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„Blessing or Curse? Different Communication Channels and
their Role in Employee Performance and Job Satisfaction in
the New World of Work “

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1. Theoretical Background

1.1. Introduction

Organizations are profoundly impacted by the globalization of markets, the accelerated speed of technological development, and competition, and must use all their resources to offer outstanding quality and value, deliver their promises of customer satisfaction, and stand out with their product offerings (Boumarafi, 2009; Hartline & Bejou, 2004).

Communication and collaboration are hallmarks of successful businesses and important resources if implemented correctly. On average, people spend more than two-thirds of their working days communicating and collaborating, losing nearly 15% of work time due to communicating ineffectively or inefficiently (Taylor & Barteaux, 2017). Not communicating and collaborating effectively, is burning massive holes in businesses pockets, which is speculated to lead to an average loss of \$11,000 per employee every year (Taylor & Barteaux, 2017). How businesses are communicating, has dramatically changed due to advances in technology, constituting a shift in the traditional working environment. The trend is toward virtual communication, also referred to as computer-mediated communication (CMC). Most companies have implemented a vast array of virtual communication channels, such as video conferencing, instant messaging and e-mails, in order to bridge space and time differences between co-workers, suppliers, and clients. As a result, most business today, no longer occurs face-to-face but instead relies on conference calls, and e-mails (Burg, 2013). With current markets placing higher demands on businesses than ever before, effective business communication could make or break an organization. The question arises how the changing landscape of business communication is affecting organizational and employee outcomes.

This study aims at shedding light on the impact different communication channels in the workplace might have on employee performance and satisfaction. Most studies so far have focused on comparing face-to-face communication to virtual communication overall or only concentrated on one channel. Additionally, researchers have found conflicting results in terms of the relationships between different communication channels and the proposed outcomes. This study will fill this research gap and explore most communication channels used in one specific multi-locational company including possible links, and amplifying as well as buffering variables, to gain greater insight into what role they each play in employee outcomes. The links

that will be assessed are interruptions and information clarity. So far, interruptions have mostly been studied in relation to specific tools and negative relationships have been suggested of interruptions with the suggested outcomes. Considering information clarity as a link, has been theoretically suggested, but not quantitatively analyzed before. A scale was constructed for the measurement of information clarity perceived by the recipient of a message, further adding to literature. In addition to external factors, interacting influences of individual differences will be considered for explaining relationships of different communication channels with outcomes – granting a more holistic understanding of the impacts of communication channels. Namely, interactions of employees' needs for predictability and abilities to achieve clarity will be explored, drawing on the framework of the person-environment fit theory. The inclusion of these interactions further adds to the person-environment fit literature. The overall goal is deriving information that can assist in the effective use of communication channels in businesses.

In the following, we will first begin by gaining a clearer understanding of what communication is, what different communication channels there are, which similarities and differences they own and how they might relate to employee performance and satisfaction. We will then continue by discussing why interruptions and information clarity are important factors to consider and how they might act as links in these relationships and in what way individual differences might come into play.

1.2. Communication Channel Characteristics: Differences and Similarities

A popular definition of communication is: “A process by which information is exchanged between individuals through a common system of symbols, signs, or behavior” (Merriam-Webster, 2018). Communication does not only serve to transfer information but is also the basis for building strong working relationships between employees, teams, and customers. To better understand how individual communication channels could affect employee outcomes, we will first take a closer look at differences and similarities between the channels.

Features that communication media can be categorized by are:

- “Copresence: A and B share the same physical environment” (Clark & Brennan, 1991, p. 229)
- “Visibility: A and B are visible to each other” (Clark & Brennan, 1991, p. 229)
- “Audibility: A and B can communicate through speaking to each other” (Clark & Brennan, 1991, p. 229)
- “Cotemporality: B receives at roughly the same time as A produces” (Clark & Brennan, 1991, p. 229)
- “Simultaneity: A and B can send and receive at once and simultaneously” (Clark & Brennan, 1991, p. 229)
- “Sequentiality: A’s and B’s turns cannot get out of sequence” (Clark & Brennan, 1991, p. 229)
- “Reviewability: B can review A’s message” (Clark & Brennan, 1991, p. 229)
- “Revisability: A can revise messages for B” (Clark & Brennan, 1991, p. 229)

Taking into account these characteristics, face-to-face communication can, contrary to popular belief, lack opportunities compared to some other communication media. One example is that it is not possible to review a message before sending it, which would allow for more reflection – e-mails offer this functionality (IJsselsteijn, van Baren, & van Lanen, 2003).

According to frequently cited media richness theory, one crucial way in which communication media differ from one another is the amount of information transferred within a specific time frame (Daft & Lengel, 1984). The richer a medium, the more cues it carries (Daft & Lengel, 1984). Hence, the media classifications in order of decreasing richness are (1) face-to-face, (2) video conference, (3) audio call/telephone, (4) instant messaging, (5) e-mail (Daft & Lengel, 1984; Kuyath & Winter, 2006). Differences in richness, are owed to the medium’s capacity for cues, personalization, language diversity, and instantaneous feedback (Daft & Wiginton, 1979). The richest medium is face-to-face communication since the receiver can catch verbal cues from the tone of voice, as well as non-verbal cues, such as gestures and facial expressions (Daft & Lengel, 1984). Furthermore, the message content is expressed in natural language, and provides immediate feedback allowing the possibility of reviewing the interpretation of the message (Daft & Lengel, 1984).

1.3. Relationships of Communication Channels with Employee Outcomes

After gaining a clearer understanding of what characterizes communication in different channels, I will next discuss in what way the different channels might impact organizations and their employees. Meaningful outcomes for employees, as well as organizations, are task performance and job satisfaction.

1.3.1. Relationships of communication channels with task performance

Above all, the focus of organizations lies in the optimization of performance (Heavey, Halliday, Gilbert, & Murphy, 2011). Due to the embeddedness of different communication channels in organizations, the question arises, how different communication channels might be affecting employee performance.

Employees have a clear stand on what communication channel is best in terms of aiding performance. Most (76%) employees favor face-to-face communication over the use of CMCs (Veljanoska, Axhiu, & Kela, 2015), and even though they are aware of the importance and usefulness of CMCs, they believe that face-to-face communication provides the best performance results (Veljanoska et al., 2015). The 24% that prefer CMCs over face-to-face communication consisted mainly of managers and supervisors (Veljanoska et al., 2015).

The results of previous research on the exact relationship between communication channels and performance do not share a clear consensus. For example, Schweitzer and Duxbury (2010) contend that increased virtuality is related to a decrease in the quality of interactions and performance in teams. In contrast, general hypoconnectivity – the state in which users do not feel like they have enough connection – also negatively relates to communication effectiveness as well as efficiency which in turn leads to diminished performance and increased frustration and disputes (Sarigianni, Waizenegger, Geiger, & Remus, 2017). Focusing on instant messaging, for example, Ou and Davison (2011) propose that using instant messaging boosts communication quality, advances trust among colleagues, and influences the performance of groups. Real estate agents increased mobile instant messaging use was also related to an increase in job performance (Sheer & Rice, 2017). Another study concludes that the intensity of the use of instant messaging in an organization has no significant effect at all on an employee's work performance (Wu, Liang, Chiu, & Yuan, 2017). Similarly, mixed results are found for the remaining communication channels.

Most studies focus on comparing face-to-face communication to virtual communication overall or only focus on the effects of one channel. This study will fill this research gap and explore the relationships of most communication channels used in one specific multi-locational company, to gain greater insight on what role they each play in employee outcomes. The first research question is:

RQ1 What relationship do different communication channels have with employee task performance?

1.3.2. Relationships of communication channels with job satisfaction

A further highly relevant factor, for organizations and employees alike, is job satisfaction. A widely accepted definition of job satisfaction was stated by Locke (1976), who defined job satisfaction as the degree to which employees feel pleasure or similar positive emotions in relation to their job. The importance of organizations aiming for highly satisfied employees is made clear by looking at the relationships job satisfaction has with other outcomes. Researchers have observed relationships with absenteeism (e.g., Obasan, 2011; Thirulogasundaram & Sahu, 2014), organizational commitment (e.g., Azeem, 2010; Top & Gider, 2013), turnover intention (e.g., Issa, Faiz, & Gelaidan, 2013; Lambert, Hogan, & Barton, 2001), attitudes toward organizational change (e.g., Chih, Yang, & Chang, 2012; Schouteten & Van der Vleuten, 2013), and health (e.g., Faragher, Cass, & Cooper, 2005).

With the importance of job satisfaction for employees and organizations alike established, the question arises how different communication channels might impact job satisfaction. Despite virtual communication media frequently being called an “electronic leash” because they bind employees to their workplaces (Boswell & Olson-Buchanan, 2007), many employees do not resist new technologies, but instead welcome them (Cavazotte, da Costa Lemos, & Villadsen, 2014; Mazmanian, 2012). They even feel greater job satisfaction as a result (Diaz, Chiaburu, Zimmerman, & Boswell, 2012). In contrast, Sobel-Lojeski and Reilly (2008) proffer an 80% decrease in work satisfaction related to the use of virtual communication tools. Taking a closer look at the relationship with individual communication channels, researchers found conflicting results. Using instant messaging as an example, Sheer and Rice (2017) contend a positive relationship between instant messaging and job satisfaction, whereas

some find no significant effect of instant messaging intensity and jobs satisfaction (Mansi & Levy, 2013; Wu et al., 2017).

The high pertinence of job satisfaction for employees and organizations, and the heterogeneous results found by previous studies make exploring the relationship between communication channels and job satisfaction highly relevant, leading to the second research question:

RQ2 What relationship do different communication channels have with employee job satisfaction?

1.4. Linking Communication Channels with Employee Outcomes

Drawing on the Job Demands-Resource (JD-R) model might yield further insights into how different communication channels are linked to job satisfaction and task performance. The JD-R model explains the extent of performance and job satisfaction an employee experiences, through work characteristics which it differentiates into job demands and job resources (Bakker & Demerouti, 2007; Demerouti, Nachreiner, Bakker, & Schaufeli, 2001). Different communication channels might differ in the extent they are related to particular job demands and resources, in turn, affecting performance and satisfaction. According to Bakker and Demerouti (2007, p. 312) „job demands refer to those physical, psychological, social, or organizational aspects of the job that require sustained physical and/or psychological (cognitive and emotional) effort or skills and are therefore associated with certain physiological and/or psychological costs.” Job resources, on the other hand, aid a person in achieving one’s goals, encourage personal growth and diminish job demands and the costs related to them (Bakker & Demerouti, 2007). Job resources and demands affect outcomes through two processes: a motivational and a stress process (Schaufeli, 2017). In the stress process, job demands without counteracting job resources are proposed to drain employee energy leading to mental exhaustion and in turn negative individual and organizational outcomes (Schaufeli, 2017). On the other hand, bountiful job resources trigger a motivational process, resulting in positive outcomes through work engagement (Schaufeli, 2017). In the following, the reasonability of two factors, possibly linking different communication channels to outcomes, will be discussed: interruptions and information clarity.

1.4.1. Role of interruptions

According to Bakker and Demerouti (2007), task interruptions are classified as demands. This supports the possibility of interruptions linking different communication channels to employee performance and satisfaction. An increase in communication possibilities through a multitude of communication channels also provides a breeding ground for possible interruptions, that might in turn influence task performance and job satisfaction. The definition of an interruption is a temporary postponement of someone's goal-directed action (Brixey et al., 2007). In many work environments, being interrupted is a part of employees' everyday work experiences. According to the sixth European survey on working conditions, which was conducted in 35 different European countries, 16% of all respondents and nearly one third (29%) of managers replied that they experience frequent disruptive interruptions at work (Eurofound, 2017). In fact, from 1993 to 2013, the amount of interruptions employees experienced has doubled (BAuA, 2013).

Timewise, this increase in interruptions went hand in hand with the introduction of virtual communication channels to the workplace. Relationships between different communication channels and interruptions have been found in many studies. In teleworkers, for example, increased connectivity through communication channels leads to a higher exposure to workplace interactions, which they may perceive as interruptions (Fonner & Roloff, 2012). Examples for such interruptions are prescheduled meetings (Luong & Rogelberg, 2005), colleagues asking for help (Perlow & Weeks, 2002), and informal communication (Jett & George, 2003).

The likelihood of causing interruptions might differ from channel to channel, depending on the context of use and channel features such as synchronicity. Video conferences, for example, are mostly used for scheduled conferences, allowing the employee more possibilities to plan around the appointment. The employee might feel less interrupted as a result. In terms of synchronicity, when using e-mails, one cannot control when colleagues send e-mails, but due to the low synchronicity of this tool, employees can choose to let the information reach them whenever it is convenient, by not opening the e-mail application and disabling notifications, therefore decreasing the possibility of task interruptions.

In addition to the relationship of interruptions with communication channels, literature also suggests that interruptions are related to satisfaction and performance of employees. Studies suggest a negative impact of interruptions on employees, indicating that typical emotional responses to interruptions include greater feelings of frustration, anxiety, stress as well as anger (Adamczyk & Bailey, 2004; Bailey & Konstan, 2006; Mark, Gudith, & Klocke, 2008; Zijlstra, Roe, Leonora, & Krediet, 1999). Interruptions are even considered a central stressor in work life (BAuA, 2013). Furthermore, interruptions are classified as job demands (Bakker & Demerouti, 2007), which are positively associated with burnout (Crawford, LePine, & Rich, 2010). These negative emotional responses also suggest that interruptions might impact job satisfaction. The cause of these emotions can be found in the semantic content of interruptions, such as illegitimate or added work, positive or negative news, and the frustration from the disruption of the current action (Baethge, Rigotti, & Roe, 2015). Furthermore, the disruption of workflow leads to additional time needed to refocus on the task that was interrupted, after the interruption is processed (Mark et al., 2008). Disruption costs, such as performance issues, hindrances to optimal workflow, and an increase in work pressure, are common (Baethge et al., 2015).

In summary, theories and research suggest, that there is a paradoxical relationship between communication channels and interruptions. Also, interruptions seem related to task performance, as well as job satisfaction, supporting the idea that interruptions might act as a mediator between communication channels and employee outcomes. This leads to the following two hypotheses:

- H1 *There is an indirect relationship between communication channel use (a. face-to-face, b. video call, c. audio call, d. instant messaging, e. e-mail) and task performance through interruptions.*
- H2 *There is an indirect relationship between communication channel use (a. face-to-face, b. video call, c. audio call, d. instant messaging, e. e-mail) and job satisfaction through interruptions.*

1.4.2. Role of information clarity

Additionally to interruptions, information clarity could prove relevant as a link for the relationship between communication channels and employee performance and satisfaction. The following example demonstrates the importance of information clarity in communication:

The air was buzzing with excitement on the morning of 28th of January 1986, as relatives gathered at the Kennedy Space Center in Florida to see off their loved ones. It was the day of the much-anticipated take-off of NASA's Space Shuttle Challenger (OV-99), the climax of years of preparation, and heartfelt work. With a thundering roar, the massive shuttle began its ascent toward the sky. Seventy-three seconds after take-off the mission came to an abrupt and unexpected end; the space shuttle erupted into a roaring ball of steel and fire. All seven astronauts on board died (Rogers et al., 1986).

This accident was preventable – the consequence of misunderstandings spiraling out of control – leading to the most tragic event in spaceflight. Data of extensive tests of the O-ring seals responsible for the explosion had shown that they could not withstand the low temperatures of a January launch (Rogers et al., 1986). Manufacturers immediately notified engineers and managers working on the shuttle. Sadly, the recipients of these messages had no shared context of understanding, due to their lacking knowledge of O-rings, thus no action was taken (Schneider, 2002; Winsor, 1988). “Communication, then, is not just shared information; it is shared interpretation” (Winsor, 1988, p. 101).

Although the effects of miscommunication are generally not quite as tragic, they can have dire consequences for businesses. Some suggest that 70% of small to mid-size businesses believe ineffective communication to be their biggest problem and spend roughly 17 hours a week having to clarify unclear communication, which calculates to wasting \$528,443 per (Training Magazine, 2014).

In order to understand what constitutes unclear information, we need to comprehend mechanisms of communication – the first thing that comes to mind is language. Language is constructed of a symbol system, but a large amount of information we want to convey is not entirely based on this system (Rhoads, 2010). This type of information is referred to as *tacit knowledge*, otherwise known as knowledge-based information, which is often hard to articulate using written language or verbally (Rhoads, 2010). This is owed to that fact, that this type of information is usually concerned with know-how, which is based on subjective insight or

intuition, and therefore leads to uncertainty (Rhoads, 2010). Besides, conveying information often depends on interpretation, and body language (Rhoads, 2010). Humans try to imagine and interpret what the communicator's intention is behind spoken words, making paraverbal as well as nonverbal cues such as inflection, tone, and pitch, at least as necessary as the actual spoken word (Baron-Cohen, 1995; Reardon, 1987). Especially messages conveying attitudes or feelings hardly depend on the spoken word (Mehrabian, 1981).

This knowledge relates to communication channels, in that some channels might be able to transfer clearer information than others based on their characteristics. According to media richness theory, communication channels with more capacity for cues, personalization, language diversity, and instantaneous feedback, should enable users to communicate faster and to better understand ambiguous or equivocal messages (Daft & Wiginton, 1979; Dennis & Kinney, 1998). Hence, less rich media, such as text-based communication should lead to more misunderstandings, due to the scarcity of other cues transmitted, and the decreased possibility of clarifying ambiguous messages, because of slower feedback speeds. Generally, communicating ambiguous information in text-based channels seems to pose problems (Derks & Bakker, 2010).

Literature provides many indicators of information clarity acting as a possible link between different channels and an employee's performance as well as satisfaction. Many e-mails do not give employees enough information to act upon, reasons being a shortfall in organization and clarity, misinformation as well as deficient grammar and construction (Frazee, 1996). This may also lead to employees fulfilling incorrect instructions, or making decisions based on wrongly interpreted information, which can induce serious consequences for organizations (Jackson & Van den Hooff, 2012). Ambiguous, unclear information could also lead to time being spent on clarifying the intended message and information instead of working on the tasks themselves, leading to a decrease in task performance. If the recipient does not clarify the information or misinterprets its meaning, the tasks could be performed incorrectly, and valuable time gets wasted by having to clarify the ambiguous information. Miscommunication may additionally reduce task performance due to misinterpreting emotions, for example, when positive feedback is understood as emotionally neutral (Byron, 2008).

Aside from impacts on performance, ambiguous, badly written e-mails can bring about tension in the workplace through misunderstandings (Burgess, Jackson, & Edwards, 2005). Furthermore, miscommunication or ambiguous information can cause frustration, stress (Day,

Scott, & Kelloway, 2010), poor decisions (Jackson & van den Hooff, 2012) and weaker interpersonal relationships (Byron, 2008), possibly leading to a decrease in work satisfaction.

In summary, literature indicates, that channel characteristics such as media richness and synchronicity could lead to different relationships between different communication channels and information clarity. Clearer information should lead to an increase in task performance as well as job satisfaction. This indicates that high information clarity might be a resource, linking different communication channels to employee outcomes.

The following hypotheses are derived:

- H3 *There is an indirect relationship between communication channel use (a. face-to-face, b. video call, c. audio call, d. instant messaging, e. e-mail) and task performance through information clarity.*
- H4 *There is an indirect relationship between communication channel use (a. face-to-face, b. video call, c. audio call, d. instant messaging, e. e-mail) and job satisfaction through information clarity.*

1.5. Influence of Individual Differences on Relationship Strengths

So far, only external influences – interruptions and information clarity – associated with different tools have been incorporated into the research model at hand. In order to gain a more holistic view, individual differences, in addition to environmental factors, should be considered.

A theoretical basis for being mindful of individual differences as well as external factors and how they might interact and affect outcomes is provided by the person-environment fit theory. It proposes that thriving is dependent on how much personal attributes align with environmental factors (Greguras, Diefendorff, Carpenter, & Tröster, 2014; Kristof-Brown, Zimmerman, & Johnson, 2005). Importantly, researchers have found positive links between person-environment fit and task performance as well as job satisfaction, among others (Kristof-Brown, Zimmerman, & Johnson, 2005).

1.5.1. Amplifying effects of employees' needs for predictability

One relevant difference between individuals is their need for cognitive structure, which is defined as an “individual’s desire for a firm answer to a question and an aversion toward ambiguity” (Kruglanski & Webster, 1996, p. 264). Specifically, the need for predictability, a subscale of one’s need for cognitive structure, could be relevant for the impact external interruptions could have on task performance and job satisfaction. In relation to the person-environment fit theory, an individual with a high need for predictability would have the most favorable outcomes if the environment was highly predictable. This type of fit is also referred to as the need-supply fit, a type of person-environment fit, where a person’s need is met by an environmental supply (Cable & Edwards, 2004). Interruptions, however, might decrease predictability. A person with a high need for predictability has a low fit with a highly interrupted environment, which is less predictable and drawing on the person-environment fit theory, this mismatch should result in an amplification of the negative outcomes for the individual – such as lower job satisfaction and lower task performance.

Due to the proposed mediating function of interruptions in the research model, the moderation of the relationship between interruptions and employee outcomes is relevant for answering the research questions, because it also infers that the proposed indirect effect of communication channels on employee outcomes through interruptions is moderated by an individual’s need for predictability. The following hypotheses are proposed:

- H5 *An employee’s need for predictability moderates the relationship between interruptions and task performance.*
- H6 *An employee’s need for predictability moderates the relationship between interruptions and job satisfaction.*

1.5.2. Buffering effects of employees' abilities to achieve clarity

In addition to the need for cognitive structure, Bar-Tal (1994) highlights the importance of taking into account one's ability to achieve cognitive structure. Specifically, the facet ability to achieve clarity might provide further insight into the relationship of the mediator information clarity with the outcomes, performance and satisfaction. In line with the person-environment fit theory, one would expect an individual with a high ability to achieve clarity to be a better fit in an environment with low information quality, and in turn, be more satisfied and perform better, than a person with a low ability to achieve clarity, in this situation. This type of fit is referred to as a demand-ability fit, the demand, in this case, being the low information clarity in the environment, which can be negated by an individual's ability, in this instance, one's ability to achieve clarity (Cable & Edwards, 2004).

An individual's ability to achieve clarity should, therefore, reduce the negative impact low information clarity might have on employee performance and satisfaction. Due to the proposition of information clarity acting as a mediator in the research model, a moderation of the relationship between information clarity and outcomes is relevant for understanding the relationships of different channels with task performance and satisfaction. Making use of the person-environment fit theory facilitates proposing the following:

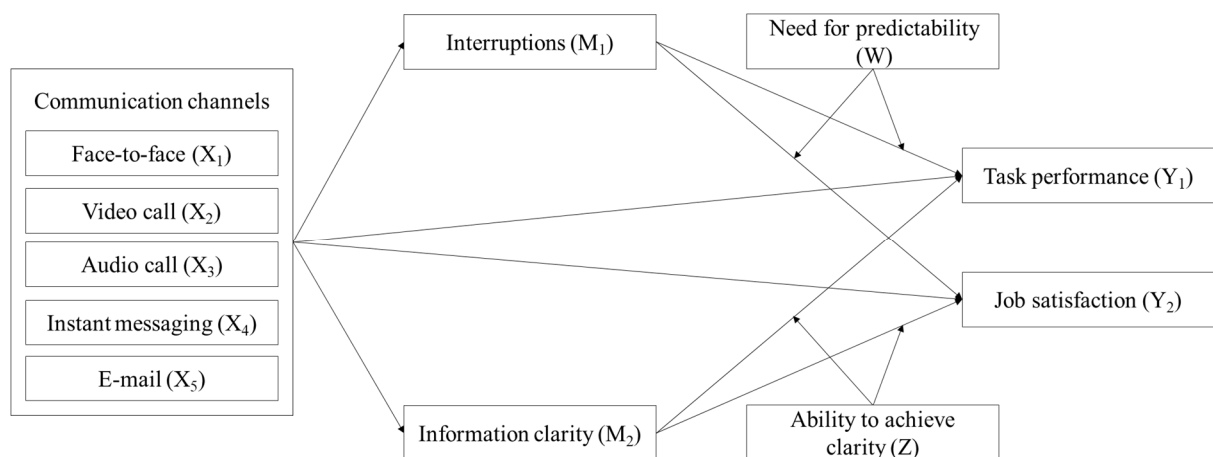
- H7 *An employee's ability to achieve clarity moderates the relationship between information clarity and task performance.*
- H8 *An employee's ability to achieve clarity moderates the relationship between information clarity and job satisfaction.*

1.6. Conceptual Model of the Study

The conceptual model illustrated in Figure 1, summarizes the suggested research questions and hypotheses. It includes the communication channels as independent variables (X_i) and their proposed or unknown relationships with the dependent variables task performance (Y_1) and work satisfaction (Y_2). This model also introduces interruptions (M_1) and information clarity (M_2) as mediators for these relationships. Need for predictability (W) is incorporated as a moderator for the relationship of interruptions (M_1) with task performance (Y_1) as well as job satisfaction (Y_2). Besides, the model proposes a moderation of the relationship between information clarity (M_2) and task performance (Y_1) as well as work satisfaction (Y_2) through an individual's ability to achieve clarity (Z).

Figure 1

Conceptual model of the study



2. Method

2.1. Sample and Procedure

This research in the context of my master thesis was embedded in a broader study that was conducted by the Department of Applied Psychology: Work, Education, and Economy – Work and Organizational Psychology – at the University of Vienna. Therefore, the study design and research topic were adapted to fit the framework of the main study, and a cross-sectional design was used to answer the proposed research questions and hypotheses. A questionnaire was distributed in English through the platform Unipark and was accessible to participants by a link provided per e-mail. The survey was active from May 2 until May 25, 2018.

The sample consisted of employees from four locations within one specific organization: Vienna, Prague, Budapest, and Bratislava. Of the 350 people employed at the organization, we managed to recruit 187 participants of which seven were excluded due to not answering all variables relevant to the research questions in this thesis, resulting in a final sample of 180 participants. All participants had completed at least 70% of the broader questionnaire, which also included variables not relevant to this thesis.

In the final sample (56.7% female), the mean age was 37.65 years ($SD = 8.67$), mean job tenure was 9.17 years ($SD = 7.07$), mean working time was 41.83 hours per week ($SD = 10.71$), and 48.9% had staff responsibilities. Overall the highest education of 77.2% of participants was a college or university degree, 20.6% had the maximum of a high school degree, and 2.2% could not be ascribed. The sample included 46.7% employees from Prague, 28.3% from Vienna, 13.9% from Bratislava, and 11.1% from Budapest.

2.2. Measures

Due to the multinational locations of the participants, the questionnaire was conducted in English. The survey began with basic sociodemographic questions, enquiring about participant age, gender, tenure, education, and working location.

Frequency of the use of individual communication channels was assessed with the question “How often are you using the following communication forms/channels for work?” In the questionnaire of the broader study, participants were asked to state the frequency of use for every one of the following channels separately: face-to-face, video conferencing via Lync, mobile phone for calls, audio call via Lync, mobile phone for chat or text messages, chat via Lync, e-mail, and the social networking site Yammer. Because employees did not have mobile phones for work, and the social networking site was rarely used, these communication channels were excluded from analysis in this thesis. The wording of the channels was adapted to match those used in the organization, for example, Lync is an application used in the company for instant messaging, audio, and video calls. Answers were measured using a 5-point likert scale, 1 = *very rarely/never*, 5 = *very often (several times an hour)*.

Task performance was measured with a four-item scale adapted from Roe, Zinovieva, Dienes, and Ten Horn (2000). Participants were asked to rate how much the statements applied to their job performance on a 5-point likert scale (1 = *does not apply at all*; 5 = *fully applies*). A sample item was “I think I deserve a very good evaluation from my supervisor.”

Job satisfaction was assessed with one item: “In general, how satisfied are you with your work life?” Answers were measured on a 5-point likert scale (1 = *not satisfied at all*; 5 = *fully satisfied*).

Interruptions at work were measured using a three-item scale adapted from Ten Brummelhuis, Bakker, Hetland, and Keulemans (2012). Participants were asked to rate the items on a 5-point likert scale, in terms of how often they experienced these situations at work, 1 = *very rarely/never*; 5 = *very often (several times an hour)*. A sample item was “People trying to contact or talk to me keep me from doing my work.”

Information clarity was assessed using a self-developed four-item scale. Participants were asked to rate how well the four statements applied to their work on a 5-point likert scale (1 = *does not apply at all*; 5 = *fully applies*). The items were: (1) Based on the information I get, I feel certain about what action is required of me. (2) Information given to me is easy to understand. (3) Information given to me is straight to the point. (4) Information given to me is complete.

Need for predictability was measured using two items from Bar-Tal (1994). Participants were asked to rate how much they agreed with the statements made in the two items, using a

5-point likert scale (1 = *I do not agree at all*; 5 = *I fully agree*). A sample item was “I hate to change my plans at the last moment.”

Ability to achieve clarity was also measured using two items from Bar-Tal (1994) with a 5-point likert scale (1 = *I do not agree at all*; 5 = *I fully agree*). A sample item was “If a situation is not clear to me, I usually obtain the necessary information on my own.”

2.3. Data Analysis

Data were analyzed using IBM SPSS Statistics, version 23. Quality checks were performed by eyeballing for patterns in the data, and participants not completing all study variables were excluded ($n = 7$). As indicators of internal consistency, especially because the scale for measuring information clarity was self-developed, Cronbach’s alphas were calculated, and scales were adapted if necessary. Descriptive statistics were analyzed, including demographic variables and key study variables.

Correlations were assessed, and mediation and moderated mediation models were conducted with the PROCESS macro version 3 for SPSS (Hayes, 2017). PROCESS uses non-parametric, bootstrap procedures with 10,000 draws to generate estimates of the sampling distribution for indirect and conditional indirect effects (Preacher & Hayes, 2004). Heteroscedasticity-consistent standard errors were calculated in order to reduce type I error rates using the HC3 estimator by Davidson and MacKinnon in PROCESS (Cai & Hayes, 2008; Davidson & MacKinnon, 1993). Additionally, the PROCESS feature *mean-centering* was activated. Hypotheses were accepted if bootstrapped 95% confidence intervals did not contain zero or $p < 0.05$. Relationships were estimated and interpreted in their unstandardized metric, which allows directly mapping the results onto the scales that were used to measure the variables (Hayes, 2017).

A custom model was built combining mediators and moderators. PROCESS restricts models to only one predictor and one outcome, therefore the model was run ten times in order to cover all combinations of different predictors and outcomes. Per model tested, the remaining communication channels were included as covariates. In order to confirm the findings of the combined custom model, moderations were also calculated separately in addition to the combined models. Results of the combined and separate model did not differ. Therefore, only the results of the combined model will be presented.

3. Results

3.1. Preparatory Analysis and Descriptive Statistics

As indicators of internal consistency, Cronbach's alphas were calculated and expected to have a minimum alpha of .70. Both mediators – interruptions ($\alpha = .79$), and the self-developed scale information clarity ($\alpha = .81$) – had satisfactory internal consistency. The outcome task performance ($\alpha = .52$), and the moderators, need for predictability ($\alpha = .31$) and ability to achieve clarity ($\alpha = .51$), did not show acceptable internal consistency.

Table 1

Descriptives of the study sample

	Total sample ($n = 180$)			
	Mean (SD)	Min.–Max.	Item count	α
Predictors				
Face-to-face (X_1)	3.90 (1.07)	1-5	1	-
Video call (X_2)	2.01 (1.01)	1-5	1	-
Audio call (X_3)	3.38 (1.22)	1-5	1	-
Instant messaging (X_4)	4.01 (1.10)	1-5	1	-
E-mail (X_5)	4.84 (0.45)	1-5	1	-
	0.88 (0.33) ^a	0-1 ^a		
Outcomes				
Task performance (Y_1)	4.10 (0.67)	1-5	2 (4)	.77 (.52)
Job satisfaction (Y_2)	4.01 (0.76)	1-5	1	-
Mediators				
Interruptions (M_1)	2.72 (0.90)	1-5	3	.79
Information clarity (M_2)	3.72 (0.65)	1-5	4	.81
Moderators				
Need for predictability (W)	3.02 (1.13)	1-5	1 (2)	(.31)
Ability to achieve clarity (Z)	3.96 (0.89)	1-5	1 (2)	(.51)

Note. ^ae-mail: 0 = used less than several times an hour, 1 = used several times an hour. If the scale was shortened, the original item count and Cronbach's alpha are in parenthesis.

To improve the reliability of the task performance measure, different item combinations were tested to ascertain which combination might result in a sufficient alpha. Two positively formulated items instead of the original four items were chosen to constitute the task

performance measure ($\alpha = .77$), namely “I think I deserve a very good evaluation from my supervisor” and “Compared to the standards I usually get good results from my work.” The lacking internal consistency of the moderators was evaded by only using the most suitable single item out of formerly two items, to measure need for predictability (“I hate to change my plans at the last moment.”) and ability to achieve clarity (“If a situation is not clear to me, I usually obtain the necessary information on my own.”).

Next, scale distributions were studied. The distribution of the channel e-mail was nonparametric and heavy-tailed with high kurtosis – most participants (87.8%) indicated that they used e-mails “very often (several times an hour)”. To include this variable into the model in a meaningful way, the measurement of e-mail was dichotomized (0 = used less than several times an hour, 1 = used several times an hour). See Table 1 for the descriptives of the research model variables.

3.2. Research Questions and Hypotheses Testing

Next, correlations were calculated as seen in Table 2, after which a combined model of mediations and moderations were analyzed in PROCESS, as depicted in Table 3 and Figure 2. Indirect relationships are presented in Table 4.

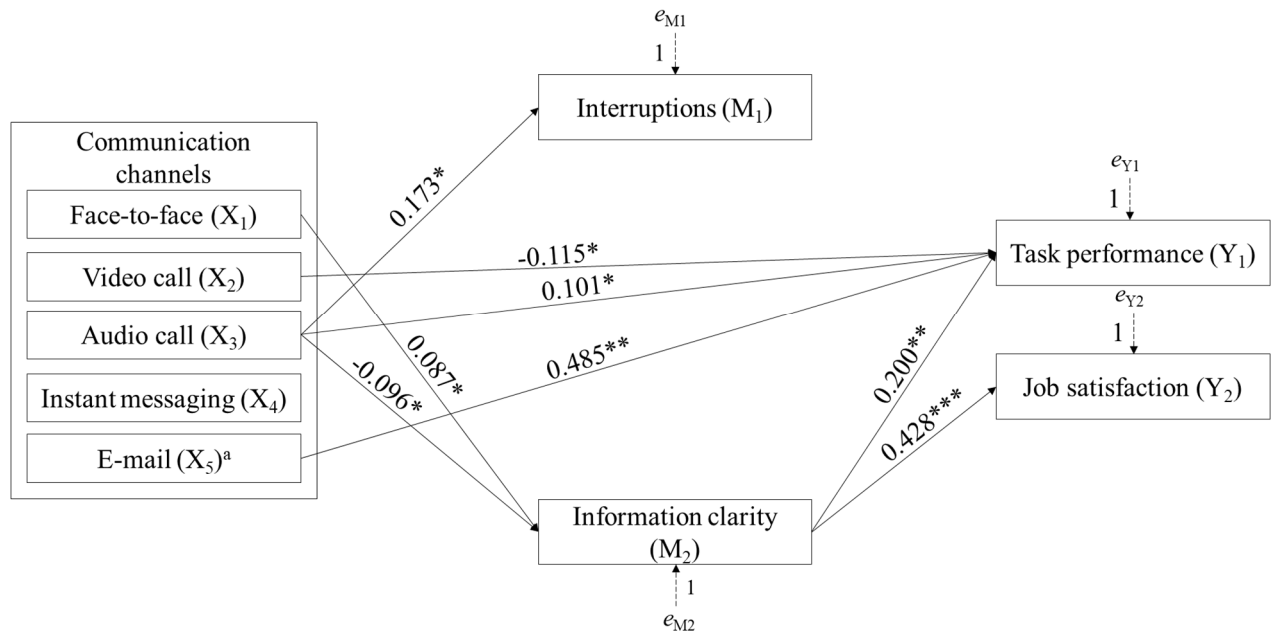
Research question 1 asked, “What relationship do individual communication channels have with employee task performance?” Running Pearson correlations (see Table 2), showed that video calls ($r = -.153, p = .040$) were related to decreased task performance, and e-mails ($r = .284, p < .001$) were related to increased task performance. Research question 2 asked, “What relationship do individual communication channels have with employee job satisfaction?” Face-to-face communication was significantly related to job satisfaction ($r = .166, p = .026$).

To gain a better understanding of what might constitute these relationships, other channels were controlled for, and mediators, as well as moderators, were examined (Hypotheses 1-8) through regression analysis. Indirect relationships (ab) and direct relationships (c) were examined. Indirect relationships are ones that pass through a mediator (Hayes, 2017). The predictor affects the mediator, which in turn affects the outcome (Hayes, 2017). An effect which influences the outcome without such a mechanism is called a direct effect (c' ; Hayes, 2017). First, indirect relationships were examined. Hypothesis 1 stated that

there would be an indirect relationship between the frequency of communication channel use and task performance through interruptions. Hypothesis 2 stated there was an indirect effect between communication channel use and job satisfaction through interruptions. Results in Table 3 show that the different communication channels explained 7.9%, $R^2 = .079$, $F(5, 174) = 2.654$, $p = .024$, of variance in interruptions, however, interruptions only increased significantly for employees using audio calls more frequently ($a_5 = 0.173$, $p = .010$). In addition, employees experiencing more interruptions did not report performing worse than workers with fewer interruptions ($b_1 = -0.029$, $p = .618$). There was no evidence of a relationship of interruptions with job satisfaction ($b_2 = -0.044$, $p = .492$). Employees experiencing more interruptions at work did not state feeling significantly less satisfied with their jobs than people experiencing fewer interruptions. There were no significant indirect relationships of any communication channels with task performance or job satisfaction through interruptions, therefore Hypotheses 1 and 2, were rejected.

Figure 2

A statistical diagram of significant relationships for the proposed model



Note. Unstandardized regression coefficients. $n = 180$. $p > .05$, * $p < .05$, ** $p < .01$, *** $p < .001$. ^a e-mail: 0 = used less than several times an hour, 1 = used several times an hour. For ease of interpretation variables with non-significant ($p > .05$) relationships are not depicted.

Table 2

Pearson correlations between study variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1. Face-to-face (X ₁)	-										
2. Video call (X ₂)	.017	-									
3. Audio call (X ₃)	.018	.327***	-								
4. Instant messaging (X ₄)	.096	.086	.422***	-							
5. E-mail (X ₅) ^a	.029	-.113	.125	.183*	-						
6. Task performance (Y ₁)	.068	-.153*	-.069	-.061	.284***	-					
7. Job satisfaction (Y ₂)	.166*	-.087	-.057	.036	.050	.226**	-				
8. Interruptions (M ₁)	.096	.157*	.307***	.096	.077	-.037	-.109	-			
9. Information clarity (M ₂)	.180*	-.181*	-.133	.001	-.066	.180*	.401***	-.225**	-		
10. Need for predictability (W)	.066	-.054	-.083	-.035	-.083	-.157*	-.065	.032	-.056	-	
11. Ability to achieve clarity (Z)	.025	-.012	.088	-.023	.099	.114	.125	.112	-.022	-.116	-

Note. $n = 180$. $p > .05$. * $p < .05$. ** $p < .01$. *** $p < .001$. Two-tailed. ^a e-mail (X₅): 0 = used less than several times an hour, 1 = used several times an hour.

Hypothesis 3 postulated an indirect relationship between communication channel use and task performance through information clarity. Hypothesis 4 suggested an indirect relationship between communication channel use and job satisfaction through information clarity. Communication channels explained 10.6% of variance in information clarity, $R^2 = .106$, $F(5, 174) = 4.977$, $p < .001$. Workers using face-to-face communication more frequently reported that information given to them was clearer compared to participants who communicated less face-to-face ($a_2 = 0.087$, $p = .048$). The frequency of audio calls ($a_6 = -0.096$, $p = .035$), on the other hand, was negatively related to information clarity. There were no significant relationships of the frequency of video calls, instant messaging, and e-mail use with information clarity. This means that people using face-to-face communication more frequently experienced increased information clarity and workers using audio calls at higher rates reported less clarity of information received. Data also showed that information clarity was positively related to task performance ($b_3 = 0.200$, $p = .008$) as well as job satisfaction ($b_4 = 0.428$, $p < .001$). Concerning the indirect relationships depicted in Table 4, employees that communicated more face-to-face reported performing better ($a_2b_3 = 0.017$, bootstrapped 95% CI [-0.0003; 0.044]; narrowly missing the significance level, because zero was included in the bootstrapped confidence interval) and being significantly more satisfied with their jobs ($a_2b_4 = 0.037$, bootstrapped 95% CI [0.002; 0.082]), through the relationship of face-to-face communication with clarity of information that employees received. Workers communicating more through audio calls, on the other hand, reported performing significantly worse ($a_6b_3 = -0.019$, bootstrapped 95% CI [-0.045; -0.0005]) and feeling significantly less satisfied with their jobs ($a_6b_4 = -0.041$, bootstrapped 95% CI [-0.084; -0.032]) through the relationships with clarity of information. Overall results lead to accepting Hypothesis 3 and Hypothesis 4 for some channels.

Next possible moderators were examined. Hypothesis 5 and 6 predicted a moderation of the relationship between interruptions and task performance (H5) as well as between interruptions and job satisfaction (H6) through an employee's need for predictability. The interaction of interruptions with need for predictability ($M_1 \times W$) was however not significantly related to task performance ($b_7 = -0.034$, $p = .536$) or job satisfaction ($b_8 = -0.044$, $p = .434$). Due to these findings, the moderation of the relationships, as stated in Hypothesis 5 and 6, were rejected.

Table 3

OLS regression coefficients, standard errors, and model summary information for the presumed parallel multiple moderated mediation model depicted in Figure 1

		Interruptions (M ₁)			Information clarity (M ₂)			Task performance (Y ₁)			Job satisfaction (Y ₂)					
		<i>b</i>	<i>SE</i>	<i>p</i>		<i>b</i>	<i>SE</i>	<i>p</i>		<i>b</i>	<i>SE</i>	<i>p</i>		<i>b</i>	<i>SE</i>	<i>p</i>
Constant	<i>i</i> _{M1}	-1.072	0.517	.040	<i>i</i> _{M2}	0.336	0.284	.239	<i>i</i> _{Y1}	3.410	0.328	< .001	<i>i</i> _{Y2}	3.809	0.353	< .001
Face-to-face (X ₁)	<i>a</i> ₁	0.130	0.073	.076	<i>a</i> ₂	0.087	0.043	.048	<i>c</i> ₁	0.053	0.057	.351	<i>c</i> ₂	0.065	0.060	.280
Video call (X ₂)	<i>a</i> ₃	0.073	0.085	.390	<i>a</i> ₄	-0.073	0.049	.134	<i>c</i> ₃	-0.115	0.056	.041	<i>c</i> ₄	0.011	0.052	.830
Audio call (X ₃)	<i>a</i> ₅	0.173	0.067	.010	<i>a</i> ₆	-0.096	0.045	.035	<i>c</i> ₅	0.101	0.050	.047	<i>c</i> ₆	-0.041	0.050	.407
Instant messaging (X ₄)	<i>a</i> ₇	-0.097	0.069	.159	<i>a</i> ₈	-0.025	0.047	.593	<i>c</i> ₇	-0.013	0.061	.837	<i>c</i> ₈	-0.016	0.049	.743
E-mail (X ₅) ^a	<i>a</i> ₉	0.257	0.183	.162	<i>a</i> ₁₀	-0.116	0.145	.426	<i>c</i> ₉	0.485	0.184	.009	<i>c</i> ₁₀	0.152	0.163	.353
Interruptions (M ₁)		—	—	—		—	—	—	<i>b</i> ₁	-0.029	0.057	.618	<i>b</i> ₂	-0.044	0.064	.492
Information clarity (M ₂)		—	—	—		—	—	—	<i>b</i> ₃	0.200	0.074	.008	<i>b</i> ₄	0.428	0.093	< .001
Need for predictability (W)		—	—	—		—	—	—	<i>b</i> ₅	-0.072	0.050	.149	<i>b</i> ₆	-0.029	0.046	.528
Interruptions × need for predictability (M ₁ × W)		—	—	—		—	—	—	<i>b</i> ₇	-0.034	0.054	.536	<i>b</i> ₈	-0.044	0.056	.434
Ability to achieve clarity (Z)		—	—	—		—	—	—	<i>b</i> ₉	0.053	0.058	.899	<i>b</i> ₁₀	0.114	0.056	.042
Information clarity × ability to achieve clarity (M ₂ × Z)		—	—	—		—	—	—	<i>b</i> ₁₁	0.030	0.082	.717	<i>b</i> ₁₂	-0.013	0.080	.872
		<i>R</i> ² = .079			<i>R</i> ² = .106			<i>R</i> ² = .167			<i>R</i> ² = .202					
		<i>F</i> (5, 174) = 2.654, <i>p</i> = .024			<i>F</i> (5, 174) = 4.977, <i>p</i> < .001			<i>F</i> (11, 168) = 5.039, <i>p</i> < .001			<i>F</i> (11, 168) = 3.134, <i>p</i> = .001					

Note. *n* = 180. All coefficients are unstandardized. *c'* = unstandardized direct effect of antecedent on consequent. Significant results (*p* < .05) are depicted in bold. ^a e-mail: 0 = used less than several times an hour, 1 = used several times an hour.

Hypotheses 7 and 8 were concerned with the second moderator – ability to achieve clarity – which was predicted to moderate the relationships between information clarity and task performance (H7) as well as between information clarity and job satisfaction (H8). Employees reporting more information clarity believed they performed better ($b_3 = 0.200, p = .008$) and were more satisfied ($b_4 = 0.428, p < .001$). The interaction between information clarity and one's ability to achieve clarity ($M_2 \times Z$) was however neither significantly related to task performance ($b_{11} = 0.030, p = .717$) nor to job satisfaction ($b_{12} = -0.013, p = .872$), in turn, Hypotheses 7 and 8 were also rejected.

Adding indirect (ab ; see Table 4) to direct effects (c' ; see Table 3) allowed the estimation of a total effect (c ; Hayes, 2017) the different channels might have on task performance and job satisfaction, further clarifying research question 1 and 2. In terms of research question 1, face-to-face closely missed the significance level for an indirect positive effect and had no direct effect. The total relationship of video calls was a negative one, solely constituted by a direct effect ($c' = -0.115, p = .041$). Combining a significant positive direct relationship of audio calls with task performance ($c' = 0.101, p = .047$), with a negative indirect relationship ($a_6b_3 = -0.019$, bootstrapped 95% CI $[-0.045; -0.0005]$), constituted a positive total effect of 0.082. Instant messaging was neither related to task performance directly nor indirectly. E-mails had a total positive effect on task performance, solely consisting of a direct effect ($c' = 0.485, p = .009$). In terms of research question 2, there were no significant direct relationships of any channels with job satisfaction, meaning existing relationships were fully mediated by information clarity. Employees communicating more face-to-face reported being more satisfied with their jobs ($a_2b_4 = 0.037$, bootstrapped 95% CI $[0.002; 0.082]$), whereas workers communicating more through audio calls reported being less satisfied with their jobs ($a_6b_4 = -0.041$, bootstrapped 95% CI $[-0.084; -0.032]$). Video calls, instant messaging, and e-mails were not significantly related to job satisfaction – neither indirectly, nor directly.

Table 4

Indirect effects, standard errors, and bootstrapped 95% confidence intervals

	Task performance (Y ₁)		Job satisfaction (Y ₂)	
	<i>ab</i>	Bootstrapped 95% CI	<i>ab</i>	Bootstrapped 95% CI
Interruptions (M ₁)				
Face-to-face (X ₁)	-0.004	[-0.023; 0.012]	-0.006	[-0.032; 0.010]
Video call (X ₂)	-0.002	[-0.018; 0.010]	-0.003	[-0.023; 0.011]
Audio call (X ₃)	-0.005	[-0.029; 0.014]	-0.008	[-0.036; 0.015]
Instant messaging (X ₄)	0.003	[-0.010; 0.019]	0.004	[-0.009; 0.023]
E-mail (X ₅) ^a	-0.007	[-0.049; 0.025]	-0.011	[-0.070; 0.023]
Information clarity (M ₂)				
Face-to-face (X ₁)	0.017	[-0.0003; 0.044]	0.037	[0.002; 0.082]
Video call (X ₂)	-0.015	[-0.043; 0.004]	-0.031	[-0.078; 0.008]
Audio call (X ₃)	-0.019	[-0.045; -0.0005]	-0.041	[-0.084; -0.003]
Instant messaging (X ₄)	-0.005	[-0.030; 0.013]	-0.012	[-0.058; 0.026]
E-mail (X ₅) ^a	-0.023	[-0.085; 0.038]	-0.050	[-0.176; 0.072]

Note. $n = 180$. *ab* = unstandardized indirect effect. CI = confidence interval. ^a e-mail: 0 = used less than several times an hour, 1 = used several times an hour. Significant coefficients (bootstrapped 95% CI not containing zero) are depicted in bold.

4. Discussion

Overall regression analysis showed that video calls were negatively, and audio calls and e-mail use were positively related to task performance, whereas face-to-face communication and instant messaging were unrelated to performance. Face-to-face communication was positively related to satisfaction, audio calls were negatively related to satisfaction, whereas video calls, instant messaging, and e-mail use were not related to satisfaction. In order to win insights from these results and aid organizations in effectively using different channels, we will in the following try to fully understand what constituted these relationships, by considering the results of the analyses and the proposed links as well as amplifying and buffering effects. Furthermore, to gain meaningful insight, we will see past the channels themselves, and instead, view the bundle of features associated with the different channels, and how these might explain relationships.

4.1. Theoretical Implications

4.1.1. Information clarity as a link for channels with employee outcomes

First, different communication channels were related to satisfaction and task performance through information clarity, supporting Hypotheses 3 and 4 for some channels. To explain these relationships, we will take a closer look at how exactly information clarity linked communication channels with outcomes, by first investigating the relationship information clarity had with the outcomes, then reviewing how different communication channels were related to information clarity and finally integrating the findings.

As expected, clearer information was related to increased performance and satisfaction. This supports the idea that high information clarity might provide resources for employees. Job resources, according to Bakker and Demerouti (2007), aid a person in achieving one's goals, encourage personal growth, and diminish job demands, and the costs related to them. In relation to performance, clearer information aids employees to effectively carry out instructions and tasks and prevents them from losing time by repeated loops of reclarification when communication was unclear, leading to better performance. Support also comes from literature

stating that unclear information may lead to employees carrying out incorrect instructions or making decisions based on wrongly interpreted information (Jackson & Van den Hooff, 2012).

Due to the subjective measurement of information clarity, the importance of information clarity for employee performance might, however, have been underestimated in this study. Information clarity was measured as perceived by the employee receiving the information. Yet sometimes issues in clarity might go unnoticed due to the belief of all involved that everyone has understood the message. “One of the reasons that people do not ask questions is that they think they have understood what was said and have no reason to seek clarification” (Schneider, 2002, p.214). Taking this into account might reveal that information clarity is even more important for performance than analysis results showed.

In terms of job satisfaction, previous studies had shown that miscommunication or ambiguous information can cause poor decisions (Jackson & Van den Hooff, 2012), and frustration and stress (Day, Scott, & Kelloway, 2010) which might lead to a decrease in work satisfaction. High information clarity, on the other hand, would aid employees by preventing stress and poor decisions. Furthermore, low clarity could also weaken relationships and affect the emotional value of a message, for example, when positive feedback is understood as emotionally neutral (Byron, 2008). High information clarity might, therefore, have positive impacts by fostering positive relationships with colleagues at work.

After having established the relationship between information clarity and employee outcomes, how different communication channels are related to information clarity, will be investigated. I assumed the channel characteristics media richness and synchronicity might predict information clarity on the basis that paraverbal, as well as nonverbal cues such as inflection, tone, and pitch seem to be at least as necessary as the actual spoken word (Baron-Cohen, 1995; Reardon, 1987). In line with this assumption, according to media richness theory, channels with more capacity for cues, personalization, language diversity, and instantaneous feedback, should enable users to communicate faster, and to better understand ambiguous or equivocal messages (Daft & Wiginton, 1979; Dennis & Kinney, 1998). I, therefore, expected less rich channels, such as text-based communication to lead to a reduction in information clarity, due to the lack of cues transmitted, and the slower possibility of clarifying ambiguous messages because of decreased feedback speeds. Results only partially supported this assumption. The more frequent use of face-to-face communication, which is the media richest channel (Daft & Lengel, 1984), was indeed positively related to information clarity. Face-to-

face communication gives employees access to the full range of communication cues, making it less likely to misinterpret spoken word. Furthermore, synchronicity is extremely high – one can immediately clarify ambiguous information through discussion and feedback. As for the remaining channels, this study showed that audio calls were negatively related to information clarity, whereas video calls, instant messaging, and e-mails had no relationship with information clarity. At first glance, the relationships do not support the importance of media richness for information clarity, necessitating the consideration of additional factors that might explain these relationships.

Firstly, switching to text-based communication does not necessarily mean one loses out on cues. Social Information Processing Theory (Walter, 1992), might partly explain why using instant messaging and e-mail was not related to information clarity as expected. Walter (1992) proposed that there is little difference in the motivation of people interacting to create rapport and reduce uncertainty, between face-to-face and virtual settings. When using communication technologies for relational content, cues available in virtual channels such as emoticons, style, language, as well as timing of the messages are used as a substitute for nonverbal cues (Walter, 1992). This suggests that the difference in cues between different communication channels might not be as vast as previously suspected.

Secondly, text-based channels boast features superior to those of richer media. Such superior features are revisability and reviewability. The sender of a message can carefully think about, plan, and revise the written message before sending it – making sure the message is understandable. The receiver of the message, in turn, also has longer time to review and process the message. Revisability and reviewability, features suggested by Clark and Brennan (1991), could equalize the negative impacts fewer cues might have on clarity.

Third, and most importantly, the number of cues a message necessitates in order to communicate it clearly, might also be dependent on the complexity of a message. This indicates that sending a straightforward message per mail, for example, would not impact clarity, because cues are sufficient for clearly communicating a straightforward message. This is supported by the task-media fit hypothesis (McGrath & Hollingshead, 1993), which further develops media richness theory by suggesting that different tasks have different optimal communication environments. The hypothesis proposes that a task communicated in an overly rich channel will perform worse because of distractions, and tasks communicated in an overly lean channel will be performed worse by constraining communication (McGrath &

Hollingshead, 1993). One must keep in mind that the research in this thesis was not performed as an experiment, but instead, data was collected from a naturalistic organizational setting. Thus, one must assume that use norms have developed, and employees are choosing the communication tool based on the content they want to communicate – thus matching the channel with the information type and cues required, and in turn not impacting clarity. According to Derks and Bakker (2010) employees are increasingly metamorphosing into experts on media and are good at judging the appropriateness of channels for messages. Further support for this theory is given by the results of our study showing that increased audio calls were related to decreased clarity. Spatial differences necessitate substituting face-to-face communication with audio calls, even though this might not be the optimal tool for the messages content. Now having to communicate a message through an audio call, that was an optimal fit with the cue density of face-to-face communication, will naturally lack clarity.

Integrating these findings, the overall analysis of indirect relationships showed that face-to-face communication was indirectly positively, and audio calls were indirectly negatively related to job satisfaction. In fact, communication channels were only linked to satisfaction through information clarity, as there were no direct relationships of channels with satisfaction. Audio calls were significantly negatively indirectly linked to task performance through information clarity. Even though individual paths between face-to-face communication and performance were significant, the overall indirect effect closely missed significance, possibly due to the study being underpowered. Independent of significance, results add to research by identifying high information clarity as possibly contributing to positive employee outcomes and linking some communication channels to these outcomes. This thesis also added to research through the development of a scale for the measurement of the perception of information clarity by the recipient of a message. Most importantly, results hint at the potential that might lie in optimizing the use of different communication channels for maximum information clarity – improved employee performance and satisfaction.

4.1.2. Interruptions as a link for channels with employee outcomes

The second overall finding is the indication that communication channels were not related to job satisfaction or performance through interruptions, rejecting Hypotheses 1 and 2. To explain these effects, we will dive deeper into why these unexpected finding came to light, by examining the individual paths constituting an indirect effect. First, we will examine the

relationship interruptions had with the outcomes, after which we will review how different communication channels were related to interruptions, and finally, we will integrate the findings.

Unexpectedly, interruptions seemed neither related to task performance, nor job satisfaction. By drawing on the JD-R model, which named task interruptions a demand (Bakker & Demerouti, 2007), I assumed interruptions might negatively impact performance and satisfaction. According to Bakker and Demerouti (2007, p. 312) „job demands refer to those physical, psychological, social, or organizational aspects of the job that require sustained physical and/or psychological (cognitive and emotional) effort or skills and are therefore associated with certain physiological and/or psychological costs.” In line with this classification, studies had registered disruption costs associated with interruptions, such as performance issues, increased pressure from work, and hindrances to optimal workflow (Baethge et al., 2015). Typical emotional responses to interruptions included greater frustration, anxiety, stress, as well as anger (Adamczyk & Bailey, 2004; Bailey & Konstan, 2006; Mark et al., 2008; Zijlstra et al., 1999), which indicated a possible impact on satisfaction. Analysis results, however, showed no relationship of interruptions with performance and satisfaction. There are multiple possible explanations, why this might be.

First, one should take into account that many preceding studies on interruptions were conducted as controlled laboratory experiments (Cades, Werner, Boehm-Davis, & Arshad, 2010). These results cannot be translated directly to real-world settings. The research in this thesis was conducted in a naturalistic setting using subjective ratings of interruptions, task performance, and job satisfaction, not objective evaluations, which might have yielded different results. Secondly, interruptions might encompass positive, as well as negative aspects, which neutralize each other. In terms of performance outcomes, Mark, Gudith, and Klocke (2008) found that there was no overall effect of interruptions on performance because people made up for lost time by working faster. Furthermore, interruptions can provide task variety, which improves peoples' precision and speed, particularly when tasks are monotonous or well-learned (Jett & George, 2003). Interruptions might also increase performance if they supply information related to one's task (Addas & Pinsonneault, 2018; Mano & Mensch, 2010).

As for neutralizing effects on job satisfaction, especially external interruptions such as ones measured in this study, can lessen boredom on tasks that are simple and demand little attention (Fisher, 1998). Additionally, there might be positive effects of interruptions on

satisfaction, through the fostering of workplace relationships. A frequently ignored characteristic of interruptions is that they provide social interaction in certain contexts. The measurement in this research only asked about interruptions due to someone “trying to contact or talk to you”. Therefore, interruptions measured went hand in hand with human communication in virtual or analog form. These interactions through interruptions might foster workplace friendships. Workplace friendships, in turn, are related to job satisfaction (Winstead, Derlega, Montgomery, & Pilkington, 1995). This interpretation would indicate that interruptions do not just have negative consequences as suggested by Bakker and Demerouti (2007), but that they might additionally have positive aspects. This is also supported by an extension of the JD-R model, differentiating between two types of demands. Job hindrances negatively impact outcomes, whereas job challenges may reduce energy but also aid growth and development (Cavanaugh, Boswell, Roehling, & Boudreau, 2000; Van den Broeck, De Cuyper, De Witte, & Vansteenkiste, 2010). After we have now gained a clearer understanding of the impact interruptions have on employee outcomes, we will now look further into how different tools were related to interruptions.

Results showed that employees communicating more by audio call reported significantly more interruptions than employees communicating less through this channel. The other communication channels were unrelated to interruptions. As predicted, we must take channel features and situational factors into account to understand these relationships. The finding that audio call was the only channel related to more interruptions might be due to one’s subjective appraisal of an interruption instead of the objective occurrence. This is supported by researchers observing that not all incoming messages are in fact interpreted as interruptions (Jett & George, 2003). The appraisal of communication as an interruption might depend on how much impact the message has on resuming a task. Research found that the difficulty of resuming an interrupted task was dependent on task complexity, duration, type, as well as the length of absence (Czerwinski, Horvitz, & Wilhite, 2004).

The relationship between audio calls and interruptions might also be explainable through the autonomy one has over receiving messages through different channels. Channels with high autonomy might result less in subjective appraisals of communication as an interruption because communication is only allowed when it suits the receiver of the messages, and one is not performing complex tasks. Autonomy might depend on a multitude of factors such as use norms, channel synchronicity, as well as copresence. Use norms might have

developed in an organization, which determine how reactive one must be to messages in different channels – for example, rules on having to be reachable through audio calls while at work, whereas e-mails can be answered whenever it is convenient, and video calls are generally pre-scheduled meetings. Functionally, the Lync application used for video calls, audio calls and instant messaging at the organization examined in this thesis, does offer the possibility to let others know when one does not want to be disturbed, how much this feature is used and complies with use norms, however, was not measured. Expected response times should be related to the extent of synchronicity of the different channels. Furthermore, copresence, as in a shared environment of the sender and receiver of a message, might provide further opportunity to indicate nonverbally, when is not a good time to talk, for example, by closing the door to the room. Overall, audio calls might be related to increased interruptions compared to the other channels because this tool possibly allows employees the least amount of autonomy over when to receive and process messages. Results add to research by suggesting that interruptions do not link tools to employee satisfaction and performance.

4.1.3. Explanations for relationships independent of the proposed mediators

The third overall finding is that different channels were directly related to performance independent of mediators. Audio calls and e-mails were positively directly related to performance, whereas video calls were negatively directly related to performance. Face-to-face communication and instant messaging were not related to performance, neither directly, not indirectly. Again, applying the task-media fit hypothesis (McGrath & Hollingshead, 1993), one can assume that matching tasks with the optimal communication channels might improve performance. According to Derks and Bakker (2010), employees were becoming quite good at judging the appropriateness of different channels for messages. If employees were good at matching tasks to channels, every channel should have been optimally used and positively related to performance, but this was not the case. An explanation is possibly that not all communication centers around tasks, but some might instead be geared towards socializing with co-workers. A survey of 1000 employees found that the third most stated non-work distraction in the office was taking part in gossip or small talk with co-workers (BambooHR, 2015). This might explain why increased face-to-face communication and instant messaging were not directly related to performance. Furthermore, according to a survey conducted with 3200 employees, 47% of participants stated that having too many meetings was the biggest

waste of time at work (Salary.com, 2012). Video calls are often performed as scheduled meetings, bridging spatial differences. Time wasted in and preparing for meetings might explain the negative relationship between video calls and performance. In sum, different direct relationships between channels might be explained through the context of use and the type of communication taking place.

4.1.4. Role of individual differences

Finally, individual differences – need for predictability, and the ability to achieve clarity – did not amplify or buffer relationships between mediators and outcomes, thus also not further explaining relationships between different channels and outcomes. Hypotheses 5, 6, 7, and 8, were therefore rejected. This study aimed at closing a research gap by including individual differences into the study model as explanations for how different channels might impact outcomes. The decision to include individual differences in addition to external factors was made based on the person-environment fit theory. This theory proposes that thriving is dependent on how much personal attributes align with environmental factors (Greguras et al., 2014; Kristof-Brown et al., 2005). Drawing on this theory, one individual difference was chosen to fit each external linking factor – interruptions and information clarity. A person's need for predictability was theorized to interact with the relationship of interruptions with employee performance and satisfaction, constituting a need-supply fit. A person's ability to achieve clarity was postulated to interact with the relationship of information clarity on performance and satisfaction, providing an example of a demand-ability fit. Results did not support these hypotheses, showing no interacting effects of the individual differences with the external mediators. Something to consider is the problems that arose with the measurements of the moderators. Only one of the originally two variables constituting each scale could be used for analysis due to low reliability. For most practical applications, measurement theory indicates that multi-item scales surpass single items in relation to their predictive validity (Diamantopoulos, Sarstedt, Fuchs, Wilczynski, & Kaiser, 2012). Overall, this study's findings in terms of contributing individual differences might not be relevant because of the unsatisfactory measurement of the moderators, leaving the theoretical foundation of the proposed interactions open for discussion.

4.2. Practical Implications

This study has produced multiple indications of how different communication channels might boost performance and satisfaction of employees. Organizations are advised to aim at maximizing information clarity associated with all communication channels. A way to do this is by providing precise best practices on what type of situation, information, and task, different channels are best suited for. Research suggests that synchronous communication channels are well adapted for decision making, brainstorming, or coping with interpersonal conflicts (Dewar, 2006; Powell, Piccoli, & Ives, 2004; Rosen, Furst, & Blackburn, 2007). Unstructured or ambiguous tasks are best performed face-to-face (Lin, Standing, & Liu, 2008; Powell et al., 2004). Instant messaging is most appropriate for communicating informally (Rosen et al., 2007), and e-mails work well for structured tasks, and non-urgent information (Lin et al., 2008; Powell et al., 2004).

Additionally, employees could be educated on how to adapt their communication styles to different channels, in order to always get their message across clearly and reduce ambiguity, independent of the channel used. One meaningful way to improve clarity in communication independent of the channel is to provide a context for information being communicated (Schneider, 2002). A shared context for interpreting the meaning of a message is not established by external circumstances but must be constructed using language (Schneider, 2002). Adopting the strategic talk technique (Heyman, 1997) as well as implementing textual strategies (e.g., headings, typography) induces a shared context and clarifies communication.

Through theoretical reasoning, it seems that autonomy over the use of different channels might play a role in the appraisal of a message as an interruption. Educating employees on when interruptions have negative impacts and when they have positive consequences, might improve the sender's ability to empathize with the recipient and make a judgment call on whether causing an interruption with negative consequences is necessary. Interruptions were perceived increasingly in relation to audio calls. The introduction of policies on allowing regular intervals in one's workday, when audio calls can be blocked, could reduce interruptions related to them.

4.3. Limitations and Avenues for Future Research

Limitations of this study should be considered when interpreting results. First, the sample consists of employees from four locations within one specific organization: Vienna, Prague, Budapest, and Bratislava. For economic reasons, the questionnaire was provided to all participants in English. This language not being most participants' mother tongue might have impacted results, by leading to misinterpretation of questions. However, this risk should have been considerably reduced by the fact that the official working language at the organization was English, making misunderstandings unlikely. Sampling only one organization, also means results are not necessarily relatable to other workplaces, therefore caution needs to be taken when generalizing results.

Furthermore, due to low reliability, some measures had to be condensed to single items. Measurement theory indicates that multi-item scales surpass single items in relation to their predictive validity (Diamantopoulos et al., 2012). Additionally, measurements may be biased due to relying on self-reported questionnaires. The subjectivity of variable measurements needs to be considered.

It is also a well-known fact that correlation does not imply causation, and results of analyzing mediation cross-sectionally cannot be interpreted as a causal effect. The associations observed might instead be outcomes of common causes not modeled (Stone-Romero & Rosopa, 2010). The clear theoretical background of this thesis does, however, support the relationship directions proposed by the tested model. Additionally, particularly small relationships might not have been detected as significant due to the lacking power of the analysis related to an insufficient sample size for discovering such a small effect. Furthermore, the study could have been improved by measuring the use of tools as well as situational contexts of use more precisely. The same is true for all the model variables. Because this research was embedded in a wider study, the number of variables I was granted to contribute to the questionnaire, were limited.

In order to improve communication in organizations as well as to further develop technological communication tools, more research is necessary. To gain a comprehensive impression of the most relevant factors contributing to relationships between communication channels and employee outcomes, the development of an integrated multidisciplinary model is advised. This requires specific research and measurement of different channel characteristics.

Additionally to external factors, it is advisable to also examine further individual differences which might impact relationships. Furthermore, research on the combined use of different communication channels in terms of employee outcomes could aid businesses in choosing what channels to use in their internal communication structure. It is also advised to conduct a similar study longitudinally in order to gain backing for the direction of the proposed relationships.

4.4. Conclusion

The main aim of this study was to shed light on the role different communication channels play in employee job satisfaction and performance. Organizations are under great pressure due to the acceleration and increased expectations of markets. At the same time, how businesses are communicating, has dramatically changed due to advances in technology, constituting a shift in the traditional working environment. Most companies have implemented a vast array of virtual communication channels, such as face-to-face communication, video conferencing, audio calls, instant messaging, and e-mails, in order to bridge space and time differences between co-workers, suppliers, and clients and keep up with market demands. This leads to the question of how the changing landscape of business communication might impact organizational and employee outcomes. This thesis aimed at filling a critical research gap by examining the relationships of most communication channels used in one specific multi-locational organization including possible links as well as amplifying and buffering variables, to gain greater insight into what role they each play in employee performance and satisfaction.

Results showed that different communication channels might be related to job satisfaction and task performance through information clarity. Channels were, however, not related to job satisfaction and performance through interruptions. The proposed individual differences did not interact with these relationships.

In sum, no communication channel is merely good or bad. Instead, after considering a wide array of theories and research, the role of different communication channels appears to be influenced by a vast array of factors that extend far beyond the channel itself. Providing guidelines on use, and adapting communication styles when switching between channels, may empower employees and organizations to maximize a channels positive impact on performance and satisfaction, and thus face current market pressures head-on.

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6. Appendix

6.1. Abstract

English

Communication in businesses has dramatically changed due to advances in technology, constituting a shift in the traditional working environment. Most organizations have implemented a vast array of communication channels, in order to bridge space and time differences between co-workers, suppliers, and clients, and keep up with increasing market demands. This thesis aimed at filling a critical research gap by examining the relationships of most communication channels (face-to-face, video conferencing, audio calls, instant messaging, and e-mails) used in one specific multi-locational organization, with task performance and job satisfaction. Interruptions and information clarity were examined as possible links for these relationships. The individual differences need for predictability and ability to achieve clarity were incorporated into the model as moderators for the relationships of the mediators with the outcomes. Cross-sectional self-reported questionnaire data were obtained from 180 employees of a multi-locational organization. Ordinary least squares regression analysis showed that different communication channels were related to job satisfaction and task performance through information clarity. No channel was related to job satisfaction and performance through interruptions. Additionally, direct relationships were found for some channels with task performance. The proposed individual differences did not interact with these relationships.

German

Die Kommunikation in Unternehmen hat aufgrund der technologischen Fortschritte das Arbeitsumfeld verändert. Die meisten Unternehmen haben eine Vielzahl von Kommunikationskanälen implementiert, um räumliche und zeitliche Differenzen zwischen Mitarbeitern, Lieferanten, und Kunden zu überbrücken und den wachsenden Anforderungen des Marktes gerecht zu werden. Ziel dieser Arbeit war es, eine Forschungslücke zu schließen, indem untersucht wurde, welche Beziehungen die Kommunikationskanäle (Face-to-Face, Videokonferenzen, Audioanrufe, Sofortnachrichten, und E-Mails) einer standortübergreifenden Organisation mit der Aufgabenleistung und Arbeitszufriedenheit haben. Arbeitsunterbrechungen und Informationsklarheit wurden als mögliche Verknüpfungen für diese Beziehungen untersucht. Die individuellen Unterschiede, das Bedürfnis nach Vorhersehbarkeit und die Fähigkeit Klarheit herzustellen, wurden als Moderatoren für die Beziehungen der Mediatoren mit Arbeitsleistung und Arbeitszufriedenheit, in das Modell aufgenommen. Die Stichprobe umfasste Fragebogenquerschnittsdaten von 180 MitarbeiterInnen einer standortübergreifenden Organisation. Ergebnisse der Regressionsanalysen zeigten, dass verschiedene Kommunikationskanäle indirekt über Informationsklarheit, nicht jedoch über Arbeitsunterbrechungen, in Zusammenhang mit der Arbeitszufriedenheit und der Aufgabenleistung standen. Darüber hinaus wurden für einige Kanäle direkte Beziehungen mit Aufgabenleistung, unabhängig von Mediatoren, gefunden. Die vorgeschlagenen individuellen Unterschiede standen in keiner Wechselwirkung mit diesen Beziehungen.

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6.4. List of Abbreviations

CMC.....	Computer-mediated communication
JD-R.....	Job Demands-Resources
OLS.....	Ordinary least squares

6.5. Questionnaire

In the following, only items relevant to this thesis are presented. The extent of the complete questionnaire asked in the context of the overall study conducted by the Department of Applied Psychology: Work, Education, and Economy – Work and Organizational Psychology – at the University of Vienna, was much larger.



Dear employee at [REDACTED]

First of all, thank you very much for participating in this questionnaire. You are a great help!

The goal of the **Flexible Work Study at [REDACTED]** is to better understand what opportunities and challenges come along with flexible forms of work for employees. With asking you questions on work and personal characteristics, your relationships and well-being at work as well as work-home interactions, we want to improve your experiences with working flexibly.

This questionnaire is the first out of three that will be conducted in May 2018 (T1), September 2018 (T2) and January 2019 (T3) and are part of the **longitudinal study**. Additionally, the 2-weeks **diary study** will start in the beginning of June 2018 for which you will be briefed beforehand.

Please be sure that we will protect your data at all times. The information collected will be securely stored in such a way that only the research team can access it.

It will take around **15-20 minutes** to complete the questionnaire. We are aware that the questionnaire is quite long, however, the questions asked are required to understand your work conditions in more detail. You may use the time answering the questions as a possibility to a guided reflexion of your work and the interface between your work and private life. Also, the anonymous results will be presented to all employees after project completion in the beginning of 2019.

With your participation, you are not only adding value to research, thus, improve your work environment, you will also contribute to make a child a little more happy as we will **donate** EUR 2 to local projects of **SOS Children's Village** for every participant.

Thank you!

**Prof. Dr. Christian
Korunka
University of Vienna**

**Dr. Bettina Kubicek
University of Applied Sciences Upper Austria**

**... and the research
team!**



DEMOGRAPHICS

Let's start with a few demographic questions.

What is your gender?

Female ☐
Male ☐

What is your age?

years

What is your highest education level completed?

☐ high school

☐ university/college

☐ Other:

How many years have you been employed at [redacted]?

year(s)

How many hours per week are you working (including overtime)?

hours

Do you have staff responsibility?

Yes ☐
No ☐

At which location are you working for [redacted]?

☐ Budapest

☐ Prague

☐ Vienna

☐ Other:



PERSONAL CHARACTERISTICS

On this page we will ask you about personal traits and preferences.

To what extent do you agree to the following personal statements?

	I do not agree at all	I somewhat disagree	I partly agree	I somewhat agree	I fully agree
I hate to change my plans at the last moment.	☐	☐	☐	☐	☐
I prefer things to be predictable.	☐	☐	☐	☐	☐
If a situation is not clear to me, I usually obtain the necessary information on my own.	☐	☐	☐	☐	☐
In ambiguous situations, I often take care of things myself in order to create clarity.	☐	☐	☐	☐	☐

WORK CHARACTERISTICS

The following questions will be about the characteristics of your job and the work tasks you have to perform.

How much do the following statements apply to your work?

	does not apply at all	does rather not apply	partially applies	somewhat applies	fully applies
Based on the information I get, I feel certain about what action is required of me.	☐	☐	☐	☐	☐
Information given to me is easy to understand.	☐	☐	☐	☐	☐
Information given to me is straight to the point.	☐	☐	☐	☐	☐
Information given to me is complete.	☐	☐	☐	☐	☐

How often do you experience the following situations at work?

	very rarely / never	rarely (approx. once a week)	occasionally (approx. once a day)	often (several times a day)	very often (several times an hour)
People trying to contact or talk to me keep me from doing my work.	☐	☐	☐	☐	☐
People contact or talk to me at inconvenient moments.	☐	☐	☐	☐	☐
People trying to contact or talk to me disturb me in doing my work.	☐	☐	☐	☐	☐

How often are you using the following communication forms/channels for work?

	very rarely / never	rarely (approx. once a week)	occasionally (approx. once a day)	often (several times a day)	very often (several times an hour)
Face-to-face communication	☐	☐	☐	☐	☐
Mobile phone for calls	☐	☐	☐	☐	☐
Audio call via Lync	☐	☐	☐	☐	☐
Video conferencing via Lync	☐	☐	☐	☐	☐
E-Mail	☐	☐	☐	☐	☐
Mobile phone for chat or text messages	☐	☐	☐	☐	☐
Chat via Lync	☐	☐	☐	☐	☐
Social network site (Yammer)	☐	☐	☐	☐	☐



WORK MOTIVATION & PERFORMANCE

We will turn now to questions regarding your motivation and your performance at work.

How much do the following statements apply to your job performance?

	does not apply at all	does rather not apply	partially applies	somewhat applies	fully applies
I think I deserve a very good evaluation from my supervisor.	☐	☐	☐	☐	☐
Compared to the standards I usually get good results from my work.	☐	☐	☐	☐	☐
There are no or few complaints about the quality of my work.	☐	☐	☐	☐	☐
The results of my work could be better than they currently are.	☐	☐	☐	☐	☐



SATISFACTION & WELL-BEING

On this page we would like to learn something about your work-related satisfaction and well-being.

In general, how satisfied are you with your work life?

- ☐ not satisfied
at all
- ☐ somewhat
not satisfied
- ☐ partly
satisfied
- ☐ somewhat
satisfied
- ☐ fully satisfied

THANK
YOU

AND SEE YOU FOR THE NEXT STUDY!
Diary study – June 4-15, 2018

If you have any questions regarding this questionnaire or the upcoming one's, suggestions, or remarks,
please don't hesitate to contact the research team via email!