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EMAIL LOAD, WORKLOAD STRESS AND DESIRED EMAIL LOAD: A CYBERNETIC APPROACH

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Abstract:

Purpose - Using email is a time-consuming activity that can increase workload stress. This paper investigates the relationship between the individual's email load, workload stress and desired email load, drawing from the cybernetic theory of stress.

Design/methodology/approach - Based on prior theory, we first hypothesized relationships among email load, workplace stress and desired email load. We then tested these relationships on a sample of 504 full-time workers in the U.S., using survey data and covariance based structural equation modeling techniques.

Findings –We find that (1) higher email load is associated with higher workload stress; (2) higher workload stress is associated with lower desired email load; (3) lower desired email load is associated with lower email load; and (4) higher workload stress is associated with higher psychological strain, higher negative emotions, and lower organizational commitment.

Originality/value – The study provides a novel understanding of workload stress due to email load, through the lens of cybernetic theory. It contributes to the email overload and technostress literatures by conceptualizing desired email load as a potential outcome of workplace stress and as a regulator for email load. For practitioners, the study highlights the importance of managing employees' email load to prevent the negative effects of workplace stress and associated strains.

Keywords: Email Stress, Email Load, Cybernetic Theory, Workplace Stress, Email Overload, Technostress

1. INTRODUCTION

Checking, receiving, reading, sending and sorting through email are time-consuming activities that have a clear influence on workload stress for employees (Barley, Meyerson, & Grodal, 2011; Jackson, Burgess, & Edwards, 2006). This is especially so in situations of unsuitable email use such as unnecessary email carbon copying (Kimble, Hildreth, & Grimshaw, 1998; O'Kane, Palmer, & Hargie, 2007; Thomas & King, 2006). This influence of email load on workload stress may cause individuals to develop perceptions that the email medium is a reason for workload stress (Barley et al., 2011), and hence to desire a lower email load (i.e. to distance themselves from the stressful source). In situations where individuals do have some control over their email load (Derks, van Duin, Tims, & Bakker, 2015), their desire to disengage from email may result in reduced email use and a lower email load. However, it can be difficult for individuals to reduce their email load, as emails continue to be sent to them (Derks et al., 2015; Renaud, Ramsay, & Hair, 2006). Moreover, individuals who evaluate their email load rarely do so in a detached, objective and attitude-free manner. Individuals who hold negative attitudes towards email generally appraise workload stress more (Barley et al., 2011; Dabbish & Kraut, 2006; Sobotta & Hummel, 2015). In all of these examples, the individual's desired email load has emerged as an important concept that shapes why he or she finds email use to be stressful.

However, the literature has not examined the concept of desired email load, specifically its antecedents or consequences. Although the relationship between the individual's email load and workload stress have been investigated (E.g., Barley et al., 2011; Dabbish & Kraut, 2006; Jackson et al., 2006), the relationships between the individual's email load, workload stress and desired email load have not. The objective of this study is to examine the concept of desired email load. We do so by developing and testing a research model between an individual's email load, desired email load, and workplace stress, based on the cybernetic theory of stress (Carver & Scheier, 1982; Liang & Xue, 2009). The principles of the cybernetic approach to stress explain how individuals react to stressful encounters by trying to distance themselves away from the stressful state and to move toward more desirable states. It is a helpful conceptual approach for understanding why desired email load is an important concept which guides individuals' experience of stress from the use of the email medium. It provides therefore an appropriate theoretical lens to examine the relationships between email load, desired email load, and workload stress. We establish the positive

influence of the individual's email load on workload stress. More importantly, we investigate how individuals' workload stress can be negatively related to their desired email load as they distance themselves from the source of stress, and how their desired email load is positively related to email load. To our knowledge, these latter two relationships have not been investigated in literature on email overload, and constitute a novel aspect of our understanding of email load (Carver, 2006).

Guided by prior research on email load and work stress, and the overarching theoretical framework of the cybernetic theory of stress, we adopt a deductive research design in this study. Specifically, we first framed hypothesized relationships among email load, workplace stress and desired email load. We then tested these relationships on a sample of 504 full-time workers in the U.S., using survey data and structural equation modeling techniques. We found that email load was positively related to workload stress. Workload stress was positively related to psychological strain and negative emotions, and negatively related to organizational commitment and desired email load. Finally, desired email load was positively related to email load.

The paper is organized as follows. The next two sections present the theoretical background and our research hypotheses respectively. The fourth section presents the methods of the study. The fifth section details the results of the model testing. The last section discusses the results and their theoretical and practical implications, along with the study's limitations.

2. THEORY BACKGROUND

2.1. Email load and workload stress

Research has frequently discussed the potential of email to increase workload. The volume of emails sent and received is particularly exacerbated by the speed and convenience of sending emails to multiple recipients (Taylor, Fieldman, & Altman, 2008; Thomas & King, 2006; Vidgen, Sims, & Powell, 2011; Yan, Guo, Lee, & Vogel, 2013), the extensive use of the 'copy' function (Ingham, 2003; Kimble et al., 1998), and the sending of irrelevant information (O'Kane et al., 2007). It has been estimated that 125 billion work emails are sent and received every day – a number forecasted to grow to year after year (Radicati, 2015). Reports have further found that 80% of work email are opened (Dietzen, 2017). The activity of reading and sending emails can thus become significantly time-consuming in current-day workplaces (Mark, Iqbal, Czerwinski, Johns, & Sano, 2016). It has been estimated that, in

2006, employees spent on average 29 minutes per day reading emails, let alone sending and answering them (Jackson et al., 2006). More recent reports have estimated that receiving, reading and sending work email consume, every day, from one hour and a half (Ofcom, 2016) to over two hours and a half (Dietzen, 2017). These estimations mirror the finding that the more emails received, the longer the perceived workday and the greater the feelings of workload stress (Barley et al., 2011). Although some work-related emails can increase work effectiveness (Mano & Mesch, 2010), others distract employees from accomplishing other tasks (Burgess, Jackson, & Edwards, 2005), potentially leading to increased feelings of workload stress.

Studies on email load also focus on interruption of workflow due to email. A high daily volume of emails is often a sign of frequent emails throughout the workday. A report found that 62% of employees leave their email inbox open all day (Future Work Centre, 2015). Every incoming email is potentially notified to employees. Within a large UK company, employees were found to react to the majority of these notifications in under six seconds (Jackson, Dawson, & Wilson, 2001). Such prompt reactions necessarily fragment employees' attention and make it harder for them to return to the tasks that they were working on prior to the interruption. According to this study, employees took an average of 64 seconds to return to their main activity following an email interruption (Jackson et al., 2001). Gupta and Sharda (2008) estimated that knowledge workers lose four to five percent or 28 minutes of their workday because of such interruptions. To avoid being interrupted by email, individuals adopt various email management practices such as checking email in batches. Studies have shown however that such practices still do not lead to lower workload stress (Mark et al., 2016).

A third aspect of research on email load focuses on email overload. Email overload has been defined as the perception of the individual that his or her email load is "out of control because they receive and send more email than they can handle, find or process effectively" (Dabbish & Kraut, 2006, p. 431). In general, the higher the volume of emails, the higher the perceptions of email overload (Soucek & Moser, 2010; Sumecki, Chipulu, & Ojiako, 2011). Other predictors of email overload include email interruptions (Wajcman & Rose, 2011), time spent managing email (Barley et al., 2011; Sumecki et al., 2011), email batching (Whittaker & Sidner, 1996) or too many email folders (Dabbish & Kraut, 2006). These predictors exemplify the multiple ways in which email can increase workload and perceptions of being

overwhelmed. Email overload has been associated with an increased risk of burnout, sleep disorders and emotional distress (Barber & Santuzzi, 2015; Brown, Duck, & Jimmieson, 2014; Jackson & Farzaneh, 2012; Mano & Mesch, 2010).

Fourthly, the technostress literature, which addresses the phenomenon of stress due to the use of ICT, also acknowledges the stress creating effects of applications such as email (Tarafdar, Cooper, & Stich, 2017). Information overload, which is a potential correlate of email overload, is encompassed in the techno-overload dimension of technostress creating conditions (Tarafdar, Qiang Tu, Ragu-Nathan, & Ragu-Nathan, 2007). Email is now ubiquitous and often accessed anytime, anywhere (Eurofound and the International Labour Office, 2017). Employees who access email outside contracted hours work longer hours (Eurofound and the International Labour Office, 2017), which could almost account for an extra day of unpaid overtime per week (BBC News, 2014). Workload stress due to email overload can, therefore, spill over into employees' personal lives (Stich, Tarafdar, & Cooper, 2018). The techno-invasion dimension of technostress creating conditions captures this perception that ICT has invaded one's personal life (Barber & Santuzzi, 2015; Day, Paquet, Scott, & Hambley, 2012; Tarafdar et al., 2007).

Finally, we make a note of how email load is assessed. We define 'email load' as the extent of email sent, read and received by the individual. Literature shows that individuals' perception of their email activity is a good indicator of their email load (Karr-Wisniewski & Lu, 2010). Studies also show that in order to prevent cognitive overload, individuals assess their information processing (in this case their email use) activity through simple and manageable criterion (Browne, Pitts, & Wetherbe, 2007). According to a number of studies (E.g., Brown et al., 2014; Dabbish & Kraut, 2006; Reinke & Chamorro-Premuzic, 2014), the extent of email, sent, read and received together form such a set of criterion for assessing the individuals' perception of email load.

2.2. Desired email load

According to the organizational psychology literature, individuals in organizations have certain 'desired' conditions with respect to specific organizational factors such as information load (Frone & McFarlin, 1989) or job control (Cummings & Cooper, 1979). A 'desired' state is defined as "any state or condition the employee consciously wants" (Edwards, 1992, p. 249). We thus define 'desired email load' as the email load that the employee wants.

Literature on email load suggests that the extent to which individuals think email is helpful or desirable, influences their email use. For instance, individuals who are apprehensive towards certain communication media tend to use these media less (Scott & Timmerman, 2005). This is reflected in their behavior with respect to the use of workplace communication technologies, such as in asking for corporate smartphones (Cavazotte, Heloisa Lemos, & Villadsen, 2014; Matusik & Mickel, 2011; Waller & Ragsdell, 2012). Similarly, individuals who consider email to be critical to their work use email more (Dabbish & Kraut, 2006), and potentially have higher desired email load. Further, when individuals have a positive attitude towards use of email, they are thus more likely to send more emails, thereby imposing emails on their colleagues who are the receivers (Renaud et al., 2006, Mazmanian, Orlikowski, & Yates, 2005; Sumecki et al., 2011). This in turn may also influence the amount of emails they get back (Brown et al., 2014; Dabbish & Kraut, 2006). Based on the above, individuals' desired email load (i.e., the email load the individual wants) is, therefore, a potential predictor of email load.

Literature has also discussed that the workload stress experienced due to email, causes individuals to want to use email less email (Pillet & Carillo, 2016). Based on these studies, less desired email load (i.e., the email load the individual wants) is a possible reaction to workload stress caused by email.

2.3. Cybernetic theory of stress

Cybernetic theory applied to human behavior is concerned with human beings self-regulating their behaviors (Carver & Scheier, 1982). The cybernetic theory of stress (Cummings & Cooper, 1979; Edwards, 1992) suggests that individuals try to distance themselves from stressful stimuli and attempt to influence their environments so as to reduce the intensity of such stimuli. When individuals face a threatening stimulus, that is, an undesired state, they try to increase the distance between them and this undesired state. This 'distancing' is termed as the *discrepancy enhancing mechanism* (Carver, 2006). The undesired state becomes an 'anti-goal' based on a negative perception of the threatening stimulus (Carver, 2006). In contrast, the *discrepancy reducing mechanism* (Carver, 2006) is about trying to bring the actual and desired states closer. Therein, the desired state is the goal that the individual wants to achieve. Increasing the distance to an undesired state (i.e., discrepancy enhancing) and reducing the distance to a new desired state (i.e., discrepancy reducing) corresponds to a coping process wherein individuals act to regulate the effects of a threatening stimulus (Cummings &

Cooper, 1979, Fay & Sonnentag, 2002, Carver, 2006), and embodies the primary aspects of the cybernetic theory of stress.

The cybernetic approach has been used to explain technology acceptance and avoidance behaviors. For instance, when users feel threatened by malicious use of IT, the IT threat becomes an 'anti-goal', such that they engage in discrepancy enhancing or IT use avoidance behaviors, that take them away from the threatening IT. Similarly, when users have the goal to enhance IT security, they adopt software that will protect them, thus engaging in discrepancy reducing or IT use acceptance behaviors (Liang & Xue, 2009).

Based on the above, we note that the cybernetic theory of stress can be fruitfully applied to investigate the individual's technology use behavior, especially when use of such technology is generally considered stressful, as is the case for email use. Our objective in this research is to explain how individuals regulate their use of email as a response to workplace stress. The cybernetic theory, which provides us with the conceptual structure of discrepancy enhancing and discrepancy reducing behaviors as regulatory mechanisms for dealing with stressful situations, is thus the informing basis of the research model that we introduce next.

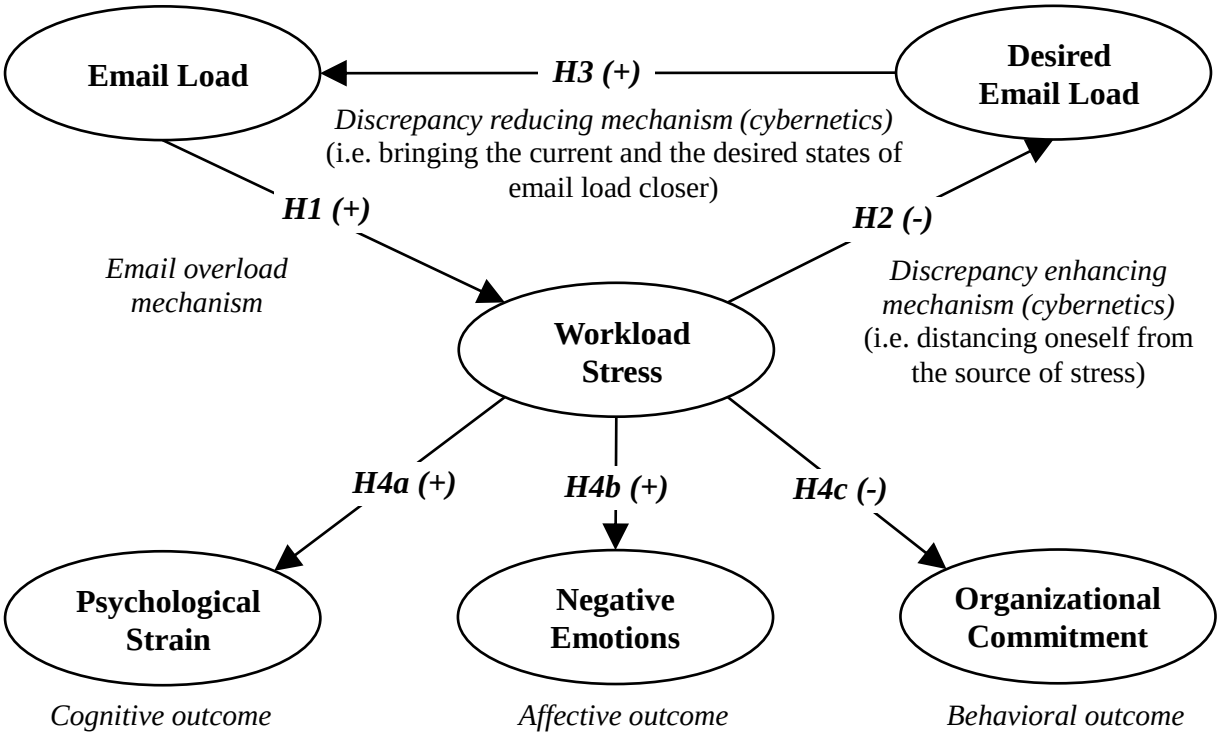
3. RESEARCH MODEL

In this section, we introduce our research model and develop our hypotheses, as shown in Figure 1. We define *email load* as the extent of emails currently sent, read and received by the individual in a workplace context. These three email use-related activities cover most of the time spent using email, address the key aspects of email load, conceptually relate well to one another and are relevant to workload stress from email load (Barley et al., 2011; Dabbish & Kraut, 2006). *Desired email load* refers to the extent of email that the individual wants, in the form of emails sent, received and read. *Workload stress* is defined as the individual's perception that his or her workload exceeds his or her capability or skills (Cooper, Dewe, & O'Driscoll, 2001). *Psychological strain* consists of factors such as difficulty in making decisions, feeling unable to cope or having difficulty concentrating (Johnson & Cooper, 2003; Kahn & Byosiere, 1992). *Negative emotions* consist of emotions such as nervousness or apprehension (Cooper et al., 2001). O*rganizational commitment* embodies the individual putting himself or herself out for one's organization and thinking it is worthwhile working there (Leiter & Maslach, 1988).

We integrate the literatures on cybernetic theory of stress, email overload, and organizational

stress, to frame our hypotheses. Thus, we hypothesize that: (1) email load is positively related to workload stress (Hypothesis H1), as **informed by the email overload literature**; (2) workload stress is negatively related to desired email load (Hypothesis H2), as illustrated by the **discrepancy enhancing mechanism from the cybernetic theory of stress**; (3) desired email load is positively related to email load (Hypothesis H3), as exemplified in the **discrepancy reducing mechanism from the cybernetic theory stress**; and, that (4) workload stress is positively related to psychological strain (Hypothesis H4a) and negative emotions (Hypothesis H4b), and negatively related to organizational commitment (H4c), based on the **organizational stress literature** We next develop the logic for each hypothesis.

Figure 1. Research Model.



3.1. Hypothesis 1: Relationship between email load and workload stress (email overload mechanism)

As alluded to in Section 2.1, studies have discussed the positive relationship between email load and workload stress. Reading and sending emails are time-consuming and overloading activities that take up a large proportion of individuals' workdays (Barley et al., 2011; Burgess et al., 2005; Jackson et al., 2001; Soucek & Moser, 2010) because of the time spent reading and replying to a large daily volume of email (Barley et al., 2011) and the time it

takes to recover from email interruptions (Jackson et al., 2001; Mark et al., 2016). Such activities lengthen the workday. In addition to the observation that time spent receiving, reading and sending email is generally stressful *per se*, studies show that the longer the time spent using email, the higher the stress (Mark et al., 2016). Receiving email is also mentally overloading, given that it interrupts the workflow and fragment individuals' attention (Gupta & Sharda, 2008; Jackson et al., 2001). Thus, the sending, receiving and reading of email represents a load for the individual, both because it creates mental overload, and because it creates additional work that increases feelings of workload stress. We frame Hypothesis 1 below to exemplify the *email overload mechanism* (See Figure 1) at play. That is, when individuals' email load is high, it is associated with increased workload, thereby resulting in workload stress.

> **Hypothesis 1**: Email load (that is, the extent to which the individual currently sends, receives and reads email) is positively related to workload stress.

3.2. Hypothesis 2: Relationship between workload stress, and desired email load (discrepancy enhancing mechanism)

We have discussed so far how email load can be positively related to workload stress. We now suggest how workload stress can be negatively related to desired email load. As a 'desired' state is "any state or condition the employee consciously wants" (Edwards, 1992, p. 249), desired email load thus refers to the email load that the employee wants, that is, the extent of emails sent, received or read. The idea that workload stress from email load could subsequently foster rejection and avoidance of email draws on cybernetic theory (Carver & Scheier, 1982). We recall that the discrepancy enhancing mechanism is about the individual distancing himself or herself from an undesired state, or 'anti-goal'. Applying this concept to our study, workload stress is the 'anti-goal' that employees want to avoid. Previous studies have investigated workload stress as a threatening stimulus due to which individuals are likely to employ a discrepancy enhancing mechanism (E.g., Frone & McFarlin, 1989). As employees often blame email for their workload stress (Barley et al., 2011), they may think that reducing their email load could reduce the intensity of their workload stress, and may thus desire lower email loads. The rejection of email may thus be a reaction to the perceived burden of too much email (Vidgen et al., 2011, p. 90). Furthermore, receiving, reading and sending email are time-consuming activities (Barley et al., 2011; Jackson et al., 2006; Mark et al., 2016). One study found that reading email alone can take 29 minutes each day (Jackson

et al., 2006), and another estimated that employees can lose up to 28 minutes per day being interrupted by email (i.e., receiving email) (Gupta & Sharda, 2008). Individuals are likely to want to reduce the reading, sending or receiving of email when they are already facing unmanageable deadlines and workloads. This may also explain why certain individuals would like to get rid of email altogether (Pillet & Carillo, 2016). Practical examples support these research findings. For example, in some organizations, "email-free" days or weeks are used to raise awareness of email-related workload stress and to reduce the desired email load of their employees (Mark, Voida, & Cardello, 2012). The discrepancy enlarging mechanism (Carver, 2006) is thus particularly appropriate, as it suggests that individuals may reject email when they believe it is one important cause of their workload stress. Hypothesis 2 highlights the *discrepancy enhancing mechanism*, as shown in Figure 1.

> **Hypothesis 2**: Workload stress is negatively related to desired email load (that is, the extent of emails the individual want to send, receive and read).

3.3. Hypothesis 3: Relationship between desired email load and email (discrepancy reducing mechanism)

Our previous hypotheses suggest that email load will be positively related to workload stress (Hypothesis 1), which will in turn be negatively related to the desired email load (Hypothesis 2). That is, employees appraise their workload to be stressful when they appraise their email load to be too high. They react to this workload stress by desiring a lower email load. Hypothesis 3 suggests that when employees desire a lower email load, they use less email.

Drawing from the cybernetic theory of stress, we recall that the discrepancy reducing mechanism is about trying to bring the actual and desired states closer. Applied to our study of email load, the discrepancy reducing mechanism is about employees trying to bring their actual email load as close as possible to their desired email load. Individuals who are apprehensive about emails tend to use email less (Scott & Timmerman, 2005), and individuals who find emails useful and desire high email load tend to use email more (Dabbish & Kraut, 2006; Matusik & Mickel, 2011; Renaud et al., 2006). Although individuals have few direct controls on the extent to which they receive and read email, they often do have control on the extent to which they send email (Renaud et al., 2006). Individuals who do desire high email loads could reach their desired state by sending more email, and thus receive more email in response (Brown et al., 2014; Dabbish & Kraut, 2006). Practical findings support these research findings. Indeed, managers exemplify this

mechanism, as they often send more emails when they need responses from others (Byron, 2008). We know that individuals want to reach desired states in the context of IT use, and will adjust their behaviors so that their goals can be met (Carver, 2006; Liang & Xue, 2009). In the case of email use, this can work both when individuals desire either higher or lower email loads than what they have. For example, on the one hand, individuals who desire low email load can ignore emails piling in their inboxes and turn to alternative communication media (Markus, 1994). On the other hand, however, individuals who desire high email load can leave handwritten notes and voicemails to their colleagues asking to reply to their email (Markus, 1994). In both cases, individuals would try to close the distance between their actual and desired email loads. Hypothesis 3 exemplifies the *discrepancy reducing mechanism*, as shown in Figure 1.

> **Hypothesis 3**: Desired email load (that is, the extent of emails the individual want to send, receive and read) is positively related to email load (that is, emails the individual currently sends, receives and reads).

3.4. Hypotheses 4: Relationship between workload stress and outcomes (stress mechanisms)

According to the stress literature, threatening stimuli such as conditions that create workload stress lead one to experience strain (Lazarus, 1990). Strain manifests itself in a variety of different responses, often categorized in cognitive, affective and behavioral responses (Cooper et al., 2001).

Cognitive responses manifest in psychological outcomes such as psychological strain (Kahn & Byosiere, 1992). Psychological strain embodies conditions such as having difficulty in making decisions, feeling unable to cope or having difficulty concentrating (Johnson & Cooper, 2003). Individuals exposed to workload stress can experience these conditions, because workload stress depletes their capacity to meet job demands up to the point that they become unable to cope and recover from work (Maslach & Leiter, 2017), resulting in chronic fatigue and psychological ill health (Sparks, Cooper, Fried, & Shirom, 1997). We thus frame Hypothesis 4a as follows.

> **Hypothesis 4a**: Workload stress is positively related to psychological strain.

Affective responses to stressful conditions manifest in the form of negative emotions such as anxiety, nervousness or apprehension (Cooper et al., 2001). Individuals respond to workload

stress by expressing such negative emotions because such stress can take an emotional toll (Wright & Doherty, 1998). Indeed, workload stress is of particular relevance to negative emotions because workload stress is a negative stimuli that can lead individuals to frequently feel anxious, angry or frustrated (Spector, Zapf, Chen, & Frese, 2000), and to a general state of emotional exhaustion associated with negative emotions (Maslach & Leiter, 2017). Hypothesis 4b is framed to reflect this effect of workload stress on negative emotions:

Hypothesis 4b: Workload stress is positively related to negative emotions.

Behavioral responses manifest in how individuals function in organizations and affect key attitudes that the individual has toward his or her job or their organization (Cooper et al., 2001). Organizational commitment consists in behaviors such as being prepared to put oneself out for one's organization (Leiter & Maslach, 1988). It is a notably important behavioral response to work related stress because it will determine if the individual is prepared to go the 'extra mile' at work or leave the organization or engage in presenteeism behavior (being present but contributing little added value to their job). Workload stress can negatively impact organization commitment because individuals being overloaded can develop depersonalized and less enthusiastic views of the organizations they use their energy for (Leiter & Maslach, 1988). We thus frame Hypothesis 4c as follows:

Hypothesis 4c: Workload stress is negatively related to organizational commitment.

We next proceed to test our hypotheses.

4. METHOD

In this section, we present the details of our research design. To test our hypotheses that were informed by the literatures from cybernetic theory, email overload and organizational stress, we collected primary survey data for the purpose of this study. We describe our instruments, sample and data collection procedures. We also present the analysis of data we undertake to test our hypotheses.

4.1. Sample and data collection procedure

We collected data from a sample of full-time U.S. workers recruited from a Qualtrics panel. This panel company was selected because of the quality of their samples as reported in literature (Brandon, Long, Loraas, Mueller-Phillips, & Vansant, 2014). 795 individuals accessed the online survey from a link they received by email. 67 of those were rejected as

they were not full-time workers. 222 were rejected because they failed to correctly answer the attention filters, and 2 were because they answered four times quicker than the average answering time. In total, 504 complete valid responses were collected, representing a usable response rate of 63%. This sample was composed of 47.4% men and 52.6% women aged from 20 to 73 years and having a mean age of 44 years. The full sample characteristics are presented in Appendix 1.

4.2. Measures

4.2.1. Email load and desired email load

We measured email load and the desired email load on the basis of email sent, received and read. These three components of email load have been commonly used in email research (E.g., Dabbish & Kraut, 2006). Email load was measured with three items: "At work, to what extent do you (1) receive / (2) send, forward or reply to / (3) read work e-mail?" This scale of three items was found to be reliable at $\alpha = .875$. The desired email extent was measured using three similar items: "At work, to what extent would you like to (1) receive / (2) send, forward or reply to / (3) read work e-mails?" This scale of three items was found reliable at $\alpha = .871$. Both these items were assessed using 7-point Likert scales ranging from "1 = Not at all" to "7 = To a very great extent"[1].

4.2.2. Workload stress

Workload stress was measured using items adapted from workplace stress instruments found psychometrically reliable in previous studies (Donald et al., 2005; Johnson, 2009; Johnson & Cooper, 2003). The three items assessed the extent to which participants were troubled about (1) facing unmanageable deadlines, (2) facing unmanageable workloads, and (3) lacking time to do their jobs as well as they would like. This scale was found reliable ($\alpha = .860$). Each item was assessed on a 6-point Likert scale of agreement from 1="Strongly Disagree" to 6="Strongly Agree", as done in previous studies having used these items (Donald et al., 2005; Faragher, Cooper, & Cartwright, 2004; Johnson & Cooper, 2003) and in other instruments measuring workload stress (E.g., Lyne, Barrett, Williams, & Coaley, 2000).

[1] We note that our measurement of email load is different from measurement of email overload, which is what is usually done in the literature. According to the literature, email overload is measured by items such as "I find dealing with my email overwhelming" (Dabbish and Kraut, 2006, p. 434) or "I get too much email" (Hogan & Fisher, 2006, p. 1). Its measurement is thus about both the email and the cognition associated with it. We measure email load (i.e., the extent of emails sent, read and received) and workload stress separately. Our email load items do not contain cognition of workload stress, and our workload stress items do not refer to email use.

4.2.3. Psychological strain, organizational commitment, and negative emotions

Psychological strain was measured with three items taken from previous studies (Donald et al., 2005; Johnson, 2009; Johnson & Cooper, 2003). The items asked for the frequency of occurrence over the last three months of the following: (1) difficulty in making decisions, (2) feeling unable to cope, and (3) having difficulty concentrating. The frequency was assessed on a 4-point Likert scale from 1=”Never” to 4=”Often”. The scale was found reliable (α = .855).

Negative emotions were measured using three items taken from the PANAS scale (Watson & Clark, 1999). The scale asked the extent to which respondents generally felt (1) afraid, (2) nervous, and (3) scared. This frequency was assessed on a 5-point Likert scale ranging from 1=”Very slightly or not at all” to 5=”Extremely”. The reliability of this scale was satisfactory (α = .856).

Organizational commitment was measured with three items developed in stress research to represent behavioral outcomes of work stressors (Donald et al., 2005; Johnson, 2009; Johnson & Cooper, 2003). The three items asked respondents the extent to which they (1) felt it was worthwhile to work hard for their organizations, (2) were prepared to put themselves out for their organizations if necessary, and (3) were committed to their organizations. Each item was assessed on a 6-point Likert scale of agreement from 1=”Strongly Disagree” to 6=”Strongly Agree”, as for the aforementioned workload stress scale. As in previous studies, the scale was found reliable (α = .862).

4.2.4. Control variables

In order to rule out alternate factors that might influence workload stress, we controlled for a number of variables. In terms of individual characteristics, we selected the respondent’s age, sex, and education level. In terms of work related variables, we selected the number of persons supervised by the respondent, and the respondent’s occupation, industry and company size (See Appendix 1).

4.3. Statistical analysis

We assessed the reliability and validity of the constructs by examining the Cronbach’s Alpha, Average Variance Extracted (AVE), and the inter-construct correlations. Our measurement model and hypotheses were tested using covariance-based structural equation modeling

(SEM) with maximum likelihood (ML) estimation[2]. To evaluate our measurement and structural models, we relied on a mix of recommended fit indices. We followed the recommended cut-off values of Hu and Bentler (1999) to assess whether our models were of acceptable fit. For each model, Chi-Square (χ^2) with its degrees of freedom and significance, the Comparative Fit Index (CFI), the Root Mean Square Error of Approximation (RMSEA), the Standardized Root Mean Square Residual (SRMSR), the Goodness-of-Fit index (GFI), the Adjusted Goodness-of-Fit index (AGFI), the Normed Fit Index (NFI), and the Tucker-Lewis Index (TLI) were computed. For a good fitting model, the CFI should exceed .95, the RMSEA should not exceed .06, the SRMSR should not exceed .08 (Hu & Bentler, 1999), the GFI, AGFI, NFI and TLI should exceed .90 (Salisbury, Chin, Gopal, & Newsted, 2002), and the χ^2/df should be between 1 and 5 (Salisbury et al., 2002). Using these techniques and guidelines, we now present the results for the measurement and structural models.

5. RESULTS

5.1. Construct reliability and validity

Table 1 shows the means, standard deviations and reliability of the constructs, together with their item loadings. The reliability, measured by Cronbach's Alpha is greater than the recommended value of 0.7, for all constructs. Using Fornell and Larcker's (1981) criteria, the convergent validity of a construct is satisfactory when (1) all of its indicators are significant and have loadings exceeding 0.7 and (2) its Average Variance Extracted (AVE) value exceeds 0.50. All items load significant at $p < .001$ with their standardized loading range from .715 to .921. The constructs thus demonstrated satisfactory convergent validity. The discriminant validity of the constructs is satisfactory when the square root value of their AVE is greater than their highest correlation with other constructs (Chin, 1998). This was the case for each of our constructs (See Table 2). Furthermore, we did not find common method bias to be a significant concern in our study based on the Harman's single factor test (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

[2] The analyses were done using the *R* software with the package *lavaan* (Rosseel, 2012) version 0.5-20 for SEM and *semTools* (Pornprasertmanit, Miller, Schoemann, & Rosseel, 2013) version 0.4-11 for the calculations of Cronbach's Alpha and Average Variance Extracted (AVE). The covariance matrix is reported in Appendix 2 and the *R* syntax is reported in Appendix 3.

Table 1. Item Loadings and Significance Levels for Constructs (N = 504).

Items descriptions	Standardized loading
Email load *(α = .875; Mean = 4.89; Std Deviation= 1.60)*	
At work, to what extent do you receive work emails? (EL_receive)	.800
At work, to what extent do you send, forward or reply to work emails? (EL_send)	.843
At work, to what extent do you read work emails? (EL_read)	.868
Desired email load *(α = .871; Mean = 4.16; Std Deviation = 1.54)*	
At work, to what extent would you like to receive work emails? (DEL_receive)	.816
At work, to what extent would you like to send, forward or reply to work emails? (DEL_send)	.830
At work, to what extent would you like to read work emails? (DEL_read)	.852
Workload stress *(α = .860; Mean = 2.57; Std Deviation = 1.33)*	
Facing unmanageable deadlines (LOAD1)	.772
Facing unmanageable workloads (LOAD2)	.960
Lacking time to do your job as well as you would like (LOAD3)	.761
Psychological strain *(α = .855; Mean = 1.75; Std Deviation = 0.76)*	
Having difficulty in making decisions (STRAIN1)	.793
Feeling unable to cope (STRAIN2)	.847
Having difficulty concentrating (STRAIN3)	.803
Negative emotions *(α = .856; Mean = 1.76; Std Deviation = 0.85)*	
Feeling afraid (NE1)	.883
Feeling nervous (NE2)	.756
Feeling scared (NE3)	.831
Organizational commitment *(α = .862; Mean = 4.29; Std Deviation = 1.19)*	
Feeling it is worthwhile to work hard for one's organization (ORGCOM1)	.921
Being prepared to put oneself out for one's organization if necessary (ORGCOM2)	.715
Being committed to one's organization (ORGCOM3)	.838

Note. All items loadings were significant at $p < .001$.

Table 2. Construct Correlations and Average Variance Extracted

	1.	**2.**	**3.**	**4.**	**5.**	**6.**
1. Email load	***0.84***					
2. Desired email load	0.80***	***0.83***				
3. Workload stress	-0.07	-0.22***	***0.83***			
4. Psychological strain	0.01	-0.09	0.49***	***0.82***		
5. Negative emotions	-0.06	-0.12*	0.40***	0.71***	***0.82***	
6. Organizational commitment	0.17***	0.32***	-0.33***	-0.35***	-0.28***	***0.83***

Note. Bold italic cells show the square root of AVE for each construct.
Note 2. ***: $p < .001$; *: $p < .05$.

5.2. Structural model

The construct validities being satisfactory, the hypotheses were then examined using SEM. The structural model presents the results of the hypotheses testing. The fit indices are presented in Table 3. The results showed that the model had a good overall fit. Table 4 and Figure 2 show that all the hypotheses were supported. Email load was positively related to workload stress (β = .229, p < .05), thereby supporting Hypothesis 1. Hypothesis 2 and 3 were also supported, as workload stress was negatively related to desired email load (β = -.386, p < .001), and as desired email load was positively related to email load (β = .764, p < .001). Finally, workload stress was positively related to both psychological strain (β = .489, p < .001) and negative emotions (β = .404, p < .001), and negatively related to organizational commitment (β = -.332, p < .001), thereby supporting Hypotheses 4a, 4b and 4c. Workload stress was not significantly related to any of the control variables.

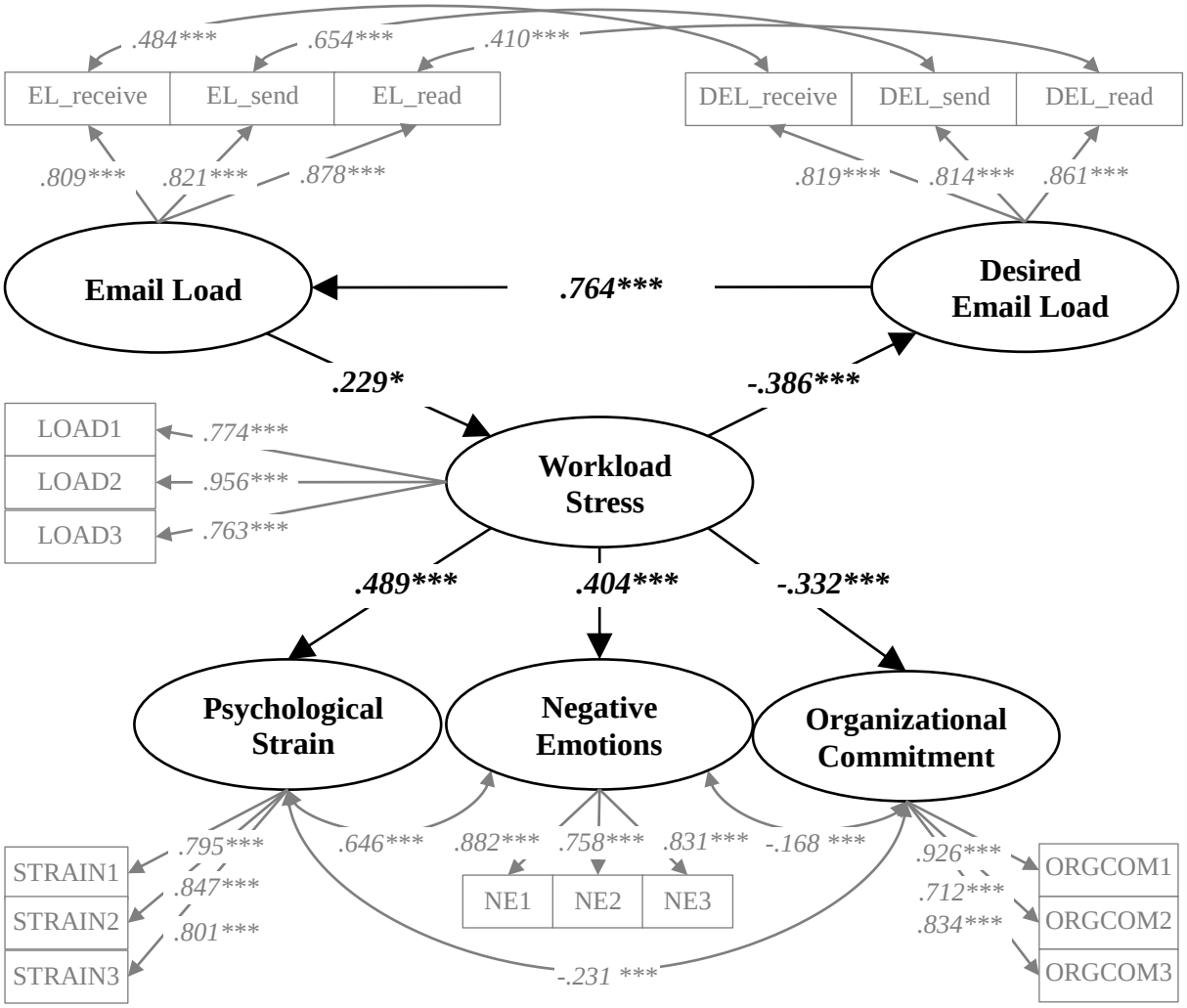
Table 3. Fit Indices for the Structural Model (N = 504).

Fit indices	Recommended values	Structural model
χ^2		229.00
d.f.		123
Sig. (p value)		.00
CFI	> .95 (Hu & Bentler, 1999)	.98
RMSEA	< .06 (Hu & Bentler, 1999)	.04
SRMR	< .08 (Hu & Bentler, 1999)	.06
GFI	> .90 (Salisbury et al., 2002)	.95
AGFI	> .90 (Salisbury et al., 2002)	.93
NFI	> .90 (Salisbury et al., 2002)	.96
TLI	> .90 (Salisbury et al., 2002)	.98
χ^2/df	[1;5] (Salisbury et al., 2002)	1.87

Table 4. Hypotheses testing (N = 504).

Hypotheses	Standardized estimate	Sig.
H1: Email load → Workload stress	.229	.018
H2: Workload stress → Desired email load	-.386	.000
H3: Desired email load → Email load	.764	.000
H4a: Workload stress → Psychological strain	.489	.000
H4b: Workload stress → Negative emotions	.404	.000
H4c: Workload stress → Organizational commitment	-.332	.000

Figure 2. Structural Model (N = 504).



Note. ***: $p < .001$; *: $p < .05$

6. DISCUSSION

The purpose of this research was to investigate the relationships between email load, workload stress, and desired email load. We addressed it by investigating these relationships based on theoretical foundations from email overload literature, stress theories, and cybernetic theory, thereby unveiling new mechanisms influencing email load and desired email load. Specifically, we found that the extent of emails sent, received and read is positively related to workload stress, that workload stress is negatively related to the desired extent of emails sent, received and read, and that the desired extent of emails sent, received and read is positively related to the extent of emails sent, received and read. Furthermore, workload stress is positively related to psychological strain and negative emotions, and negatively related to organizational commitment. Our study makes a number of theoretical

contributions, opens up avenues for further research and has implications for practice, as we describe below.

6.1. Implications for research

The first theoretical contribution of this study is that it provides a novel understanding of workload stress due to email load, through the lens of the cybernetic theory. Literature has primarily investigated the relationships between email load and workload stress (i.e., email overload mechanism), but has not considered how individuals can engage in approach and avoidance behaviors regarding email use (i.e., discrepancy reducing and enhancing mechanisms). Our study examines these through the added construct of desired email load and through an examination of its antecedent and consequent effects. Specifically, we considered how discrepancy enlarging and discrepancy reducing mechanisms (Carver, 2006) can be applied to understand how individuals react to workload stress from email load. One limitation of this study is that it is based on cross-sectional data. However, despite that, we find evidence that cybernetics theory can theoretically inform research that investigates stress from email load. Future studies could use longitudinal methods such as diary studies to look at how the relationships examined in this paper can develop over time. Based on our findings, we suggest that individuals possibly cope with higher workload stress due to email received, sent and read, by desiring a lower email load. They further, seek to adjust the extent of email received, sent and read, in line with their desired email load.

Second, the study provides a deeper understanding of email overload by examining the regulatory mechanisms at play between email load, desired email load and workplace stress. Desired email load is important because it serves as a reference point for individuals to assess their email use. Stress literature has shown that desired states are core to how individuals cognitively identify the sources of their stress and the associated coping responses (Cummings & Cooper, 1979; Edwards, 1992). While sources of stress (email load in our study) help individuals identify their undesired states, desired states (desired email load in our study) help them identify relevant coping responses (Carver, 2006). We thus suggest that desired email load is central to understanding both email rejection (Barley et al., 2011; Mark et al., 2012; Pillet & Carillo, 2016) and email management practices (Kalman & Ravid, 2015; Mark et al., 2016). In spite of that it has not been examined in research on email use. While previous studies have suggested that individuals desiring to use email less suffer from greater email overload (E.g., Barley et al., 2011; Dabbish & Kraut, 2006; Mark et al., 2016; Sobotta

& Hummel, 2015), they do not explain how desired email load can regulate the individual's email use when the latter leads to workload stress. By drawing on the mechanisms suggested by cybernetic theory, we conceptualize desired email load in our framework as both a potential outcome of workplace stress and a potential influencer of email load, something that current research does not examine. Interestingly, the effect size of the email load–workload stress relationship (β = .229, p < .05) is both smaller and of higher p value than that of the workload stress–desired email load relationship (β = -.386, p < .001). This finding implies that the discrepancy enhancing mechanism may be stronger than the email overload mechanism. That is, individuals might 'over-correct' for the effects of higher email load by desiring a lower email load than what might be required to retain existing levels of workload stress. In addition to these new findings, our study also supports previous findings that have shown that the more emails sent, received and read, the greater the workload stress (E.g., Barley et al., 2011; Jackson et al., 2001).

We further note that our findings have complementarity with studies that have focused on email management such as email batching and regular inbox cleaning (Mark et al., 2016; Kalman & Ravid, 2015). Such email management practices have potential conceptual links to our study because they could form the basis of discrepancy enhancing mechanisms (E.g., practices such as email batching could be adopted by users in order to avoid email interruptions) and discrepancy reducing mechanisms (E.g., practices such as cleaning their email inboxes regularly to keep their email load low). Future research could examine these links. We further note that the cybernetic approach may be helpful for understanding, in a similar way, the stressful effects of other characteristics of IT use such as connectivity and multitasking. Future research can study discrepancy-enhancing and discrepancy-reducing processes associated with these aspects of IT as well and identify implications for other stressors such as techno-overload and techno-invasion (Tarafdar et al., 2007).

Third, in examining the relationship between workload stress, and psychological strain, negative emotions and organizational commitment, we show that these negative effects can arise directly and indirectly from email load. Literature has often considered email overload by itself (E.g., Brown et al., 2014; Dabbish & Kraut, 2006; Sumecki et al., 2011) or as an antecedent of work overload (E.g., Barley et al., 2011; Taylor et al., 2008), burnout (E.g., Reinke & Chamorro-Premuzic, 2014) and emotional exhaustion (E.g., Brown et al., 2014). We enrich this literature by conceptualizing and validating workload stress as well as the

three types of strains as potential effects of email load. In doing so, we also create theoretical links between the literatures on email use and concepts from organizational stress. To the best of our knowledge, such integration between two literatures is rare.

Fourth, we note here that the relationship linking desired email load to actual email load did not take into consideration the role of control the individual has over his or her email load (Hair, Renaud, & Ramsay, 2007). Indeed, employees might not have entire control over their email load. Desiring one's email load to decrease might not be enough to decrease one's email load. For instance, literature has discussed the imbalance in control over email load between managers and subordinates (E.g., Derks et al., 2015) or between senders and receivers (E.g., Burgess et al., 2005; Hiltz & Turoff, 1985). We note, however, that controlling for the number of persons under one's supervisions and for one's occupation did not influence our results, meaning that our model held for both managers and non-managers. Future research could study the effect of control over email load (E.g., Hair et al., 2007) on the relationships examined in this paper.

Fifth, this study contributes to the technostress literature in the following ways. Through the cybernetic theory of stress, we introduce the concept of regulation as a means of coping with stress from the use of email. In our study, we examined regulation as embodied in changes in desired email load. Future research can examine other means of regulation as ways to cope with technostress from other types of applications (Tarafdar et al., 2017). Similar to our findings about desired email load, desired technology use or attitudes towards technology may act as technostress coping responses and lead to IS use related behaviors (e.g., IS approach and avoidance).

6.2. Implications for practice

In terms of implications for practice, we empirically demonstrated the existence of discrepancy enlarging and discrepancy reducing mechanisms. On the one hand, employees may want to distance themselves from email when they experience high levels of workload stress. It may therefore be risky to promote a culture encouraging the use of email (Sumecki et al., 2011) in organizations with already high levels of workload stress. On the other hand, employees want to send, receive and read emails to the extent they actually desire to do so. It may thus be equally risky to reduce or ban emails (Pillet & Carillo, 2016) when employees consider email to be an important medium (Sumecki et al., 2011). Individuals' desired email load should also be respected by those who have control over their email load. Senders with

managerial responsibilities have a particular responsibility to consider the email they send to their subordinates (Derks et al., 2015), given their hierarchical power over them. Similarly, when individuals send email, they should consider the fact that the receivers' extent of emails received and read may increase. Adapting one's email use to others' desired email loads may however be difficult in organizations that already have strong cultures either promoting (Sumecki et al., 2011) or discouraging (Pillet & Carillo, 2016) email use and, thereby, limiting individual opportunities to self-adjust. Finally, we have shown that workload stress can be associated with increased psychological strain and negative emotions, and decreased organizational commitment. The email use regulating mechanisms we have unveiled should thus matter to organizations, because through these relationships, they matter to the individuals' workplace well-being.

To conclude, given that email is the most widely used medium for electronic communication in organizations, it is important to understand the relationships among employees' email load, workload stress and desired email load. In this paper, we show that workload stress can be influenced by email load and in turn influence desired email load. The relationships investigated in this paper can form the basis of future studies that examine how individuals cope with workload stress from their use of organizational email.

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APPENDICES

Appendix 2. Sample characteristics.

Characteristic	Count	Percent	Mean	Std
Age			44	12.3
20-24	13	2.6%		
25-29	52	10.3%		
30-34	71	14.1%		
35-39	69	13.7%		
40-44	64	12.7%		
45-49	60	11.9%		
50-54	59	11.7%		
55-59	54	10.7%		
60 or more	62	12.3%		
Sex				
Male	239	47.4%		
Female	265	52.6%		
Education level				
Completed Some High School	4	0.8%		
High School Graduate	30	6.0%		
Completed Some College	123	24.4%		
College Degree	200	39.7%		
Completed Some Postgraduate	25	5.0%		
Master's Degree	95	18.8%		
Doctorate, Law or Professional Degree	27	5.4%		
Persons supervised			12.6	59.6
0	213	42.3%		
1-5	147	29.2%		
6-10	56	11.1%		
11-15	26	5.2%		
16-20	13	2.6%		
21-25	14	2.8%		
26 or more	35	6.9%		
Industry				
Agriculture, forestry, fishing, and hunting	4	0.8%		
Mining, quarrying, and oil and gas extraction	1	0.2%		
Construction	31	6.2%		
Manufacturing	51	10.1%		
Wholesale and retail trade	47	9.3%		
Transportation and utilities	13	2.6%		
Information	20	4.0%		
Financial activities	24	4.8%		
Professional and business services	73	14.5%		
Education and health services	108	21.4%		
Leisure and hospitality	9	1.8%		
Other services	105	20.8%		
Number of employees in the organization			12791	68294
1 - 49	139	27.6%		
50 - 499	155	30.8%		
500 - 999	52	10.3%		
1,000 - 4,999	53	10.5%		
5,000 - 9,999	29	5.8%		
10,000 or more	66	13.1%		
Missing	10	2.0%		

Appendix 2. Covariance Matrix (N = 504).

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1. EL_receive	3.30																	
2. EL_send	2.20	3.24																
3. EL_read	2.24	2.25	3.01															
4. DEL_receive	1.93	1.58	1.54	2.86														
5. DEL_send	1.46	2.21	1.58	1.94	2.92													
6. DEL_read	1.51	1.66	2.07	2.10	2.16	3.19												
7. LOAD1	0.08	0.06	-0.19	-0.28	-0.21	-0.48	2.02											
8. LOAD2	-0.10	-0.12	-0.21	-0.44	-0.31	-0.56	1.56	2.20										
9.LOAD3	-0.03	-0.07	-0.15	-0.47	-0.35	-0.60	1.25	1.75	2.57									
10. STRAIN1	-0.03	-0.02	-0.09	-0.13	-0.10	-0.14	0.39	0.42	0.38	0.69								
11. STRAIN2	0.03	0.03	-0.01	-0.06	-0.09	-0.10	0.50	0.53	0.46	0.49	0.78							
12. STRAIN3	0.09	0.11	0.06	-0.09	-0.05	-0.07	0.46	0.47	0.44	0.48	0.54	0.78						
13. NE1	-0.03	-0.10	-0.16	-0.10	-0.10	-0.16	0.50	0.43	0.33	0.41	0.44	0.37	0.88					
14. NE2	0.15	0.06	0.06	-0.06	-0.03	-0.05	0.48	0.48	0.44	0.45	0.49	0.44	0.65	1.12				
15. NE3	-0.04	-0.06	-0.13	-0.19	-0.16	-0.24	0.43	0.43	0.39	0.35	0.39	0.35	0.63	0.59	0.82			
16. ORGCOM1	0.38	0.27	0.25	0.58	0.45	0.59	-0.56	-0.58	-0.59	-0.33	-0.34	-0.32	-0.26	-0.29	-0.31	1.78		
17. ORGCOM2	0.26	0.20	0.25	0.55	0.36	0.55	-0.33	-0.39	-0.36	-0.22	-0.20	-0.20	-0.18	-0.22	-0.21	1.23	1.97	
18. ORGCOM3	0.37	0.34	0.33	0.60	0.47	0.55	-0.42	-0.45	-0.38	-0.25	-0.24	-0.24	-0.20	-0.24	-0.26	1.34	1.11	1.68

Note 1. EL: Email load (EL_receive refers to the extent of emails received, EL_send refers to the extent of emails sent, and EL_read refers to the extent of emails read).
Note 2. DEL: Desired email load (DEL_receive refers to the desired extent of emails received, DEL_send refers to the desired extent of emails sent, and DEL_read refers to the desired extent of emails read).
Note 3. LOAD: Workload stress (LOAD1, LOAD2 and LOAD3 refer to the three items of workload stress).
Note 4. STRAIN: Psychological strain (STRAIN1, STRAIN2 and STRAIN3 refer to the three items of psychological strain).
Note 5. NE: Negative emotions (NE1, NE2 and NE3 refer to the three items of negative emotions).
Note 6. ORGCOM: Organizational commitment (ORGCOM1, ORGCOM2 and ORGCOM3 refer to the three items of organizational commitment).

Appendix 3. R and Lavaan Syntax Used to Test the Structural Model.

```
# install.package("lavaan") # Lavaan package is required. Install first if necessary.
library(lavaan)

# Import the covariance matrix. Note: the numbers are rounded and the results obtained with
these rounded numbers may thus slightly differ from the results presented in the paper, which
used raw data
lower_matrix <- '
3.30,2.20,3.24,2.24,2.25,3.01,1.93,1.58,1.54,2.86,1.46,2.21,1.58,1.94,2.92,1.51,1.66,2.07,2.10
,2.16,3.19,0.08,0.06,-0.19,-0.28,-0.21,-0.48,2.02,-0.10,-0.12,-0.21,-0.44,-0.31,-
0.56,1.56,2.20,-0.03,-0.07,-0.15,-0.47,-0.35,-0.60,1.25,1.75,2.57,-0.03,-0.02,-0.09,-0.13,-
0.10,-0.14,0.39,0.42,0.38,0.69,0.03,0.03,-0.01,-0.06,-0.09,-
0.10,0.50,0.53,0.46,0.49,0.78,0.09,0.11,0.06,-0.09,-0.05,-0.07,0.46,0.47,0.44,0.48,0.54,0.78,-
0.03,-0.10,-0.16,-0.10,-0.10,-0.16,0.50,0.43,0.33,0.41,0.44,0.37,0.88,0.15,0.06,0.06,-0.06,-
0.03,-0.05,0.48,0.48,0.44,0.45,0.49,0.44,0.65,1.12,-0.04,-0.06,-0.13,-0.19,-0.16,-
0.24,0.43,0.43,0.39,0.35,0.39,0.35,0.63,0.59,0.82,0.38,0.27,0.25,0.58,0.45,0.59,-0.56,-0.58,-
0.59,-0.33,-0.34,-0.32,-0.26,-0.29,-0.31,1.78,0.26,0.20,0.25,0.55,0.36,0.55,-0.33,-0.39,-
0.36,-0.22,-0.20,-0.20,-0.18,-0.22,-0.21,1.23,1.97,0.37,0.34,0.33,0.60,0.47,0.55,-0.42,-0.45,-
0.38,-0.25,-0.24,-0.24,-0.20,-0.24,-0.26,1.34,1.11,1.68'

covariance_matrix  <-  getCov(lower_matrix,names  =  c("EL_receive",  "EL_send",  "EL_read",
"DEL_receive",  "DEL_send"  ,  "DEL_read",  "LOAD1",  "LOAD2",  "LOAD3",  "STRAIN1",  "STRAIN2",
"STRAIN3", "NE1", "NE2", "NE3", "ORGCOM1", "ORGCOM2", "ORGCOM3"))

model <- '
  # Measurement model
      Email_Load               =~ EL_receive + EL_send + EL_read
      Desired_Email_Load       =~ DEL_receive + DEL_send + DEL_read
      Workload_Stress          =~ LOAD1 + LOAD2 + LOAD3
      Psychological_Strain     =~ STRAIN1 + STRAIN2 + STRAIN3
      Negative_Emotions        =~ NE1 + NE2 + NE3
      Organizational_Commitment =~ ORGCOM1 + ORGCOM2 + ORGCOM3

  # Correlations
      EL_receive               ~~ DEL_receive  # Email load - Desired email load correlations
      EL_send                  ~~ DEL_send     # Email load - Desired email load correlations
      EL_read                  ~~ DEL_read     # Email load - Desired email load correlations
      Psychological_Strain     ~~ Negative_Emotions            # Stress outcomes correlations
      Psychological_Strain     ~~ Organizational_Commitment    # Stress outcomes correlations
      Organizational_Commitment ~~ Negative_Emotions           # Stress outcomes correlations

  # Structural model
      Workload_Stress          ~ Email_Load                    # Hypothesis 1
      Desired_Email_Load       ~ Workload_Stress               # Hypothesis 2
      Email_Load               ~ Desired_Email_Load            # Hypothesis 3
      Psychological_Strain     ~ Workload_Stress               # Hypothesis 4a
      Negative_Emotions          ~ Workload_Stress             # Hypothesis 4b
      Organizational_Commitment ~ Workload_Stress              # Hypothesis 4c

  '
  fit <- sem(model, sample.cov=covariance_matrix, sample.nobs=504)
  summary(fit, fit.measures=TRUE,standardized=TRUE)
  fitMeasures(fit, c("cfi", "rmsea", "srmr", "gfi", "agfi", "nfi", "tli"))

  # Optional: Plot the model using the semPlot package
  # install.package("semPlot")
  # library(semPlot)
  #  semPaths(fit,  what="path",  whatLabels="std",  edge.label.cex=1,  sizeLat=10,  sizeMan=8,
reorder=FALSE, nCharNodes=15, curvePivot = TRUE, residuals=FALSE, rotation=2, layout="tree2")
```