacy and intimacy, social presence theory seeks to make sense of “how differences in technological connection, representations, and mediated access affect, distort, or enhance the perception (mental model) of others’ intentional, cognitive, and affective states and behavior resulting from those perceptions.” (Biocca et al., 2003, p. 473) Following that, the social presence approach allows understanding how work interfaces affect communication processes. Moreover, it sheds light on the effects of the changing communication environment as a relational property (Sarker et al., 2011).

Horizontal communication as a determinant of intergroup relations. Teams that have a high degree of virtual collaboration can be characterized as virtual teams (Hertel et al, 2006). In that sense, employees who work in hybrid or completely remote conditions on tasks that

are fulfilled predominantly out of office can be classified as remote employees, and their collaboration with colleagues can be described as virtual. Comparing FTF and virtual working environments revealed that the former condition had significantly higher levels of intellectual stimulation and individual consideration, whereas transformational leadership skills were more prominent in the latter condition (Purvanova and Bono, 2009). It is clear that supervisors and employees working remotely or in hybrid environments need to possess advanced communication skills (Ziek and Smulowitz, 2014). What is not so clear is how exactly these skills reflect on relationships in virtual environments and to what extent are communication factors relevant in improving relationships when there is a lack of FTF interaction.

Horizontal communication refers to employee interaction regarding both task-related information as well as informal topics not related to work. The most prominent characteristic that separates horizontal from vertical communication is the hierarchical sameness of the communicators (Postmes et al, 2001). In other words, horizontal communication manifests itself in day-to-day activities among staff who work in the same teams and who share similar responsibilities. When group members share a common goal, they are more likely to show coherence, whereas competitiveness and conflict are reduced (Hogg, 2018). By communicating both informally and formally about daily tasks and projects, employees create a feeling of belongingness to that group (Postmes, 2003). Moreover, video-conferencing and audio-conferencing systems enable frequent and open communication, similar to physical environments (Sallnas, 2005) and can therefore be an effective auxiliary tool in facilitating social presence in employee relationships.

Togetherness in virtual teams. When it comes to smaller group relationship establishment and maintenance, the concept of togetherness becomes relevant due to its

cohesive power in collectives. It closely relates to the “feeling of belongingness to a group and to the feeling that one wants to remain a member of this group.” (Van Oers and Hannikainen, 2001, p. 102) Togetherness in the work context can be described as the extent of mutual understanding and core value sharing among team members (Palovac, 2020). One of the most important characteristics of togetherness is the production of content, culture, and relationships in people’s social interactions (Bakardjieva, 2003). This systematic production helps team members to make sense of their position within the group and their contribution to its values. One of the implications of togetherness is continuation of common activities even when problems and conflicts arise as the group continuously settles them (Van Oers and Hannikainen, 2001).

Horizontal communication facilitated through appropriate technological tools can determine the dynamic of relationships in work teams (Sarker et al., 2011) and induce feelings of togetherness. Because the employees closely work together, there is a greater sense of immediacy, which encourages active contribution in the shape of feedback and informal communication (Durlach and Slater, 2000). Exchanging information by a means of video and web-conferencing systems can ensure quality horizontal communication and thereby, a mode of enhancing employee togetherness and reducing social isolation (Hacker et al, 2020). Kegel et al. (2012) emphasize how peer-level communication reinforced by high-resolution video conferencing closely resembles an actual physical environment where technology-related disturbances are not present. This way, seeing and communicating with colleagues enables compensation of non-verbal communication, critical for relationship building (Hudcova, 2014). Following these findings, it is hypothesized that a better perception of horizontal communication within virtual teams induces a greater sense of togetherness among employees.

H4: Employees who more positively evaluate horizontal communication will have a stronger sense of togetherness.

An advantage of virtual collaboration in organizations is the opportunity for geographically scattered groups to equally participate in the process of making decisions (Bordia, 1997). This implies that togetherness within groups, facilitated by equality in participation, can be a beneficial factor in boosting job engagement. Furthermore, there is evidence that social support from colleagues on the same hierarchical level can contribute to employees being more engaged in their work roles (Leiter and Bakker, 2010). Mutual understanding, support, and cooperativeness may motivate employees to work towards group achievements and thereby stimulate job engagement. Therefore, it is assumed that job engagement is positively influenced by the feeling of togetherness.

H5: Stronger sense of togetherness increases job engagement.

Horizontal communication can be considered a crucial aspect of facilitating cooperation in smaller groups (Levine and Moreland, 1990). Mindful choice of communication tools and methods can reduce confusion and uncertainty that aggravate performative and relational outcomes in organizations (Thompson and Coover, 2003). Subsequently, communication in virtual teams is one of the key factors in driving job engagement (Shaik and Makhecha, 2019). Better collaboration in virtual teams, cultivated by both skilful team leaders as well as involved employees, can foster greater job engagement (Panteli et al., 2019). This reasoning provides evidence to assume that job engagement, as a multifaceted construct, can be predicted by a multitude of factors, including horizontal communication. Extending past well-established theoretical framework that engagement is dependent on vertical exchange with supervisors and top management, this study incorporates

the horizontal dimension of communication as another predictor of job engagement in virtual environments. Pertaining to this reasoning, the following hypothesis is presented:

H6: Employees who more positively evaluate horizontal communication will have higher job engagement.

The proposed relational model of virtual collaboration is depicted in Figure 1. Following the proposed hypotheses, this model will be tested and empirically evaluated next.

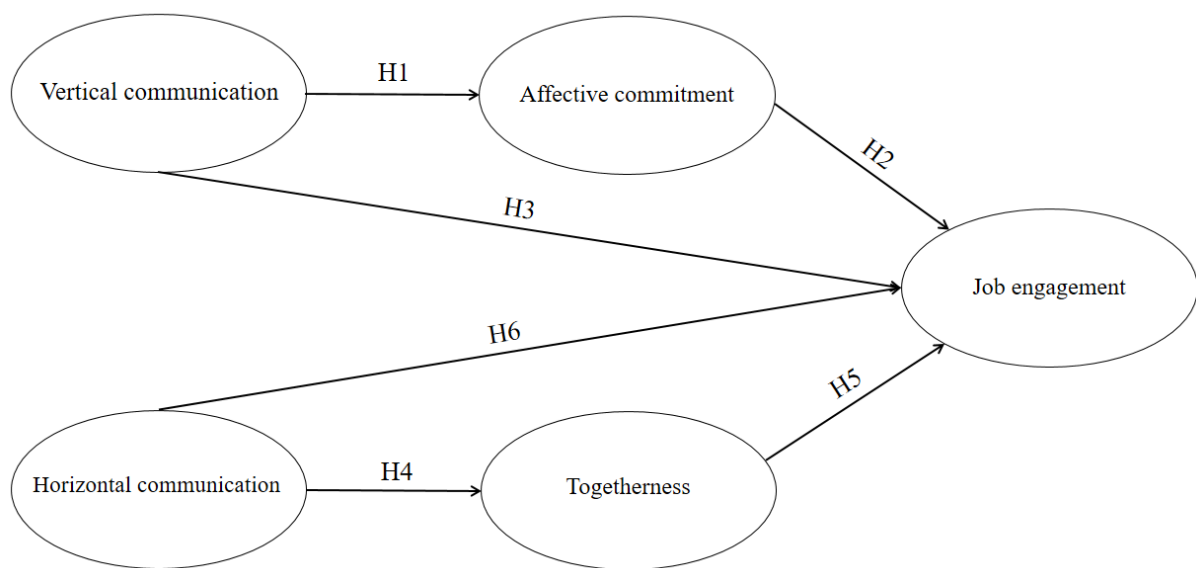


Figure 1. Nomological model

Method

An online survey was administered to the staff at the United Nations Office in Vienna (UNOV) and the United Nations Office on Drugs and Crime (UNODC) from May 20, 2021, to June 7, 2021. A post with the direct link to the survey was distributed via the Microsoft Teams UNOV-UNODC Human Resources channel among 4145 employees. The criterion for participation was telecommuting at a cutoff point of at least 50 percent of the working time. In total, 155 employees returned the survey, which is a response rate of approximately 3.7%. After data cleaning, a sample size of 114 respondents was obtained for data analysis. Full

anonymity and confidentiality of the provided information were explicitly stated to the participants in accordance with ethical recommendations by Trochim et al. (2016). Furthermore, informed consent was obtained from participants before proceeding with the questionnaire.

Sample

The sample consisted of 60.9% females and the mean age of respondents was 41.8 years ($SD = 9.5$). The majority of employees (69.6%) were affiliated with the Headquarters duty station in Vienna, Austria, while the rest served in field offices. Organizational tenure was 8.9 years on average ($SD = 8.6$), with 21.1% being employed with the organization for one year or less, 27.1% one to five years, 20.2% five to ten years, 19.3% ten to twenty years, 11.4% twenty to thirty years, and 0.9% more than thirty years. A position with managerial responsibility was held by 40% of respondents. On average, 76.9% of the working time was spent working remotely by the employees over the period of twelve months, from May 2020 to May 2021.

Measurements

Aside from togetherness, all the measurements were taken from previous well-established scales and adapted to the context of remote work. The two dimensions of communication, horizontal and vertical, were adapted from Bartels et al. (2010). The answers were measured on a 7-point Likert scale and ranged from 1 (strongly disagree) to 7 (strongly agree). Vertical communication was measured with six items divided into two sub-dimensions, namely “participatory decision-making” and “satisfaction with the communication from top management”, while horizontal communication was measured with additional six items belonging to two another sub-dimensions: “daily routines” and “openness and honesty”. Some items were reworded to the context of remote work, e.g. “My colleagues

and I are encouraged to participate in making important decisions” to which “despite our (current) remote status” was added, or “My opinion makes a difference in the everyday decisions that affect my job” to which “Although I work remotely” was added (Table 1). Affective commitment was measured using the Einwiller et al. (2021) adaptation of the Allen and Meyer (1990) scale. The measurement consisted of five items with those negatively worded being transformed into affirmative statements to avoid a two-factor solution (Merritt, 2012). The responses were measured on a 7-point Likert scale, from 1 (strongly disagree) to 7 (strongly agree). Since an established scale for togetherness has not been found in the literature, one was constructed for the purpose of this study. It consisted of four items measured on a 7-point Likert scale, from 1 (strongly disagree) to 7 (strongly agree). Job engagement was measured using the “job engagement” sub-dimension from the engagement scale by Saks (2006). The responses were recorded on a 7-point Likert scale ranging from 1 (never) to 7 (always). Additional information on the item wordings and reliability measures can be found in Table 1, while the full questionnaire structure can be found in Appendix A.

Data Analysis

Raw data was cleaned and descriptive statistics were obtained in SPSS v.21. Following that, data was analyzed using the maximum likelihood estimation in the structural equation modelling program AMOS v.26. The advantages of structural equation models include the ability to model multivariate relations with latent and observed variables as well as to provide estimates of error variances (Byrne, 2010). Data analysis was carried out in two steps as described in Anderson and Gerbing (1988): firstly, the measurement model with confirmatory factor analysis was specified, and secondly, a structural model based on theoretical assumptions was established. This allowed for hypothesis testing as well as the assessment of indirect effects.

Constructs, Sub-Dimensions, and Items	SL	α	CR	AVE
<i>Vertical communication</i>		0.91	0.92	0.80
<i>Satisfaction with the communication from top management</i>				
Information I get from my supervisor(s) is reliable.	0.91			
I think my supervisor(s) tell the truth.	0.94			
I am satisfied with the explanations of made decisions provided by my supervisor(s).	0.83			
<i>Participatory decision-making</i>				
My colleagues and I are encouraged to participate in making important decisions despite our (current) remote status.	deleted			
I am consulted before my supervisor(s) take any major decisions that fall under my responsibility.	deleted			
Although I work remotely, my opinion makes a difference in the everyday decisions that affect my job.	deleted			
<i>Horizontal communication</i>		0.94	0.94	0.83
<i>Daily routines</i> – Overall, the colleagues I collaborate with...				
...are honest to each other.	deleted			
...are open to each other.	deleted			
...are open to the opinions of others.	deleted			
<i>Openness and honesty</i> – I chat with my colleagues about...				
...daily routines unrelated to our work.	0.90			
...developments in our field.	0.94			
...things happening at our organization.	0.90			
<i>Affective commitment</i>		0.94	0.94	0.74
I feel a strong sense of belonging to my organization.	0.83			
I feel emotionally attached to this organization.	0.88			
This organization has a great deal of personal meaning for me.	0.91			
I would be very happy to spend the rest of my career with this organization.	0.90			
I really feel as if this organization's problems are my own.	0.78			

(continued) Constructs, Sub-Dimensions, and Items	SL	α	CR	AVE
<i>Togetherness</i>		0.89	0.90	0.75
I feel comfortable with the colleagues in my team.	0.92			
I am happy to help my teammates, even when things go wrong.	deleted			
When working with my colleagues, I feel a strong sense of togetherness.	0.92			
There are people in this organization who really understand me.	0.74			
<i>Job engagement</i>		0.91	0.91	0.78
At the moment, I really ‘throw’ myself into my job.	0.84			
I am totally into my job.	0.92			
I am highly engaged in this job.	0.88			
Sometimes I am so into my job that I lose track of time.	deleted			

Table 1. Item wordings and construct measures. *Note:* SL = standardized loading; α = Cronbach's alpha; CR = composite reliability; AVE = average variance extracted.

The goodness of fit estimation was done using several indicators, specifically the χ^2 (Chi-square) goodness of fit test, comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) (see Bentler and Bonett, 1980; Bentler, 1990). Cutoff criteria for the indices were based on Hu and Bentler (1999), wherein order to have a good model fit, values have to be close to .95 for CFI and TLI, close to .06 for RMSEA, and close to .08 for SRMR. Additionally, Akaike Information Criterion (AIC) was examined in model comparison, where a lower value indicates a better model fit (Anderson et al., 1998).

Results

Measurement Model

A measurement model was set up where all latent variables were allowed to correlate with one another (Appendix B). Composite reliability and discriminant validity were ensured by using the Fornell-Larcker criterion (Fornell and Larcker, 1981). The items that did not satisfy the ideal factor loading threshold of 0.7 (Chin, 1998) were removed to reveal a good model fit ($\chi^2 = 173.936$, $p < .001$, $df = 108$; CFI = 0.964; TLI = 0.954; RMSEA = 0.074 [90% CI: 0.053, 0.093]; SRMR = 0.050), as displayed in Table 3. As demonstrated in Table 1, all constructs had acceptable levels of Cronbach's alpha, ranging from 0.89 to 0.94, whereas composite reliabilities ranged from 0.90 to 0.94. The convergent validity scores, indicated by the value of average variance extracted (AVE), satisfied the threshold of 0.50 (Hair et al., 2009) and ranged from 0.70 to 0.83. As seen in Table 2, all of the correlations between the constructs are smaller than the square root values of AVE, which indicates proper discriminant validity of the measurement model. After establishing the measurement model with acceptable goodness of fit indices, it was proceeded with the evaluation of the hypothesized structural model.

	<i>M</i>	<i>SD</i>	(1)	(2)	(3)	(4)	(5)
(1) Vertical communication	5.77	1.40	<i>0.89</i>				
(2) Horizontal communication	5.23	1.37	0.42	<i>0.91</i>			
(3) Affective commitment	5.16	1.71	0.56	0.40	<i>0.86</i>		
(4) Togetherness	5.57	1.40	0.63	0.65	0.76	<i>0.86</i>	
(5) Job engagement	5.77	1.24	0.48	0.54	0.67	0.65	<i>0.88</i>

Table 2. Means, standard deviations, discriminant validity values (square root of AVE) displayed diagonally and italicized, construct correlations displayed below the diagonal. *Note:* all correlations are significant at $p < .001$ level

Structural Model

A measurement model with good fit provided grounds for establishing a structural model based on the theoretical assumptions. The model was specified as follows: job engagement as a latent variable was predicted by four other latent variables, namely vertical communication, horizontal communication, affective commitment, and togetherness. Additionally, affective commitment was predicted by vertical communication and togetherness was predicted by horizontal communication. Tenure with the organization and gender were included as control variables in the model. Model specification details can be found in Appendix C.

Model	χ^2	<i>df</i>	CFI	TLI	RMSEA	SRMR	AIC
Measurement model	173.936***	108	0.964	0.954	0.074 [90% CI: 0.053, 0.093]	0.050	327.828
Hypothesized model	277.940***	135	0.922	0.901	0.097 [90% CI: 0.081, 0.113]	0.156	387.940
Alternative model	207.653***	132	0.959	0.946	0.071 [90% CI: 0.052, 0.089]	0.046	323.653

Table 3. Goodness of fit measures for the three tested models. *Note:* *** $p < .001$

The analysis revealed poor model fit to the data, as displayed in Table 3 ($\chi^2 = 277.940$, $p < .001$, $df = 135$; CFI = 0.922; TLI = 0.901; RMSEA = 0.097 [90% CI: 0.081, 0.113]; SRMR = 0.156; AIC = 387.940). Four out of six hypothesized relationships were statistically significant at minimal $p < .05$ level. Hypothesized relationships between vertical communication and affective commitment, affective commitment and job engagement, and horizontal communication and togetherness were statistically significant at the $p < .001$ level, whereas the relationship between horizontal communication and job engagement was significant at the $p < .05$ level.

To obtain a better model fit, an alternative model was tested after two modification indices recommendations. Here, additional three paths were drawn, one from vertical communication to togetherness, one from affective commitment to togetherness, and one from horizontal communication to affective commitment (Appendix D). The model showed a satisfactory fit to the data ($\chi^2 = 207.653$, $p < .001$, $df = 132$; CFI = 0.959; TLI = 0.946; RMSEA = 0.071 [90% CI: 0.052, 0.089]; SRMR = 0.046, AIC = 323.653) as well as fit improvement compared to the original structural model, as indicated by the lower AIC value (Table 3). The three added regression paths were statistically significant with the path from vertical communication to togetherness reaching $p < .05$ level, the path from affective commitment to togetherness reaching $p < .001$ level, and the path from vertical communication to togetherness reaching $p < .05$ level. This model, displayed in Figure 2, was kept for hypothesis testing.

Hypotheses Testing

In support of H1, vertical communication positively predicted affective commitment ($\beta = 0.51$, $p < .001$). As postulated in H2, affective commitment positively predicted job engagement ($\beta = 0.43$, $p < .01$). However, the hypothesized effect of vertical communication on job engagement did not reach statistical significance and was barely detectable ($\beta = -0.004$, $p = .972$), thereby lacking support for H3. As predicted in H4, horizontal communication had a positive effect on togetherness ($\beta = 0.37$, $p < .001$), however, no support was found for H5 as the data indicated that togetherness did not significantly predict job engagement ($\beta = 0.20$, $p = .236$). Finally, supporting H6, horizontal communication was found to significantly predict job engagement ($\beta = 0.22$, $p < .05$). All the hypothesized relationships are shown in Figure 2.

Additionally testing non-hypothesized effects, it was found that vertical communication significantly predicted togetherness ($\beta = 0.20, p < .05$). Furthermore, affective commitment significantly predicted togetherness ($\beta = 0.50, p < .001$). Horizontal communication had a positive effect on affective commitment ($\beta = 0.21, p < .05$). Vertical communication and horizontal communication jointly accounted for $R^2 = .42$ of explained variance in affective commitment. For togetherness, the explained variance was $R^2 = .74$, as accounted by horizontal communication, vertical communication, and affective commitment together. Finally, affective commitment and horizontal communication accounted for $R^2 = .56$ of explained variance in job engagement.

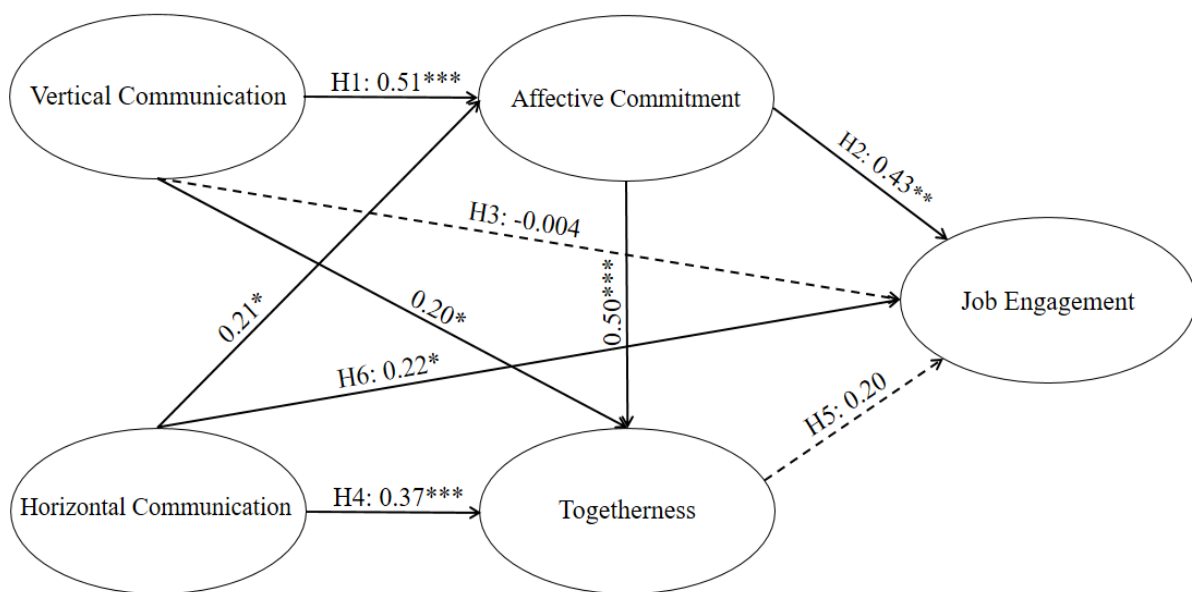


Figure 2. Alternative structural model. The effects of organizational tenure and gender were controlled. Goodness of fit indices: $\chi^2 = 207.653$ [$p < .001$]; $df = 132$; CFI = 0.959; TLI = 0.946; RMSEA = 0.071 [90% CI: 0.052, 0.089]; SRMR = 0.046. Note: *** $p < .001$; ** $p < .01$; * $p < .05$

To estimate indirect effects, a Monte Carlo parametric bootstrapping procedure based on $N = 2000$ resamples was carried out with confidence intervals being set to 95%. The indirect effect of vertical communication on togetherness was statistically significant ($\beta =$

0.25, $p < .01$, 95% CI [0.146, 0.384]). Vertical communication was also found to indirectly affect job engagement ($\beta = 0.31$, $p < .01$, 95% CI [0.165, 0.500]). Horizontal communication was found to have an indirect effect on job engagement ($\beta = 0.18$, $p < .05$, 95% CI [0.008, 0.349]) as well as on togetherness ($\beta = 0.11$, $p < .05$, 95% CI [0.015, 0.202]). However, the indirect effect of affective commitment on job engagement was not statistically significant ($\beta = 0.10$, $p = .281$, 95% CI [-0.090, 0.299]).

Discussion

The present study examined relationships between communication at different organizational levels and the relational outcomes of such practices. The findings confirm that communication coming from managers has an effect on employees' affective commitment as well as that communication within the working unit affects the feeling of togetherness. Extended from classic organizational research to mediated virtual environments, the results verify the consistency of social interactions, social presence and group identification, which is in line with both social identity theory (Hogg, 2018) as well as social presence theory (Gunawardena, 1995; Wiesenfeld et al., 1999). This demonstrates that supportive communication, reinforced by appreciation and participation, has the potential to affect workplace relations outside of traditional physical workplace. One could argue that mediated communication has a greater significance in virtual environments depleted from context and non-verbal cues (Hudcova, 2014), thereby emphasizing the continuation of dialogue as the foundation of mutual understanding and value sharing (Tan et al., 2000). In that sense, striving for symmetrical communication where employees feel appreciated, well-informed and represented, can greatly facilitate relational goals in virtual work settings and therefore minimize negative outcomes of transitioning to solitude, such as social and organizational isolation (Even, 2020).

Testing direct relationships between communication dimensions and job engagement revealed conflicting findings. While horizontal communication is a significant predictor of job engagement, the effect of vertical communication on job engagement is not only insignificant but practically non-existent. This is inconsistent with previous research on key communication drivers of job engagement (Karanges et al., 2015; Welch, 2011). A possible explanation could lie in the changed priorities in virtual settings, where team leaders represent the forefront of motivating and supporting their groups (Hunsaker and Hunsaker, 2008), thereby directly influencing job engagement. Furthermore, while remote workers can potentially connect themselves to their work roles, they might not have met the top management in a two-way interaction, detaching them from the management's messages. This explanation becomes increasingly applicable as the size of an organization grows. The United Nations, as one of the largest intergovernmental organizations, has more than 37 thousand employees worldwide (United Nations, 2020) and a complex organizational structure. The propositions of virtual collaboration success, including inclusive and participatory leadership as well as rewards and recognition (Derven, 2016), could be strenuous to apply on a more individual level when dealing with a substantial workforce.

Data further revealed that job engagement is significantly predicted by affective commitment. Consistent with previous research (Choi et al, 2015; Liu, 2019; Poon, 2013), it is clear that committed employees continue to be engaged in their jobs in virtual settings. Job engagement is vital for the functioning of any organization (Saks, 2006), hence it should be prioritized by the management, especially when employees are not physically present. Having in mind that various external factors can affect job engagement in virtual environments, such as personality traits (Albrecht and Marty, 2020) it is important that the organization continuously promotes job engagement by supporting employees' careers and acknowledges collective and individual efforts (Poon, 2013) to not only increase job engagement through

affective commitment but also to minimize the risks of disengagement which can negatively affect employees' mental health, productivity, and turnover rates (Wollard, 2011). As this study showed that horizontal communication also predicts job engagement in virtual environments, organizations should make sure telecommuters are able to collaborate effectively and that conflicts can be transparently solved within and between separate teams.

The unique contribution of this study lies in its novel application of togetherness as an important relational resource in virtual collaboration. A couple of interesting findings have been revealed here. Firstly, the data indicates that vertical communication positively predicts togetherness. This demonstrates how different levels of communication can be intertwined in facilitating relational goals and therefore, a holistic communication approach is needed to ensure virtual teams have the highest levels of cooperation and productivity (Prasad and Akhilesh, 2002). Secondly, togetherness is strongly predicted by affective commitment. In other words, the more employees identify with their organization, the more they will feel a sense of belongingness to their team. It can be argued that organizations as collectives represent a certain social context. Being embedded in that social context creates values and meaning for everyone involved, prompting them to individually contribute to producing standards of desirable behavior (Procentese et al., 2019). The social context of an organization, reinforced by communicating common goals and values, can therefore result in the translation of affective commitment into stronger adherence to a workgroup, especially if individual goals and beliefs become aligned with the ones of an organization and team. This is also consistent with social identity theory, as shared identity by the ones working within the same organization can contribute to collaborative behaviors with emotional significance to the group membership (Hogg, 2018; Postmes, 2003). Finally, though hypothesized, togetherness is not a significant predictor of job engagement. This is somewhat surprising considering that horizontal communication predicts both job engagement and togetherness. It can be

extrapolated that togetherness may be a necessary, but not sufficient prerequisite for job engagement. In other words, employees might have strong interpersonal relationships and feel affectionate towards the working team, but this does not seem to change concrete behavior, although a significant part of virtual collaboration is task-related. Nevertheless, this study provided useful insights regarding antecedents of togetherness in virtual environments, as indicated by the high explained variance (74%) by the proposed model.

Looking at the strength of the relationships, a couple of interesting conclusions can be inferred. Vertical and horizontal communication both predict affective commitment, but vertical communication is a stronger predictor. In that regard, this study replicated findings by Postmes et al. (2001). This indicates that the management's messages have the power to engage employees in the organization's goals and values both in physical and virtual environments. Togetherness is more strongly predicted by affective commitment than horizontal communication, whereas job engagement is predicted by affective commitment and horizontal communication, but not by vertical communication and togetherness. As indicated by the social presence theory, relationships in virtual settings are subject to change, depending on the technology adoption and utilization (Sallnas, 2005). This is especially true for communication practices in times of an increasingly fast transition to virtual collaboration since timely and accurate information provision can facilitate change (Klein, 1996). Therefore, it is evident that virtual environments alone have the potential to disrupt and redefine how employees perceive their relationships with organizations and colleagues.

Practical Implications

Undeniably, virtual collaboration is increasingly implemented by organizations whenever possible and there is no doubt that this type of working arrangement will prevail in the future. This study contributes to the relatively scarcely researched field of employee

communications in virtual environments and therefore can provide guidance to both managers and employees in effectively facilitating relationship establishment. Although telecommuters are much more closely collaborating with close colleagues within teams, top management should not neglect the transformative power of vertical communication in keeping the organization's members emotionally invested and engaged in their job. It has been argued that in virtual settings, identification with the organization becomes the "organizational glue" (Wiesenfeld et al., 1999, p. 788) that keeps employees committed. This implies that organizations can benefit from placing values on developing trust, appreciating employees' efforts, and making members feel heard and represented (Mayfield and Mayfield, 2002). Therefore, specific teams must be considered as the extension of organizational culture on an operational level rather than separate closed units independent from distant top management's messages.

It should be noted that organizational relationships are formed based on the common production of meaning (Sluss and Ashforth, 2007), of which a great part is initiated by communication. In that sense, emphasizing individual achievements in the context of successful collaboration and contribution to the team's success is a recommended strategy to keep the team members aware of how their individuality helps to create a better collaborative environment. Furthermore, encouraging equal participation and informal conversation within teams can be a powerful resource for team leaders to implement in order to both increase collective productivity and job engagement as well as coherence, unity, and togetherness.

Limitations and Future Research

Several limitations have to be acknowledged when interpreting the findings of this research. The sample size used for the data analysis is relatively small. Structural equation models generally require greater sample sizes (Byrne, 2010), which could have influenced the

statistical power of this study. Moreover, the collected data are representative of the United Nations Office in Vienna and the United Nations Office on Drugs and Crime, hence the findings need to be interpreted with caution in relation to generalizability to organizations of different sizes and functions. Another limitation could be the self-reported measures, introducing the possibility of socially desirable responses and misjudgments that diverge from the described constructs.

Two moderators intended to be examined in the study had to be discarded due to the low variability reflected in their measured variables: computer-mediated communication (CMC) competence (Spitzberg, 2006) and video conferencing frequency. As it turned out, the staff had reported exceptionally high levels of both constructs, which eliminated the possibility to examine the potential moderating technology-related impact on the effect of communication perceptions. Having studied these constructs one year into remote working arrangements, it is possible that daily mediated communication in combination with staff trainings contributed to the employees' abilities to effectively use resources in virtual environments. However, this is only a speculative interpretation of the observable occurrences which could only be confirmed with a longitudinal study extending for more than several weeks.

Future studies could also focus on the specific outlets of employee communication, as indicated by Welch (2012). This could reveal how each channel, e.g. newsletter, internal publications, podcasts, or webcasts influence relationships in a virtual context. Finally, future research should consider other relevant factors of group identification emerging from communication practices in organizations. Togetherness and its performative outcomes represent a plausible phenomenon to further examine in organizational research, especially

across different working arrangements. In that sense, experimental research could contribute to a more robust understanding of antecedents and consequences of virtual group coherence.

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Appendices

Appendix A – Questionnaire Structure

1. Welcome page

Welcome!

Thank you very much for your interest in the survey “Employee communication in times of virtual collaboration”, which is part of a research project at the University of Vienna’s Department of Communication.

Due to the ongoing worldwide pandemic, many people are still required to work from home. This mode of working can have a substantial impact on the collaboration with colleagues, both in everyday tasks and informal communication. Considering these changes, this research project aims to find out how employees feel about communicating by means of technology while working remotely.

2. Informed consent

Before you start the questionnaire, please read the following information.

- For participating in this survey you should have worked from home at least 50 per cent of the time since the beginning of the Covid-19 pandemic.
- Answering the questions takes around 10 minutes.
- Participation is voluntary and you can refuse to participate or quit the survey any time without providing the reason for doing so.

- All data will be processed anonymously. This is why it will not be possible to provide you with your personal results after you have completed the survey.
- Your information will only be used for scientific purposes.

If you are interested in the overall research findings, you can contact study author. For other questions of legal nature, please contact the [Data Protection Officer of the University of Vienna](#).

By answering “I agree” below, you declare that you have been properly informed about the conditions of this research, and that you fully and voluntarily agree to take this survey.

☐ I agree

3. Horizontal communication assessment

To start, we are interested in your assessment of the communication with your colleagues during the time you spent working remotely since the beginning of the pandemic. Kindly use the scale below to rate the degree to which you agree to the following statements. There is no right or wrong answer; only your personal perception counts.

Openness and honesty: In general, the colleagues I collaborate with are...

...honest to each other. / ...open to each other. / ...are open to opinions of others.

Daily routines: I chat with my colleagues...

...about daily routines unrelated to our work. / ...about developments in our field. / ...about things happening at our organization.

4. Vertical communication assessment

Participatory decision-making: Next, please provide your assessment of your supervisor communication practices during the time you spent working from home.

My colleagues and I are encouraged to participate in making important decisions despite our (current) remote status. /I am consulted before my supervisor(s) take any major decisions that fall under my responsibility. /Although I work remotely, my opinion makes a difference in the everyday decisions that affect my job.

Satisfaction with the communication from top management: When it comes to my supervisor(s)...

...the information I receive from them is reliable. /...I think they tell the truth. /...I am satisfied with their explanations on the made decisions.

5. Computer-mediated communication (CMC) competence

Next, we are interested in how comfortable you are with using online communication tools while working remotely. Kindly use the scale from “never” to “always” to rate the degree to which each statement applies to you.

Efficacy: When introduced to new work-related platforms and/or intranet features, I feel very competent in learning how to use them. /I feel completely capable of using our organization’s current online platforms. /I quickly figure out how to use our organization’s newly introduced online platforms, even if they are not user friendly.

Motivation: When it comes to communicating with my colleagues online...

I enjoy using our organization’s provided platforms. /I feel motivated to use our organization’s provided platforms. / I look forward to use our organization’s provided platforms.

Knowledge: When it comes to our organization's online platforms...

I always seem to know how to say things the way I mean when communicating through them.

/I am familiar with how to use and communicate through them. /I know how to adapt my messages to the medium I am communicating through.

5. Affective commitment

Thank you for the input that you have provided us so far! The following statements aim to find out how you feel about your organization while working remotely. Please try to rate the statements as spontaneously as possible.

I feel a strong sense of belonging to my organization. /I feel emotionally attached to this organization. /This organization has a great deal of personal meaning for me. /I would be very happy to spend the rest of my career with this organization. /I really feel as if this organization's problems are my own.

6. Togetherness

The following statements concern your thoughts about the team or people from your department you closely collaborate with while working remotely. Keep in mind that your answers remain completely anonymous.

I feel comfortable with the colleagues in my team. /I am happy to help my teammates, even when things go wrong. /When working with my colleagues, I feel a strong sense of togetherness. /There are people in this organization who really understand me.

7. Job engagement

Next, we are interested in how you experience your job while working remotely. Kindly use the scale from “never” to “always” to rate the degree to which each statement applies to you.

At the moment, I really ‘throw’ myself into my job. /I am totally into my job. /I am highly engaged in this job. / Sometimes I am so into my job that I lose track of time.

8. Demographics

Almost done! The last questions concern some additional information as well as demographics. Please answer them as individually instructed.

Video conferencing frequency: How often do you have video conferences/meetings with your colleagues on average?

never /once or twice per year /once every couple of months /once to twice every month /once a week /several times a week /every day or multiple times a day

Do you have managerial responsibilities? yes/no

For how many years have you been working for the organization? (E.g. 2.5 years)

Please indicate the gender you identify with. female /male /non-binary /prefer not to say

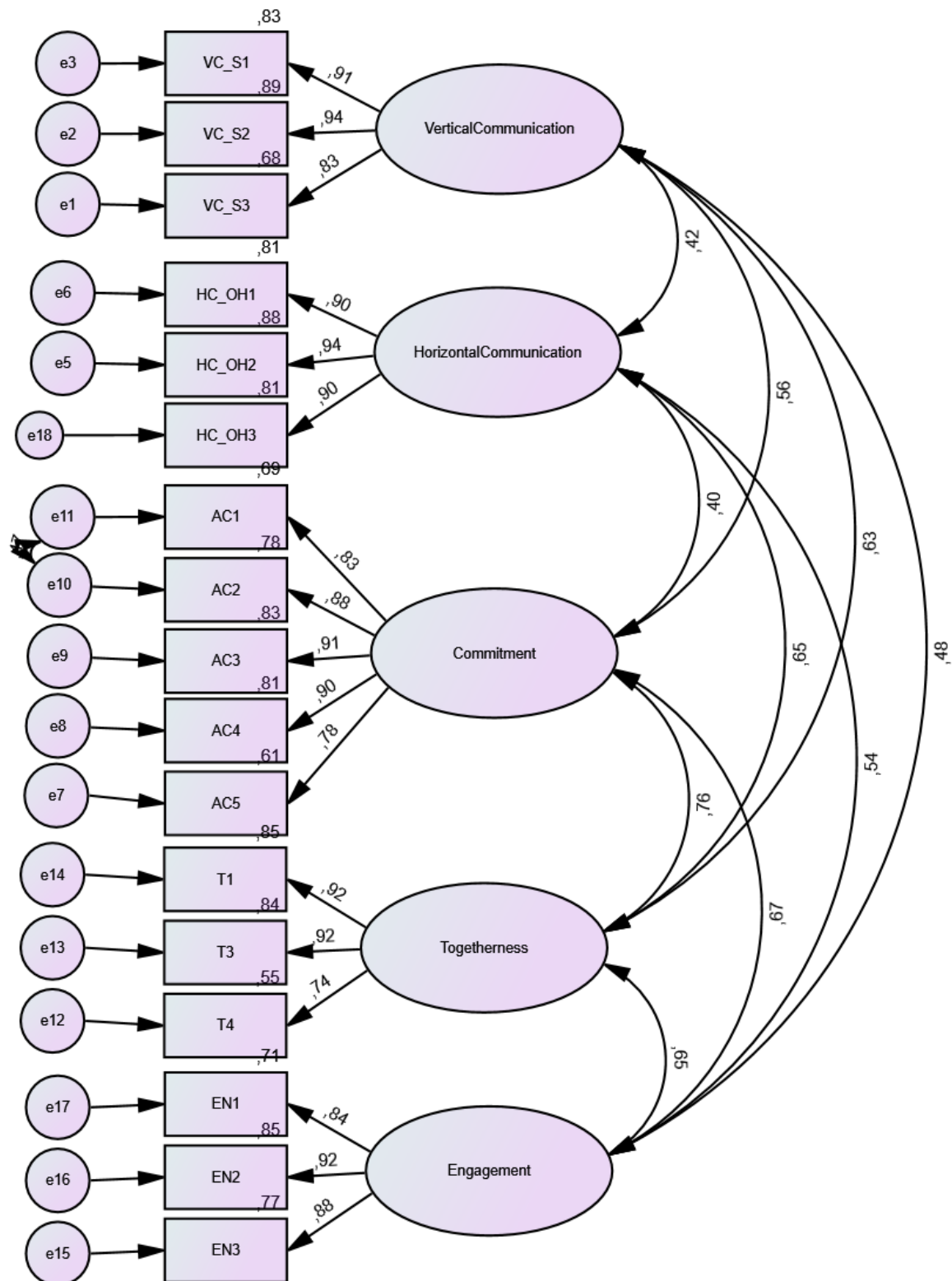
Please indicate how old you were on your last birthday.

Please estimate how much time you have spent working remotely in the last 12 months, in percent.

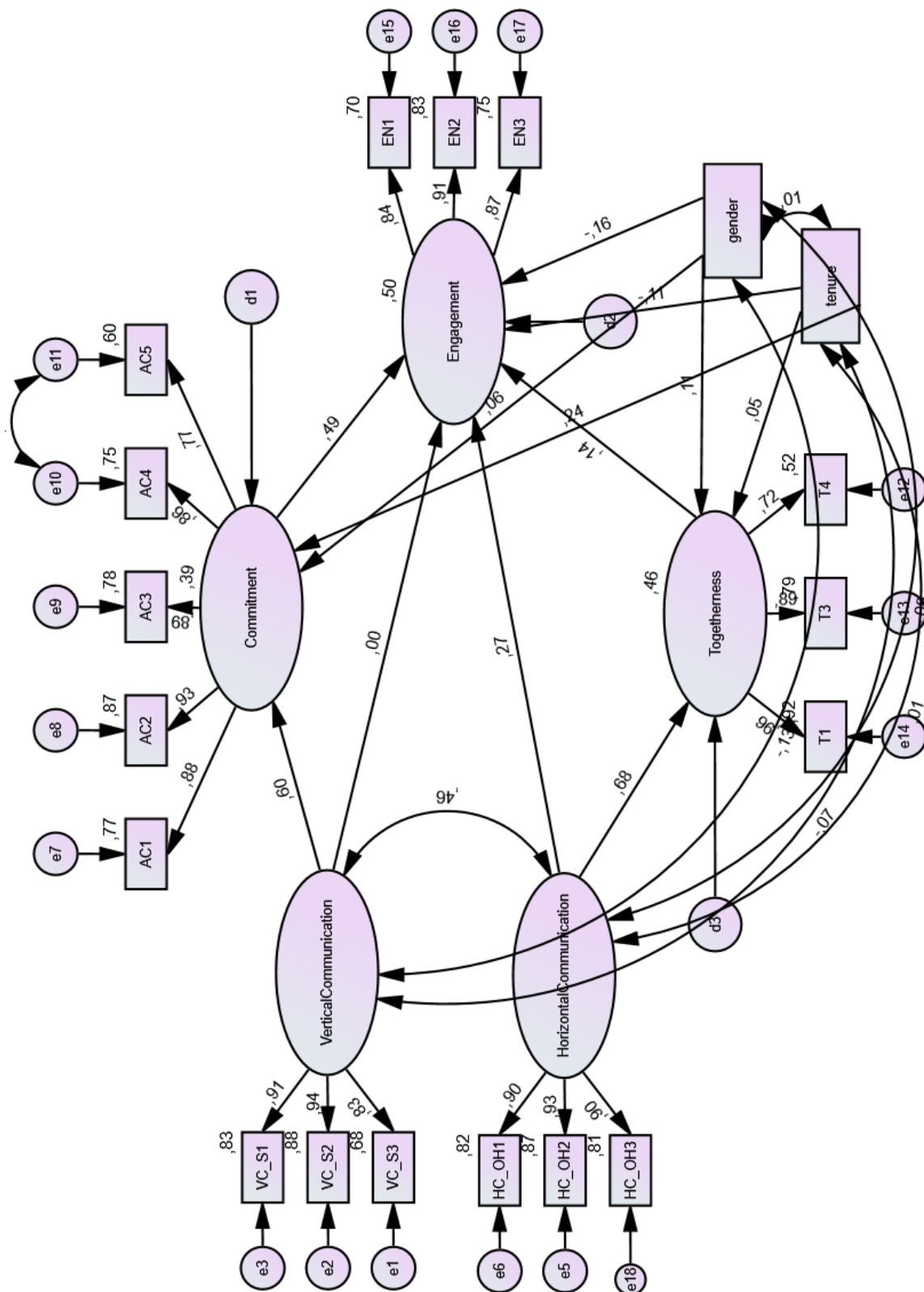
At the moment, I am working...

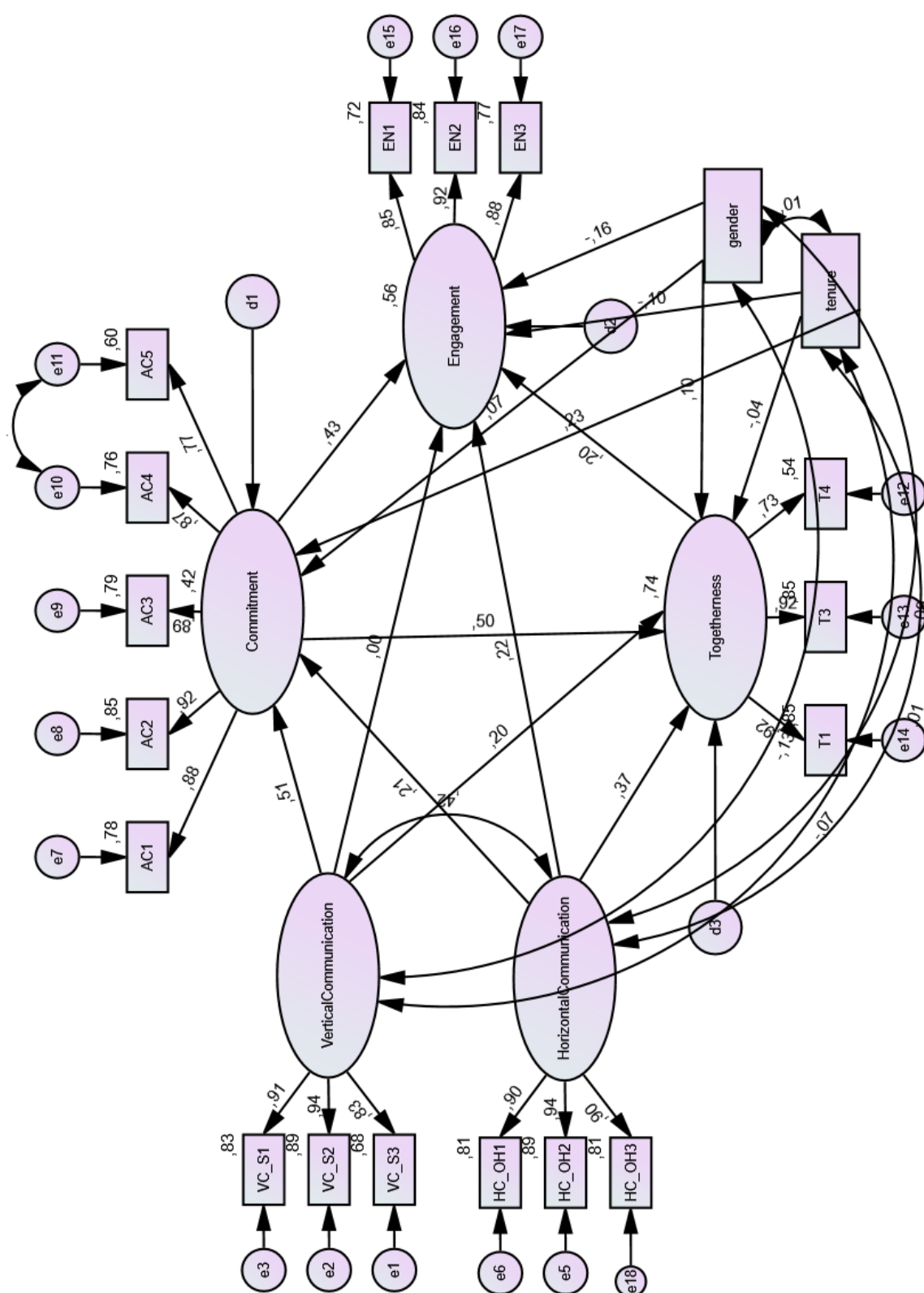
...in the Headquarters (Vienna). /...in the field mission.

Appendix B – Measurement Model with Standardized Estimates



Appendix C – Hypothesized Structural Model with Standardized Estimates





Abstract

The highly relevant impact of digitalization is recognizable in almost every aspect of human activity nowadays. With organizations increasingly adapting to telecommuting, it is clear that the trend of virtual collaboration will prevail in the future. By using a mixed approach of social identity theory and social presence theory, this study aims to examine how communication affects employee relationships in virtual environments. Two communication dimensions are distinguished, namely vertical and horizontal, while the outcomes are identified as affective commitment, togetherness, and job engagement. The results indicate that vertical communication significantly predicts affective commitment and togetherness, but not job engagement. Furthermore, horizontal communication significantly predicts all three outcome variables. Additionally, affective commitment is a strong predictor of both job engagement and togetherness, however, togetherness does not predict job engagement. These findings are partly inconsistent with previous organizational research, suggesting that the perception of communication and its relational impact can change depending on the working environment. In that sense, although vertical communication proves to be relevant in virtual environments, communication with proximate colleagues is shown to be more influential in terms of facilitating the number and the strength of relationships through virtual collaboration.

Keywords: employee communication, virtual collaboration, social identity, social presence, affective commitment, togetherness, job engagement

Abstrakt

Der Einfluss der Digitalisierung ist heutzutage in fast allen Aspekten menschlicher Aktivitäten erkennbar. Da sich vor allem Organisationen zunehmend auf dezentrales Arbeiten einstellen, ist ein klarer Trend erkennbar, dass sich virtuelle Zusammenarbeit in Zukunft weiter durchsetzen wird. Durch eine Kombination aus sozialer Identitätstheorie und sozialer Präsenztheorie wird in dieser Studie untersucht, wie Kommunikation die Beziehungen zwischen Mitarbeitern in virtuellen Umgebungen beeinflusst. Es werden zwischen zwei Kommunikationsdimensionen unterschieden, die vertikale und horizontale. Deren Auswirkungen auf affektives Commitment, Zusammengehörigkeitsgefühl und Job-Engagement werden untersucht. Die Ergebnisse zeigen, dass vertikale Kommunikation das affektive Commitment und Zusammengehörigkeitsgefühl signifikant vorhersagt, nicht aber das Job-Engagement. Außerdem ist horizontale Kommunikation ein signifikanter Prädiktor für alle drei Ergebnisvariablen. Darüber hinaus ist das affektive Commitment ein starker Indikator, sowohl für das Job-Engagement als auch für das Zusammengehörigkeitsgefühl, während das Zusammengehörigkeitsgefühl das Job-Engagement nicht vorhersagt. Diese Erkenntnisse stehen teilweise im Widerspruch zu bisheriger Organisationsforschung und deuten darauf hin, dass die Wahrnehmung von Kommunikation – und deren Auswirkungen auf die Beziehungen zwischen Mitarbeitern – sich je nach Arbeitsumfeld ändern kann. Zwar erweist sich vertikale Kommunikation in virtuellen Umgebungen als relevant, jedoch ist die Kommunikation mit nahestehenden Kollegen einflussreicher in Bezug auf die Anzahl und Stärke der Beziehungen durch virtuelle Zusammenarbeit.

Schlüsselwörter: Mitarbeiterkommunikation, virtuelle Zusammenarbeit, soziale Identität, soziale Präsenz, affektives Commitment, Zusammengehörigkeit, Job-Engagement