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The impact of self-esteem, conscientiousness, and pseudo-personality on technostress

Purpose

We investigated how personality traits are associated with workplace technostress (perception of stressors related to the use of Information and Communication Technologies—ICTs).

Methodology

We collected 95 self-rated and 336 observer-rated questionnaires using the Personality Audit and a shortened version of the Technostress Scale. To analyze relationships between personality dimensions and technostress, we applied partial least squares structural equation modeling.

Findings

Our study shows that in line with previous studies, self-esteem is negatively related to levels of technostress. Contrary to our expectations, conscientiousness is positively related to technostress. Finally, the gap between a person's self-ratings and observer ratings in all personality dimensions is positively associated with technostress.

Practical implications

We showed that the experience of technostress varies significantly amongst individuals. By taking personality differences into account when allocating responsibilities and creating guidelines for ICT use at work, technostress could be addressed. Instead of setting organization-wide norms for availability and use, we suggest it would be more effective to acknowledge individual needs and preferences.

Originality/value

This study contributes to current technostress research by further examining antecedents, and by focusing on the role of personality. In addition, we examined how differences in "self" and "observer" ratings of personality characteristics may point to variations in the way individuals

experience technostress. We outlined concrete best practice guidelines for ICTs in organizations that take inter-individual differences into account.

Keywords: Information and communication technologies, Technostress, Personality traits, Conscientiousness, Extroversion, Self-esteem,

1. Introduction

Information and communication technologies (ICTs), such as email, mobile phones, and social media have become inextricable threads that weave together all aspects of our lives (Jeske and Shultz, 2019, Korzynski et al., 2020). Due to COVID-19, most people are now obliged to use ICTs at work to communicate internally (e.g., Zoom, Microsoft Teams) or externally (e.g., LinkedIn, Facebook) The COVID-19 sped up the digital transformation of many organizations. As a result, people started to use ICTs in situations they were previously online such as medical consultations, studying, or participation in music events (Marr, 2020).

However, there is a human cost and a deeper conundrum. First described as "a modern disease of adaptation caused by an inability to cope with new computer technologies in a healthy manner" (Brod, 1984, p.16), the concept of "technostress" is now used to explore how people are affected by continually evolving ICTs. Technostress is linked to the way people adapt to changing social and professional expectations, as well as the need to quickly adapt to new developments (Ragu-Nathan et al., 2008). The inability to control one's use of ICTs - in other words, "push" (indiscriminate response to incoming connections) and "pull" (compulsively checking in) - is linked to lower productivity (Brooks and Califf, 2017). In addition, the invasive impact of technology on personal life is increasingly problematic (Bright and Logan, 2018; Salo et al., 2018). For example, many people check ICTs at night, leading to sleep deprivation (Luqman et al., 2020). Habitual checking for messages, e-mails, or missed calls can devolve into mental health issues such as uncontrollable compulsive behavior or addiction (Oulasvirta et al., 2012; Barnes et al., 2015; Stich et al., 2019). Not surprisingly, there is a growing demand for a better understanding of the factors that make people prone to technostress in the work context. Earlier literature looks at personality traits. For example, individuals often react to and cope with, workplace stress in ways

that appear to be influenced by personality traits (Bolger, 1990; Code and Langan-Fox, 2001). Other research focuses on the link between personality traits - often measured with the support of the five-factor model (McCrae and Costa, 1987) - and other factors such as internet use (McElroy et al., 2007); use of collaborative technology (Devaraj et al., 2008); work-related connectivity during the non-work time (Richardson and Benbunan-Fich, 2011); and the nature or number of Facebook connections (Moore and McElroy, 2012). Hung et al. (2015) indicated that people with proactive personalities have a higher tolerance for technostress created through overload in technology use and communication. Similarly, Maier et al. (2019) showed that IT mindfulness positively impacts the perception of technostress. Khedhaouria and Cucchi (2019) further examined the effect of different configurations of personality traits on technostress creators and burnout.

Our paper contributes to the existing research on personality and technostress in two ways. First, the majority of previous studies focused on the *consequences* of technostress such as lower job satisfaction (Kumar et al., 2013; Suh and Lee, 2017; Yin et al., 2018) or decreased organizational commitment (Hwang and Cha, 2018). Our study, on the other hand, further contributes to the literature that examines several personality traits as *antecedents and factors* of technostress (Srivastava et al., 2015; Krishnan, 2017; Khedhaouria and Cucchi, 2019). For example, Srivastava et al. (2015) examined how personality influences whether ICTs are seen as an opportunity or challenge for increasing job-performance, which would affect the perception of technostress creators. We, in turn, examine the role of personality in appraising whether sufficient resources are available to cope with technostress creators and therefore influencing the perception of technostress creators and the resulting experience of technostress. Second, we use a personality scale that includes observer evaluations. To the best of our knowledge, ours is the first study of technostress

to include observers' perceptions of an individual's personality traits. This is a worthy pursuit as, particularly in a workplace setting, individuals display learned behaviors that do not necessarily adhere to their core personality traits (Kets de Vries, 2012). They, therefore, engage in efforts of self-regulation that can lead to depletion of resources through high levels of self-regulation (Muraven and Baumeister, 2000), which diminishes the ability to deal with demands in the workplace, such as posed through ICT use. This phenomenon can be observed through the difference between self-ratings and observer ratings.

Based on the existing literature on workplace stress (transactional stress model) (Lazarus and Folkman, 1984) and a validated personality trait framework (Kets de Vries et al., 2006), we propose hypotheses that explore whether an individual's personality traits affect the way he or she experiences technostress creators. Before we outline the hypotheses, we review current knowledge on technostress and the role of personality in the stress experience.

2. Theory and hypotheses development

2.1. Technostress

Ragu-Nathan et al. (2008) proposed five technostress creator dimensions: techno-overload (higher workload generated by ICTs), techno-invasion (impact on personal life), techno-complexity (difficulty in learning to use ICTs), techno-insecurity (job threat due to ICTs), and techno-uncertainty (related to new ICT developments).

Following this path, Tarafdar et al. (2010) analyzed the importance of user involvement and innovation support mechanisms as factors that are negatively related to technostress. Besides, Shu et al. (2011) found that a lower level of technostress is associated with a higher level of computer self-efficacy, while a higher level of technology dependence is related to a higher level of computer-related technostress. Ayyagari et al. (2011) found that intrusive technology characteristics are the dominant predictors of experienced technostress of an individual.

This growing body of work examined the influence of extrinsic factors on technostress and acknowledged the importance of individual characteristics as antecedents of technostress. However, there is still a limited understanding of the effects of individual personality traits on stress related to the use of ICTs. We, therefore, examined in detail the impact of personality on experienced stress to create hypotheses on how particular personality traits might be linked to the experience of technostress in the workplace.

2.2. Personality and the experience of stress

According to the transactional model (Lazarus and Folkman, 1984), stress is an individual's psychological, behavioral, and physical response to environmental demands. Workload pressure and lack of managerial support are often cited as employees' main work stressors (HSE, 2017), but these broad-brush descriptions hide underlying factors that are experienced differently by each one of us. Individual triggers of negative stress include self-perception of inability to cope; belief that one has lost control of a situation; lack of resources to achieve a performance target (Lazarus and Folkman, 1984); low tolerance for ambiguity; type A behavior (Cooper et al., 2001); and external locus of control (Sassi et al., 2015). Overall, personality has been found to influence the experience

of stress through the creation of daily hassles for example (Vollrath, 2001), and to impact the perception of stress and related coping mechanisms (Cooper and Payne, 1991). Indeed, personality traits have strong implications for how a person experiences life (McCrae and Costa, 2003).

The transactional approach argues that stress is psychologically mediated, in other words, a person's subjective impression of stress is connected to systemic demands in his or her environment (Lazarus and Folkman, 1984). On the other hand, personal factors such as the perception of resource control (Spector, 2017), and awareness of personal resources (Hobfoll and Freedy, 1993), play a crucial role in mediating the stress experience. Therefore, the interaction of the individual with the environment is crucial in determining whether a stressor leads the individual to experience strain and distress. The (cognitive) appraisal process refers to an individual's interpretation of systemic demands, which in turn determines his or her (subjective, emotional) perception of the relevance of the stressor (Lazarus and Lazarus, 1991). If the stressor is then deemed relevant, a secondary appraisal takes place, by which the individual evaluates his or her ability or resources to cope with the stressor (Folkman et al., 1986). A threat-appraisal occurs when a person anticipates that resources to effectively cope with the situation are not available. In this study, we focus on negative stress (threat-appraisal) related to ICTs. Previous studies have looked at the way personality influences the experience of positive and negative emotions (e.g., neuroticism correlates positively with negative affect and extroversion correlates positively with positive affect (Costa and McCrae, 1980; Watson and Tellegen, 1985). However, we explore the impact of personality on stress by focusing on the stress appraisal process, rather than on the individual's general tendency to experience positive and negative well-being. Therefore, we measure the perception of technostress creators rather than the experience of feeling stressed. We propose that personality traits contribute to an individual's feeling of ability to cope (secondary appraisal) with

technostress creators. Whereas previous studies (Srivastava et al., 2015; Krishnan, 2017) examined the impact personality on the primary appraisal process, we focus on the impact on the secondary appraisal process.

In the following sections, we explore in detail three personality dimensions and their impact on the secondary appraisal of techno stressors (i.e., technostress creators). Whereas literature exists on most personality traits and the experience of stress, we explore only three personality dimensions of the Personality Audit (PA): We focus (1) on self-esteem because the stress literature has established an impact of (the related construct of) self-efficacy on the secondary appraisal process through feelings of control and ability to cope; (2) on conscientiousness, because conscientious people seem to prefer active coping styles, which would mean they are more likely to do challenge appraisals rather than threat appraisals; and (3) on extroversion, because the negative correlation between stress and extroversion is likely to be mediated through the perceived availability of social support (Vollrath, 2001). We do not explore high-low spiritedness, which seems closely related to neuroticism (one of the Big 5 dimensions) (Costa and McCrae, 1980). Even though there is strong empirical evidence for the link between neuroticism and stress via the creation of daily hassles and negative judgment of available resources (Vollrath, 2001), the high-low spiritedness dimension of the PA captures positive-negative emotionality, which can lead to experiencing higher stress levels but is unlikely to strongly influence the appraisal process. Studies examining adventurousness (i.e., openness to experience) concerning stress are rare (Leger et al., 2016). Therefore, we did not include this personality trait in our current research. We further did not include the personality dimension 'trustful/vigilant' as it is closely linked to adventurousness. Adventurousness presupposes a certain degree of trust toward life situations and the actors involved in them, therefore, people high on trust are, generally, more adventurous (Kets de Vries et al.,

2006). We also did not include 'assertive/self-effacing' as it is closely linked to self-esteem; people who are high on self-esteem are expected to be more assertive, while those low on self-esteem are expected to be low on assertiveness (Kets de Vries et al., 2006).

Further, by exploring only conscientiousness and extroversion in addition to self-esteem, we capture the personality spectrum on a second higher-order level. Several studies (see Strickhouser et al., 2017) found that the Big 5 can be structured into the higher-order factors of stability (agreeableness, conscientiousness, and neuroticism), which describes attributes of stable psychosocial organization, and plasticity (extroversion and openness to experience), which describes attributes of social dynamism. We now present our hypotheses regarding how the three personality traits might relate to experienced technostress.

2.2.1. The impact of extroversion

Extraversion is negatively correlated with stress (Lys et al., 2019). Extroverts are social, active, and outgoing (Son and Ok, 2019). The dimension of introversion-extroversion relates to the way individuals feel an innate yearning for interpersonal relatedness or attachment. Yearning for *affiliation* is related to the human need for engagement with groups (Kets de Vries et al., 2006). The strength of these needs determines one's position on the continuum of extroversion versus introversion (Jung, 2016). For example, after a busy period at work, individuals at the extrovert end of the spectrum might unwind by socializing, whereas more introverted individuals would prefer to spend some time alone. To add a layer of nuance, the extrovert might prefer to talk over the day with others, whereas the introvert is content to just listen (and possibly daydream at the same time). In addition, several scholars underlined that privacy concerns are among the most

important problems in the information age (Bansal et al., 2016) and that they are related to technostress creators (Ayyagari et al., 2011). However, extroverts are naturally comfortable using ICTs to interact with others online (Choi et al., 2017; Wang et al., 2018)and are less concerned with information privacy (Chen et al., 2016). Furthermore, they are more likely to actively maintain social relationships (affiliation and attachment). Indeed, research has found that extroverts perceive reduced stress and greater enjoyment related to the use of ICTs (Fraj-Andrés et al., 2018). This led us to formulate the following hypothesis:

*H1. E*xtroversion is negatively associated with technostress.

2.2.2. The impact of self-esteem

Self-esteem and stress have been explored with self-esteem as a proxy for the positive appraisal (Vollrath, 2001; Chen et al., 2017), i.e. the higher one's self-esteem, the higher one's evaluation of self-efficacy or ability to cope with a stressor. Self-esteem reflects how an individual evaluates his or her self-worth (del Mar Ferradás et al., 2016). Self-efficacy has been shown to positively impact the ability to cope with professional demands (Gottschling et al., 2016). Individuals with high self-esteem display more coping resources than others and consider their work settings to be controllable, hence decreasing their risk of depression (Orth et al., 2016). Self-esteem may also be a source of proactive behavior (Wu et al., 2019) and proactive behavior is negatively related to technostress (Hung et al., 2015). As an example, someone with high self-esteem is probably going to feel comfortable asking for help with technical questions. We thus formulate the following hypothesis:

H2. Self-esteem is negatively associated with technostress.

2.2.3. The impact of conscientiousness

Because ICTs can cause information overload and demand for quick responses (Karr-Wisniewski and Lu, 2010), conscientious individuals might be more susceptible to technostress. However, conscientiousness can be a psychological resource helping to prevent stress (Zellars et al., 2006; Batista and Reio Jr, 2019) and it has been found that highly conscientious individuals use more effective stress coping strategies than others (Sesker et al., 2016). Conscientiousness refers to a tendency to show self-discipline, carefulness, thoroughness, and planned rather than spontaneous behavior (Sutin et al., 2018). Therefore a negative link between stress can be expected as conscientious individuals tend to have stable, well-adjusted personalities, and tend to address issues actively and persevere (Feist, 2019) as they are self-disciplined, careful, and thorough. This discussion leads us to the following hypothesis:

*H3. C*onscientiousness is negatively associated with technostress.

2.2.4. The impact of the difference between self-ratings and observer ratings in all personality dimensions

The majority of studies on personality have been based on self-reports of personality traits. However, some scholars have noted that self-ratings alone may underestimate personality features (Mount et al., 1994) and observer ratings of personality traits are strong predictors of behavior (Connelly and Ones, 2010). Even though observers might not be able to 'access' all the information about a person's personality, the disparity between self-and other-ratings of personality is typically

small (Allik et al., 2010). Indeed, observers may have a clearer view of some personality traits than self-raters (Connelly and Hülsheger, 2012) due to fundamental attribution errors and self-enhancement of self-rater (Allik et al., 2010). By comparing self and observer ratings, a person's blind spots regarding their own personality traits can be explored and how personality characteristics are enacted (Kets de Vries et al., 2006). Most importantly, observer ratings are particularly relevant, especially in a workplace setting, as individuals might display learned behaviors that do not necessarily adhere to their core personality traits. For example, pseudo-extroverts—those who rate themselves as introverts, but whose observers see them as extroverts—are very often to be found in senior executive positions, where they have to interact with others frequently and have learned to conserve their energy and make the most of their introvert strengths (Kets de Vries, 2012). It is important to note that if this type of behavior is not managed consciously by the individual, it can be an additional energy drain or source of stress (Kets de Vries, 2012) due to resource depletion (Muraven and Baumeister, 2000). For example, having to cope with ICTs could be perceived as more difficult by pseudo-extraverts (as for 'real' extraverts) as the person's personal resources are depleted because of the enactment of pseudo-extraversion. Researchers came out also with the term pseudo-self-esteem which refers to the situation when individuals present themselves as worthy but do not have a sense of ability and might experience stress while being questioned about their competence (Hoban and Hoban, 2004). Although former studies did not describe other pseudo-traits, scholars showed that individuals can fake a conscientiousness (Griffith et al., 2007), being trustful (Latusek and Vlaar, 2018), assertiveness (Kern, 1994), openness to experience (Hauenstein et al., 2017), and calmness (Burić and Frenzel, 2019). Lee (2016) indicated that faking behavior may be related to an increased feeling of stress.

The reason for showing different personality traits than those which are really possessed by an individual can be associated with self-presentation tactics, defined as activities aimed at managing impressions to accomplish different personal goals (Rosenberg and Egbert, 2011). In terms of stress, previous studies supported both the positive and negative effects of online self-presentation tactics depending on authenticity. Zhang (2017) showed that authentic self-disclosure on social media helps in stress reduction. Wright et al. (2018) indicated that false self-presentation may lead to stress, anxiety, and depression. Therefore, we propose the following hypothesis:

H4: The difference between self-ratings and observer ratings in all personality dimensions is positively associated with technostress.

3. Method

Figure 1 shows the theoretical relationships between technostress, personality dimensions, and control variables that we analyzed in our empirical analysis.

INSERT FIGURE 1 ABOUT HERE

3.1. Sample and Procedure

We informed 324 MBA and MA students about the study and explained that there were no monetary incentives for participants, but each participant received a detailed report on their personality dimensions. Of the 324 students, 133 agreed to fill in the self-report online-surveys (described below) and find observers for the personality survey. These observers included friends,

family members, and co-workers. A total of 119 subjects and 394 observers sent back their completed questionnaires (36.73% response rate). After removing incomplete data, the final sample consisted of 95 self-rated questionnaires and 336 observer-rated questionnaires. Of the subjects, 59% were females and 41% were males, with an average age of 24.65 years. Participants had an average of 1.97 years of work experience and came from fifteen countries: Poland (48%), Ukraine (18%), Germany (7%), France (5%), India (5%), Belarus (3%), United States (2%), and other countries (Egypt, Georgia, Latvia, Netherlands, Romania, Taiwan, Turkey, and Vietnam) (12%).

3.2. Measures

Technostress. We measured the perception of technostress creators through an average of single items for each technostress creator, based on Ragu-Nathan et al. (2008). These are techno-overload ("I have a higher workload because of increased technology complexity"); techno-invasion ("I feel my personal life is being invaded by ICT technologies"); techno-complexity ("I often find it too much trouble for me to learn to use new technologies"); techno-insecurity ("I feel a threat to my job security due to new technologies"); and techno-uncertainty ("There are frequent new developments in the technologies we use in our organization"). While partial least squares structural equation modeling (PLS-SEM) analysis we needed to exclude techno-invasion and techno-uncertainty because of loadings lower than 0.7 (Hair Jr et al., 2016). The loading, mean, and standard deviation for each item of technostress are presented in Appendix 1. In line with the characteristics of ICTs provided by Ragu-Nathan et al. (2008), the following examples of ICTs were mentioned in our survey: mobile calling, e-mailing, text messaging, instant messaging, video conferencing, and social media. Answers for each technostress creator item were indicated on a Likert-scale ranging from 1 (strongly disagree) to 5 (strongly agree). The Cronbach's alpha for our

used technostress scale accounted for 0.714 which means that the reliability of the research is confirmed.

Personality. We assessed personality traits through self- and observer reports using the Personality Audit survey developed by Kets de Vries et al. (2006). The Personality Audit measures personality traits on a bipolar continuum. Three personality dimensions have been included in our study: negative self-esteem/positive self-esteem; introverted/extroverted; and laissez-faire/conscientious. The personality dimensions were measured through six items each. After PLS-SEM analysis we kept from three to four items in each dimension: negative self-esteem/positive self-esteem (items: "When I compare myself to other people, I feel that I have... very little control over events in my life / a considerable amount of control over events in my life"; "When I compare myself to my peers, I feel.. inferior / superior"; "I see myself as someone who is... not successful / extremely successful", the Cronbach's alpha = 0.713); introverted/extroverted (items: "Compared to my peers... I am not a very sociable person / I am extremely sociable person"; "I would prefer to spend most of my time... alone / with other people"; "I seek the company of other people... rarely / quite often", the Cronbach's alpha = 0.745); laissez-faire/conscientious (items: "My personal standards of behavior are... relaxed / very strict"; "If my things are not neat and orderly... I don't mind at all / I get very annoyed"; "I pay... little attention to details / great attention to details"; "I am... disorganized / extremely organized", the Cronbach's alpha = 0.784). Responses corresponded to a 7-point Likert-scale, for example, 1 corresponds with strong introversion, and 7 corresponds to strong extroversion. The loading, mean, and standard deviation for each item of personality dimensions are presented in Appendix 1. To calculate observer evaluation, we calculated an observer average from two, three, or four reports.

Difference between self and observer ratings. We calculated the absolute value of differences between self and observer ratings in personality dimensions and built a formative variable (Diamantopoulos et al., 2008).

Control variables. In our PLS-SEM model, we used control variables that have been chosen based on previous literature as well as the anticipated relationship with technostress (Bernerth and Aguinis, 2016). In previous research, age did not affect computer-related stress (Hudiburg and Necessary, 1996), but Burton-Jones and Hubona (2005) found a negative relationship between technology use and age. For this reason, age serves as a control variable in our study. Moreover, we included gender as a variable, as prior scholarly work indicated that women might experience less ease of use with ICTs than men do (Gefen and Straub, 1997). We controlled also for work experience that supports the use of ICTs (Agarwal and Prasad, 1999). We took also nationality into consideration. Finally, we used the general use of ICTs and availability on ICTs as controls, because unlimited access to ICTs increases levels of stress (Kushlev and Dunn, 2015).

3.3. Analysis

To analyze data in this study, we applied variance-based structural equation modeling (SEM), i.e., partial least-squares SEM, because formatively measured constructs were developed (Richter et al., 2016; Hair Jr et al., 2017). Furthermore, PLS-SEM is suggested when theoretical information is rather low (Chin et al., 2003), due to the fact that the reliability and validity of constructs need to be evaluated and a new model tested (Wasko and Faraj, 2005).

We used the resampling method for significance testing and bootstrapping of 500 resamples and 100 cases per sample (Podsakoff et al., 2003).

4. Results

Table 1 reports the means, standard deviations, and minimum and maximum values of variables used in the study. Table 2 reports the average variance extracted (AVE) and the correlations matrix.

INSERT TABLE 1 and 2 ABOUT HERE

To assess internal consistency, we calculated composite reliability which was above 0.70, indicating internal consistency (Wasko and Faraj, 2005), and Cronbach alpha which also exceeded 0.70, confirming the reliability of our reflective measures. We examined the heterotrait-monotrait ratio of correlations (HTMT) to evaluate discriminant validity. The HTMT value was below 0.90. It means that discriminant validity is confirmed (Henseler et al., 2015). The AVE exceeds 0.50 which indicates that convergent validity is established (Naylor et al., 2012). We analyzed also collinearity measured through Variance Inflation Factors which were below 5 for all values, thus concluding that there is no multicollinearity (Kock, 2017). All values are summarized in Table 3A, 3B, and 3C.

INSERT TABLE 3A, 3B and 3C ABOUT HERE

In the model, the R-squared value for technostress accounts for 27.9%. This implies that more than almost one-fourth of the variance in technostress is accounted for by the variables in the model.

The results did not confirm the relationship between technostress and extroversion. Thus, *H1* (extroversion is negatively associated with technostress) is not supported.

Regarding the relationship between self-esteem and technostress, we can observe the direct negative effect of -0.203 which is significant (p-value of 0.041). Therefore, *H2* (self-esteem is negatively associated with technostress) is supported.

With regard to the relationship between conscientiousness and technostress, we observe a positive direct effect of 0.245 which is significant (p-value of 0.022). That is why *H3* (conscientiousness is negatively associated with technostress) is not supported.

Finally, we found a positive effect of 0.319 between the differences between self-ratings and observer ratings and technostress. This effect is also significant (p-value of 0.026). It means that *H4* (the difference between self-ratings and observer ratings in personality dimensions is positively associated with technostress) is supported.

Additionally, we can observe a positive effect of the nationality of 0.211 (p-value of 0.028). It means that individuals from Eastern European countries such as Ukraine or Belarus experience higher levels of technostress than other nationalities.

Table 4 illustrates the coefficients and p-values.

INSERT TABLE 4 ABOUT HERE

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5. Discussion

Overall, we found that personality dimensions do indeed influence how technostress is perceived. Our study supported the negative relationship between technostress and self-esteem. We found a positive relationship between technostress and conscientiousness, and between technostress and gaps in self-and observer personality ratings.

We had hypothesized that ICTs would be experienced as a flexible means to connect for extroverts. Contrary to our expectations, we did not find evidence for a negative relationship between extroversion and technostress. The lack of this relationship may be explained by some studies which indicated that ICTs allow introverts, who may find direct face-to-face interaction to be draining, to communicate on their own terms (Yen et al., 2012). Moreover, some research also showed a positive relationship between introversion and the use of ICTs (Mitchell et al., 2011; Roja, 2020). ICTs are useful for pseudo-extroverts (i.e., introverts who adopted some extrovert behaviors) because they are comfortable interacting with others online, while pseudo-introverts (i.e., extroverts who incorporated some introvert self-restraint) may use ICTs features, such as digital storytelling, for self-reflection (Couldry, 2008). Although previous studies indicated that extroverts benefit from ICTs in terms of wider possibilities of relationship building (Golbeck et al., 2011), our study showed that ICT use could become too much of a good thing for extroverts, who

may find it harder disconnect. For introverts, the constant demand for attention through ICTs could outweigh their ability to manage relationships at a distance through ICTs.

The negative relationship we found between self-esteem and technostress adds to the literature in previous studies indicating that individuals with high self-esteem can cope with negative outcomes of work stress (Bliese et al., 2017). We can conclude that high self-esteem also helps people cope with technostress. Self-esteem reflects an individual's overall evaluation of his or her own worth (Leary and Baumeister, 2000), and therefore people with high self-esteem may be less hesitant to ask for help with ICTs, as their self-esteem is less contingent on external validation. Overall, in relation to effectively coping with ICT use, as self-esteem is related to confidence in one's own abilities, it is very likely that people who are characterized by high levels of self-esteem are also able to adjust their use of ICTs to suit their own needs.

Surprisingly, the negative relationship between conscientiousness and technostress was not supported. The positive relationship can also be explained through the specific context of ICT use: In order to use ICTs effectively, spontaneous and quick online activity is needed (Smith and Gallicano, 2015), and individuals are often pressured to respond immediately. In this context, the personality trait of conscientiousness, which is related to carefulness, thoroughness, and tendency to plan ahead, brings negative outcomes in terms of technostress.

Results from our study indicated that significant gaps between self-ratings and observer ratings are positively associated with technostress in all personality dimensions. This points to possible deviance between personality traits and learned behavior at work, which may be exacerbated by ICT use. Previous personality research has focused on examining the difference between self- and observer ratings in terms of the accuracy of ratings. Our findings suggest that particularly

personality research on stress could gain more from understanding how personality traits are enacted at work where certain role demands might require behavior contrasting natural preferences.

Finally, we found that individuals from Eastern Europe such as Ukraine and Belarus might experience higher levels of technostress than other nationalities. It can be related to cultural norms in these regions which in turn lead to technostress. Krishnan (2017) studied the influence of cultural differences and showed that power distance was one of the predictors of technostress. Hofstede et al. (2010) and Glinkowska-Krauze et al. (2020) showed that Ukrainian and Belarussian people distinguish themselves with a higher power distance than for example Central and Western Europeans.

To summarize, our results confirmed that personality traits should be taken into consideration when exploring how to minimize experienced stress from the use of ICTs. In addition, our results showed intriguing nuances in the dimension of conscientiousness, and unexpected findings related to extroversion. We were also intrigued by the fact that disparity in ratings between individuals and their observers on personality dimensions is related to technostress. In the following sections, we outline future research avenues and create recommendations for managerial practice to ensure the effective use of ICTs in the workplace that contributes to workplace well-being and productivity.

5.1. Implications for theory

This study contributed to the literature on technostress and individual differences in several ways. First, our analysis went beyond traditional individual characteristics such as age, gender, or experience and focuses on personality. Second, this study complemented previous research

which indicated the role of IT mindfulness (Maier et al., 2019) or agreeableness, neuroticism, and openness to experience (Krishnan, 2017) as antecedents of technostress and indicates of the importance of self-esteem and conscientiousness. Third, this study was conducted in an international setting which was underlined as a limitation in the study conducted by (Krishnan, 2017) and showed that individuals from Eastern Europe may exhibit higher levels of technostress than other nationalities. Finally, our study collected data from observers, and this way it adds to existing technostress literature focusing on specifics self-rated personality traits or self-rated configurations of personality traits (Khedhaouria and Cucchi, 2019) another point of discussion on the difference between self and observer-rated traits.

5.2. Implications for practice

The broad acceptance and adoption of ICTs in times of COVID-19 have ameliorated the perception of stress in some dimensions that were included in the original technostress scale. On the other hand, the speed with which people have to deal with information and expectations generated by ICTs has only increased. We argue technostress is related to one's perceived ability to set priorities and make choices (which is linked to personality characteristics such as self-esteem) that are firmly anchored and measured in terms of relevance to one's own personal and organizational objectives and values. The ability to choose implies control over actions. This is the essence of the difference between added value and added stress through ICT use at work.

Knowledge about the influence of certain personality characteristics on how people engage with ICTs and experience technostress, as a result, will help leaders, HR professionals, and employees to set boundaries and allocate responsibilities for ICT use. ICTs work well for people with high self-esteem, as they tend to experience lower levels of technostress. For example, they may adapt more quickly to virtual meetings and other ICT-aided situations.

People with high levels of extroversion should be careful that their ICT use does not become too much of a good thing, meaning that they need to actively manage to be able to disconnect. Also, people with low levels of self-esteem and/or high levels of conscientiousness should pay particular attention to how they use ICTs. The organization should provide a compelling rationale for using ICTs, as well as clear guidelines and boundaries for how and when to use them. It may be useful to provide information about personality traits and ICT use, so people with low self-esteem or high levels of conscientiousness traits do not compare themselves disfavorably to others and become discouraged or frustrated. Any transition to new ICTs should offer individually-paced adaptation and learning opportunities to everyone.

Our study indicated that 360-degree personality assessment will also help people manage technostress creators. Employees with large gaps between self- and observer personality ratings should also be made aware that they are more likely to experience technostress. These employees can still be high performing contributors, but they should be encouraged to take note of note their level of technostress, and seek advice or help if they need it.

5.3 Limitations

It should be noted that the study was conducted among MBA and MA students with an average work experience of two years, who may exhibit different levels of technostress creators compared to more senior professionals.

Moreover, we could not include techno-uncertainty and techno-invasion in the construct of technostress. Therefore we can conclude that the subdimensions of the technostress construct and measure need to be reviewed based on current developments in ICTs and their use at work in the current decade. The original technostress scale (Ragu-Nathan et al., 2008), was developed during a period of inter-generational tension surrounding the use of ICTs (Boomer and Wiley, 2017). At that time, many older people were less familiar with, and often suspicious of, the use of ICTs. However, now everyone is using ICTs at work.

Furthermore, although we paid special attention to anonymity and confidentiality, social desirability response bias needs to be underlined as a potential limitation of this study.

5.4 Recommendation for future studies

We propose three future research avenues. First, given the widespread use of ICTs, it might be worth examining whether including techno-stressors and techno-inhibitors in workplace stress models would create a better understanding of the prevalence of work-related stress in contemporary organizations. Also, including in the research, the role of techno-inhibitors (such as self-efficacy of ICT use or other supporting factors) would be worthwhile. In particular, exploring the interaction between techno-stressors and inhibitors would be meaningful to create suggestions on what job design and workplace support could actively do to support employees.

Second, we recommend that it is time to revise the original concept of technostress from a stress-generator related to learning and performance (insecurity and complexity), to a stress-generator related to perceived control overuse (relevance, boundaries, visibility, and speed).

Third, future studies should examine the differences between ratings for each personality dimension as an independent variable rather than pooling all differences together.

Finally, we suggest that future research might explore the depletion of the personal resources caused by the display of learned behaviors that do not necessarily adhere to core personality traits and test a potential mechanism channeling the influence of the gap between self and observer ratings into technostress.

6. Conclusion

Although ICTs support different positive organizational, team, and individual outcomes at work, they are also associated with decreased productivity and stress. Therefore, in order to create productive ICT working practices, we suggest that instead of organization-wide norms for availability, individuals at work should be better supported in understanding their individual preferences. To ameliorate technostress, organizations should help people to develop self-knowledge and self-confidence, so they can find their own optimal way to use ICTs.

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Table 1. Descriptive statistics

	Mean	SD	Min	Max
1. Technostress	2.934	0.961	1.000	5.000
2a. Self-esteem (self-rating)	4.964	0.940	2.333	7.000
2b. Self-esteem (observer rating)	4.977	0.615	3.333	6.277
3a. Extroversion (self-rating)	4.689	1.211	2.000	7.000
3b. Extroversion (observer rating)	4.680	0.764	2.722	6.611
4a. Conscientiousness (self-rating)	4.821	1.105	1.500	6.750
4b. Conscientiousness (observer rating)	4.954	0.724	2.583	6.390
5. The difference between self-ratings and observer ratings	1.066	0.261	0.711	3.159
6. Availability on ICTs (hours per day)	11.031	5.382	1	24
7. Use of ICTs (hours per day)	5.821	2.906	2	14

Table 2. Square root of the average variance extracted (AVE) and correlations matrix.

Variables	1.Technostress	2a. Self-esteem (self-rating)	3a. Extroversion (self-rating)	4a. Conscientiousness (self-rating)	5. The difference between self-ratings and observer ratings	6. Availability on ICTs (hours per day)	7. Use of ICTs (hours per day)
1. Technostress	0.637						
2a. Self-esteem (self-rating)	-0.201	0.620					
3a. Extroversion (self-rating)	-0.032	0.242	0.634				
4a. Conscientiousness (self-rating)	0.161	0.217	0.101	0.600			
5. The difference between self-ratings and observer ratings	0.071	-0.294*	-0.281*	-0.158	-		
6. Availability on ICTs (hours per day)	-0.107	-0.047	0.172	0.128	0.056	1.000	
7. Use of ICTs (hours per day)	0.1712	0.0112	0.101	0.073	0.058	0.128	1.000

* $p < 0.05$

Table 3A. Measurement Model

Reflective Constructs	Composite reliability	AVE	Cronbach's alpha
Technostress	0.840	0.637	0.714
Extroversion (self-rating)	0.837	0.634	0.745
Self-esteem (self-rating)	0.830	0.620	0.713
Conscientiousness (self-rating)	0.856	0.600	0.784

Table 3B. Collinearity statistics (VIF)

	VIF
Extroversion (self-rating)	1.211
Self-esteem (self-rating)	1.329
Conscientiousness (self-rating)	1.148
The difference between self-ratings and observer ratings	1.271
Availability on ICTs	1.156
Use of ICTs	1.146
Experience	1.866
Gender	1.077
Age	1.724
Nationality (Eastern Europe)	1.150

Table 3C. Heterotrait-Monotrait Correlation Ratio (HTMT)

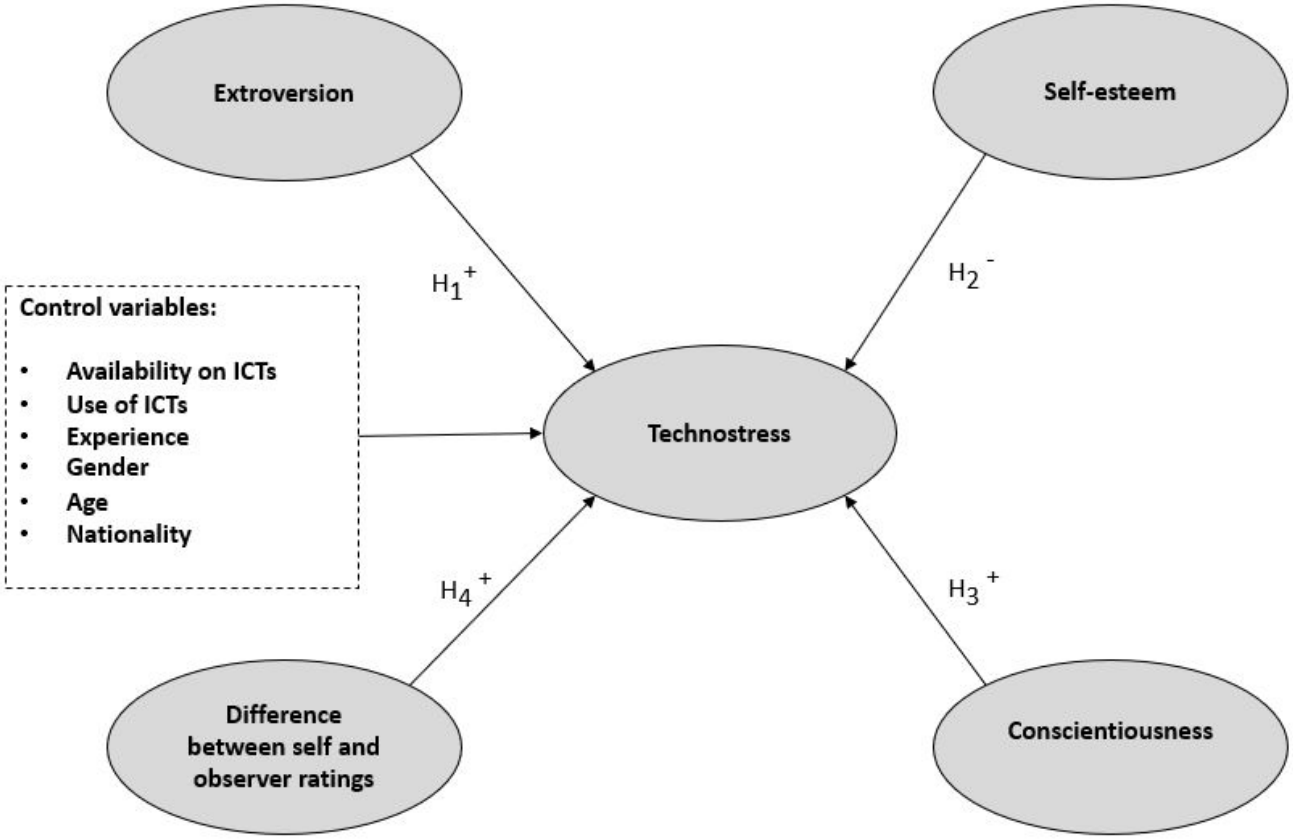
Reflective Constructs and Control Variables	Technostress	Extroversion	Self-esteem	Conscientiousness	Availability on ICTs	Use of ICT	Experience	Gender	Age
Extroversion (self-rating)	0.075								
Self-esteem (self-rating)	0.288	0.330							
Conscientiousness (self-rating)	0.222	0.075	0.293						
Availability on ICTs	0.123	0.200	0.056	0.145					
Use of ICTs	0.198	0.115	0.078	0.082	0.128				
Experience	0.251	0.059	0.094	0.098	0.198	0.246			
Gender	0.121	0.052	0.111	0.164	0.005	0.015	0.142		
Age	0.121	0.085	0.091	0.107	0.013	0.252	0.618	0.099	
Nationality (Eastern Europe)	0.172	0.190	0.146	0.031	0.032	0.033	0.140	0.032	0.209

Table 4. Path coefficients and p-values

	Parameter Estimate
H1: Extroversion (self-rating) → Technostress	0.098
H2: Self-esteem (self-rating) → Technostress	-0.203*
H3: Conscientiousness (self-rating) →Technostress	0.245*
H4: The difference between self-ratings and observer ratings in all personality dimensions → Technostress	0.319*
Availability on ICTs → Technostress	-0.120
Use of ICTs → Technostress	0.117
Gender → Technostress	-0.036
Experience → Technostress	0.182
Age → Technostress	-0.008
Nationality (Eastern Europe) → Technostress	0.211*

* $p < 0.05$

Figure 1. Research model



Appendix 1

Reflective Constructs	Loadings	Mean	SD
Technostress			
Techno-insecurity ("I feel a threat to my job security due to new technologies").	0.799	2.989	1.309
Techno-overload ("I have a higher workload because of increased technology complexity");	0.762	3.032	0.972
Techno-complexity ("I often find it too much trouble for me to learn to use new technologies");	0.851	2.789	1.312
Extroversion (self-rating)			
Item1 "Compared to my peers... I am not a very sociable person / I am extremely sociable person"	0.662	4.726	1.511
Item2 "I would prefer to spend most of my time... alone / with other people"	0.828	4.800	1.411
Item3 "I seek the company of other people... rarely / quite often"	0.882	4.539	1.549
Self-esteem (self-rating)			

Reflective Constructs	Loadings	Mean	SD
Item1 “When I compare myself to other people, I feel that I have... very little control over events in my life / a considerable amount of control over events in my life”	0.707	4.989	1.259
Item2 “When I compare myself to my peers, I feel.. inferior / superior”	0.859	4.947	1.095
Item 3 I see myself as someone who is... not successful / extremely successful	0.790	4.958	1.18
Conscientiousness (self-rating)			
Item 1 “My personal standards of behavior are... relaxed / very strict”	0.872	4.884	1.375
Item 2 “If my things are not neat and orderly... I don't mind at all / I get very annoyed”	0.661	4.253	1.502
Item 3 “I pay... little attention to details / great attention to details”	0.810	4.789	1.413
Item 4 “I am... disorganized / extremely organized”	0.740	5.358	1.391