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Personality and espoused cultural differences in technostress creators

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ABSTRACT

This study examines the individual differences in 'technostress creators'—defined as the factors that cause technostress for employees. Drawing on the Five-Factor model of personality and Hofstede's cultural values framework, this study proposes that the Big-Five personality traits and the espoused cultural values explain variation in technostress creators beyond the traditional antecedent measures of age, gender, education, and computer confidence. Further, in line with the insights from extant behavioral studies on "personality–culture" interaction, this study posits that the Big-Five personality traits can be linked to technostress creators more closely when each of them is accompanied by the espoused cultural value of long-term orientation than when without it. Analyzing data from an online survey of 322 full-time employees in India, results indicated that (1) the personality traits of agreeableness, neuroticism and openness to experience, and the espoused cultural values of masculinity and power distance are the key predictors of technostress creators; and (2) the relationships of agreeableness, conscientiousness and extraversion with technostress creators are contingent on espoused long-term orientation. Findings of this study contribute to the knowledge base of technostress by understanding the linkages of (and among) personality and culture with technostress creators.

1. Introduction

The rapid proliferation of information and communication technologies (ICTs) in organizations has resulted in significant benefits for its employees in terms of their performance, satisfaction, productivity and effectiveness (DeLone & McLean, 1993, 2003; Petter, DeLone, & McLean, 2008). At the same time, both academic and practitioner communities highlight that in addition to these benefits; ICTs also present potential drawbacks as well. Technostress, a term coined in 1984 by clinical psychologist Craig Brod (Ayyagari, Grover, & Purvis, 2011), is a modern disease caused by one's inability to cope or deal with ICTs in a healthy manner (Brod, 1984), which can be a destructive force for employees; and hence for their organizations. To illustrate, a report from Pew Research Center highlights that though ICTs offer increased connectivity and flexibility, they also add stress and new demands to employees' lives (Madden & Jones, 2008). Another study indicates that ICTs affect employees' work and emotions as personal resources such as energy and attention are required in dealing with them (Lim & Chen, 2012; Macklem, 2006). Indeed, technostress is linked to reduced job satisfaction, commitment, innovation and productivity (Tarafdar, Tu, Ragu-Nathan, & Ragu-Nathan, 2011).

Drawing on the extant literature on technostress, Srivastava and his associates highlight that technostress is caused in employees "because of the increased work overload, excessive technology dependence, demands for enhanced productivity and a constant need to adapt to emerging ICT applications, functionalities and workflows" (Srivastava, Chandra, & Shirish, 2015, p. 356), which together is termed as *technostress creators* (Tarafdar, Ragu-Nathan, Ragu-Nathan, & Tu, 2007). While studies indicate that these creators having implications for employees vary across individuals (Tarafdar et al., 2007), there are only a handful of research examining such differences. For instance, a study by Ragu-Nathan and his affiliates tested the effects of four traditional antecedent measures namely, age, gender, education, and computer confidence on technostress, and found that males experienced more technostress than females, and that technostress decreased with increase in age, education and computer confidence (Ragu-Nathan, Tarafdar, Ragu-Nathan, & Tu, 2008). However, these traditional measures are only surface-level traits, and to our knowledge, extant studies have not accounted for the effects of deep-level traits such as personality and espoused culture that are often associated with a number of organizational processes, behaviors and outcomes (Barrick &

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Mount, 1991; Birnbaum & Sommers, 1986; Bono & Judge, 2004; Wilkins & Ouchi, 1983). Hence, against this backdrop, we believe that it is vital to understand the personality and espoused cultural differences in relation to technostress creators. We argue that individuals, depending on their personality traits and espoused cultural values, will perceive technostress creators either as having negative consequences or as providing opportunities for them to engage in and learn new things at workplace. Accordingly, the key research question (RQ) of this study is as follows:

RQ: How are personality and espoused culture related to technostress creators?

The rest of the paper is organized as follows. First, by drawing on the Five-Factor model (FFM) of personality and Hofstede's cultural values framework, we explain the linkages of (and among) personality and espoused culture with technostress creators. This is followed by the section on research design. Thereafter, using data from an online survey of 322 full-time employees in India, we test our hypotheses. We then discuss the results and the implications for future research. The final section provides concluding remarks with a restatement of the value of our study.

2. Theoretical background and hypotheses

Tarafdar et al. (2007) identified five factors that create technostress for employees: (1) techno-complexity; (2) techno-insecurity; (3) techno-invasion; (4) techno-overload; and (5) techno-uncertainty. While *techno-complexity* describe situations where the complex computer systems used at work force people to spend time and effort learning and understanding how to use new applications and updating their skills, *techno-insecurity* is associated with situations where people feel threatened about losing their jobs to other people who have a better understanding of new gadgets and computing devices. Whereas *techno-invasion* denotes being 'always exposed' so that people can potentially be reached anywhere and anytime and feel the need to be constantly connected, *techno-overload* describe situations where the use of new technologies force people to work more and faster. And, *techno-uncertainty* relate to the short life-cycles of computer systems because of which people do not get the chance to experience a particular system. Table 1 summarize the sample situations that cause technostress to employees.

The central premise of this study is that technostress varies across individuals, and such variations become evident when the linkages of deep-level traits such as personality and espoused culture with technostress creators are accounted for. In the ensuing sections, by drawing on the personality and espoused culture literature, we describe how different individuals perceive technostress creators differently.

2.1. Relating personality to technostress creators

Personality refers to an individual's personal set of mental programs that need not be shared with any other individuals (Everton, Mastrangelo, & Jolton, 2005; Hofstede, Hofstede, & Minkov, 2010). It is a stable set of characteristics that determine individuals' commonalities and differences in thoughts, feelings and actions (Gosling, Augustine, Vazire, Holtzman, & Gaddis, 2011; Maddi, 1989). A key model that is central to personality and work behavior research is the Five-Factor model (Goldberg, 1992; John & Srivastava, 1999; McCrae & Costa, 1999) in which the essence of one's personality is comprehensively represented by five traits, labeled as the Big-Five: (1) agreeableness; (2) conscientiousness; (3) extraversion; (4) neuroticism; and (5) openness to experience. Table 2 provides a brief description on each of these traits.

Although some studies have argued for a framework consisting of less than five factors (e.g., Block, 1995; Eysenck, 1992), it is the FFM that has gained a lot of attention amongst researchers across different disciplines such as organizational science (e.g., Barrick, Mount, & Judge, 2001) and information systems (e.g., Devaraj, Easley, & Crant, 2008; Krishnan, 2016). As noted by Briggs (1992), the FFM model of personality is "… the model of choice for the researcher wanting to represent the domain of personality variables broadly and systematically" (p.254). Hence, we believe that FFM would present a concise theoretical framework for studying individuals' personality related differences in technostress creators.

In this study, we propose that individuals with different personality traits are likely to perceive technostress creators differently. For instance, as agreeable individuals score high on characteristics such as likeability, friendly compliance and social adaptability, they will be more accommodating when asked to use organizational ICTs (Devaraj et al., 2008). And, because of their communal orientation (Zellars & Perrewé, 2001), they tend to perceive technostress creators positively; as such creators are more likely to change their work habits to adapt them to new technologies. Further, studies indicate that agreeable individuals tend to use new ICTs in their job even without having the required capability (Srivastava et al., 2015). Hence, we posit the following hypothesis:

H1a: Individuals scoring high on agreeableness will perceive technostress creators positively.

Conscientiousness is the tendency to be goal-oriented with a strong sense of purpose (Venkatesh, Sykes, & Venkatraman, 2014). Individuals who are conscientious are characterized by will to achieve, conformity and prudence (Witt, 2002). Although conscientiousness can act as a psychological resource that protects an individual from experiencing stress (Zellars, Perrewé, Hochwarter, & Anderson, 2006), it is likely that conscientious individuals at work tend to perceive technostress creators negatively as they might feel that such creators are more likely to negatively impact their qualities of planning and persistence (Carver & Connor-Smith, 2010). Further, as new developments and constant changes in organizational ICTs are likely to affect their characteristics of responsibility and impulse control (Carver & Connor-Smith, 2010); they will comprehend technostress creators negatively. Therefore, we propose the following hypothesis:

H1b: Individuals scoring high on conscientiousness will perceive technostress creators negatively.

Extraversion is called by alternative labels such as confident self-expression, sociability and surgency (Witt, 2002). As individuals scoring high on extraversion experience greater positive affect in response to positive stimuli (Gomez, Cooper, & Gomez, 2000; Gross, Sutton, & Ketelaar, 1998), it is more likely for them to perceive technostress creators as the negative stimuli impacting their emotions negatively. Further, as extroverted individuals are characterized by energy and positive emotions, work-related ICTs and its frequent changes are more likely to make them feel the need to update their skills constantly to avoid being replaced. Also, studies indicate that extroverts in comparison with their counterparts prefer face-to-face interaction than interactions via organizational ICT tools (Hamburger & Ben-Artizi, 2000; Landers & Lounsbury, 2006). So, we posit the following hypothesis:

H1c: Individuals scoring high on extraversion will perceive technostress creators negatively.

Neuroticism, known by its positive pole of emotional stability,

Table 1
Technostress creators and sample situations causing technostress (source: Tarafdar et al., 2007).

Technostress creator	Sample situations that cause technostress
Techno-complexity	Caused when employees: ▪ Do not know enough about the new ICTs to handle their job satisfactorily ▪ Do not find enough time to study and upgrade their ICT skills ▪ Need a long time to understand and use new ICTs ▪ Often find it too complex for them to understand and use new ICTs ▪ Find that new recruits to their organization know more about ICTs than they do
Techno-insecurity	Caused when employees: ▪ Feel constant threat to their job security because of new ICTs ▪ Feel constant need to update their ICT skills to avoid being replaced ▪ Feel constant threat by coworkers with newer ICT skills ▪ Do not share knowledge with their coworkers for fear of being replaced ▪ Feel there is less knowledge sharing amongst coworkers for fear of being replaced
Techno-invasion	Caused when employees: ▪ Spend less time with their families because of ICTs ▪ Have to be in touch with work even during their vacation because of ICTs ▪ Have to sacrifice their vacation and weekend time to keep themselves updated on new ICTs ▪ Feel their personal life is being invaded because of ICTs
Techno-overload	Caused when employees are forced by ICTs to: ▪ Work much faster ▪ Do more work than they can handle ▪ Work with very tight time schedules ▪ Change their work habits to adapt to new technologies ▪ Handle higher workload because of increased technological complexity
Techno-uncertainty	Caused in employees when there are always: ▪ New developments in the ICTs they use in their organization ▪ Constant changes in ICT software of their organization ▪ Constant changes in ICT hardware of their organization ▪ Frequent upgrades in ICT networks of their organization

Table 2
Description of Big-Five personality traits (source: John & Srivastava, 1999; McCrae & Costa, 1999).

Personality trait	Description
Agreeableness	Agreeableness characterizes individuals who are kind, considerate, likeable, helpful and cooperative. Agreeable individuals are more likely to be accommodating and cooperative when asked to consider a new technology.
Conscientiousness	Conscientiousness characterizes individuals who are intrinsically motivated to achieve and perform at a high level and take actions to improve their job performance.
Extraversion	Extraversion characterizes individuals who are social, active and outgoing, and place a high value on close and warm interpersonal relationships. The biggest motivation for such individuals to adopt an innovation is prospective gain in terms of social image.
Neuroticism	Neuroticism characterizes individuals who are anxious, self-conscious, paranoid and prone to negative emotions and negative reactions to work-related stimuli.
Openness to experience	Openness to experience characterizes individuals who are willing to try new and different things. They actively seek out new and varied experiences and value change.

embodies stress, anxiousness and hostility (Landers & Lounsbury, 2006). On the other hand, emotional stability, called by alternative labels such as emotional control, adjustment and ego strength (Witt, 2002), represents even-temperedness (John & Srivastava, 1999). Studies have found that individuals scoring high on neuroticism have negative feelings towards things such as computers, to which they have not been exposed before (Landers & Lounsbury, 2006). In our study context, as neurotic individuals possess negative attitudes and cognitions towards organizational ICTs (Srivastava et al., 2015), it is more likely for them to view ICT-related job disruptions as threatening (Srivastava et al., 2015) and technostress creators as threats (Goldberg, 1990). Further, as neurotics tend to be insecure, there is a high chance for them to perceive newer ICTs as a threat to their job security. Hence, we propose the following hypothesis:

H1d: Individuals scoring high on neuroticism will perceive technostress creators negatively.

Openness to experience describes creativity, flexibility, curiousness and unconventionality found in individuals. They engage in experiential learning and proficiency (Barrick et al., 2001), and are motivated towards self-set work goals accomplishment (Judge, Higgins, Thoresen, & Barrick, 1999). Individuals scoring high on openness to experience are more likely to perceive technostress creators negatively as such creators are likely to negatively impact their artistic creativity and divergent thinking (Bala & Venkatesh, 2013). Further, as ICT-based disruptions at work will have a negative influence on their learning experiences and their propensity to try novel approaches (Williams & Anderson, 1991), they tend to have negative attitudes and cognitions for job-related ICTs. Therefore, we posit the following hypothesis:

H1e: Individuals scoring high on openness to experience will perceive technostress creators negatively.

2.2. Relating espoused culture to technostress creators

Culture is a collective macro-level phenomenon (Hofstede et al., 2010; Krishnan & AlSudiary, 2016) consisting "of several elements of which some are implicit and others are explicit … most often these elements are explained by terms such as behavior, values, norms, and basic assumptions" (Groeschl & Doherty, 2000, p. 14). Accordingly, national culture is defined as "the collective programming of the mind which distinguishes the members of one

group or category of people from another" (Hofstede, 1991, p. 5). One of the key frameworks central to culture research is Hofstede's typology of national cultural values comprising four dimensions, namely (1) individualism vs. collectivism; (2) masculinity vs. femininity; (3) power distance; and (4) uncertainty avoidance (Hofstede, 1980). Later, long-term vs. short-term orientation was added as the fifth dimension (Hofstede & Bond, 1988). Though this framework has received criticisms on several grounds including methodology (Korman, 1985; Robinson, 1983) and sample data's representativeness (Huo & Randall, 1991; Myers & Tan, 2002), it has gained prominence over the last few decades (Krishnan & Lymm, 2016). Moreover, this framework has been the basis for numerous empirical studies in a variety of disciplines (Sondergaard, 1990), and several studies have confirmed the validity of the aforementioned dimensions of the framework (e.g., Brouthers & Brouthers, 2001). Hence, we believe that Hofstede's cultural values framework would present a concise theoretical model for studying individuals' cultural differences in technostress creators.

As individuals may identify with each of the aforementioned national cultural values to varying degrees, studies indicate that at the individual-level of analysis, culture can be treated as an individual-difference variable (Hoehle, Zhang, & Venkatesh, 2015; Omoush, Yaseen, & Alma'aitah, 2012; Srite & Karahanna, 2006). Srite and Karahanna indicates that "at the individual level of analysis national culture manifests through an individual's espoused national cultural values" (2006, p. 681). Accordingly, based on the aforementioned Hofstede's dimensions of national culture, the following five espoused cultural values are specified in the literature: (1) espoused individualism vs. espoused collectivism; (2) espoused masculinity vs. espoused femininity; (3) espoused power distance; (4) espoused uncertainty avoidance; and (5) espoused long-term vs. espoused short-term orientation (Hoehle et al., 2015; Omoush et al., 2012; Srite & Karahanna, 2006). Table 3 provides a brief description on each of the espoused cultural values.

In this study, we propose that the individuals with different espoused cultural values are likely to perceive technostress creators differently. For example, as individuals scoring high on espoused collectivism are attuned to the perspectives of others and are responsive to the needs of others (Jordan & Surrey, 1986), they tend to be more accommodative to constant changes and frequent upgrades in organizational ICTs. On the other hand, as individuals scoring high on espoused individualism focus primarily on their own internal traits, skills and attitudes (Srite & Karahanna, 2006), they are unlikely to adjust to such changes and upgrades at their workplace; and hence perceive technostress creators negatively. Further, as they are characterized to be self-promoters (Bem, 1981; Yoo & Huang, 2011), they tend not to share knowledge with their coworkers in the interest of their job security in comparison with their counterparts who are characterized as loyal to the group. Hence, we posit the following hypothesis:

H2a: Individuals scoring high on espoused individualism will perceive technostress creators negatively.

Individuals who espouse masculine values emphasize ego-enhancing goals driven by competitiveness (Srite & Karahanna, 2006). Hence, individuals scoring high on espoused masculinity are more likely to comprehend technostress creators positively as they tend to be more willing to change their work habits by adapting to new organizational technologies and by handling heavy workloads. In contrast, individuals who espouse feminine values tend to perceive technostress creators negatively as they emphasize more on interpersonal relationships (Bem, 1981; Hofstede, 1984), and hence will be less willing to sacrifice their vacation and weekend time to keep current on the new ICTs at their workplace. Further, as they are characterized to be compassionate and expressive (Bem, 1981; Hofstede, 1984) in their relationships, it is more likely for them to feel that their personal life is being invaded due to organizational ICT-led disruptions. Therefore, we propose the following hypothesis:

H2b: Individuals scoring high on espoused masculinity will perceive technostress creators positively.

Individuals scoring high on espoused power distance will be more concerned about complying with their superiors' opinions and will fear to disagree with them (Hofstede, 1984). As new ICTs in an organization gets implemented often as a mandate from the superiors, these individuals are more likely to comprehend technostress creators positively as they not only tend to comply with the mandates (Hofstede & Associates, 1998) but also adapt to the subsequent changes at the workplace. In a similar vein, they are more likely to readily acknowledge that the new recruits of their organization know more about ICTs than themselves as they feel that these new recruits are hired by their superiors and hence they need to comply with their decisions. So, we posit the following hypothesis:

H2c: Individuals scoring high on espoused power distance will perceive technostress creators positively.

Individuals espousing high uncertainty avoidance tend to perceive technostress creators negatively as they feel that such creators might lead them to unknown or uncertain situations. Further, as they emphasize the need for predictability through formal rules and structure in organizations (Hofstede, 1984), it is

Table 3
Description of espoused cultural values (source: Hoehle et al., 2015; Srite & Karahanna, 2006).

Espoused cultural value	Description
Individualism vs. collectivism	Espoused individualism/collectivism refers to an individual's preference for a social framework where individuals take care of themselves (espoused individualism) as opposed to where individuals expect the group to take care of them in exchange for their loyalty (espoused collectivism).
Masculinity vs. femininity	Espoused masculinity/femininity refers to the degree to which gender inequalities are espoused by an individual. While individuals espousing masculine values emphasize work goals such as earnings, advancement, competitiveness, performance and assertiveness, individuals espousing feminine values emphasize personal goals such as a friendly atmosphere, comfortable work environment, quality of life, and warm personal relationships.
Power distance	Espoused power distance refers to the degree to which large differentials of power and inequality are accepted as normal by the individual. It will condition the extent to which the employee accepts that his/her superiors have more power.
Uncertainty avoidance	Espoused uncertainty avoidance refers to the extent to which individuals feel vulnerable to unpredictable and unknown situations. It is the level of risk accepted by the individual, which can be gleaned by his/her emphasis on rule obedience, ritual behavior, and labor mobility.
Long-term vs. short-term orientation	Individuals who espouse long-term orientation values emphasize thrift, perseverance for building relationship, ordering relationships by status and observing this order, and preference towards future rewards. On the other hand, individuals who espouse short-term orientation values underline fostering virtues of personal steadiness and stability, protecting face, respect for tradition, and fulfilling social obligations.

more likely for them to see the constant and frequent changes in their organizational ICT software and hardware not only as threats but also as uncertain situations requiring time and effort for updating their skills. On the other hand, individuals espousing low uncertainty avoidance are likely to perceive technostress creators positively as they are tolerant of unstructured situations (Hoehle et al., 2015) like working with very tight time schedules, changing the work habits to adapt to new technologies, etc. Further, as they are open to change and have the willingness to take risks (Earley & Stubblebine, 1989), it is likely that they will find it less complex than their counterparts to use newer ICTs at workplace. Hence, we propose the following hypothesis:

H2d: Individuals scoring high on espoused uncertainty avoidance will perceive technostress creators negatively.

Espoused long-term/short-term orientation refers to an individual's consideration of the future (Hofstede et al., 2010). Individuals espousing long-term orientation tend to perceive technostress creators positively as they have a strong preference for future rewards. Hence, they may not mind spending less time with their family because of newer ICTs at work. Further, they will be more willing to handle higher workload because of increased technological complexity at their workplace. In contrast, as individuals scoring high on espoused short-term orientation emphasize on fostering virtues of personal steadiness and protecting face (Omoush et al., 2012), they are more likely to feel constant threat from coworkers with newer ICT skills. Further, they tend not to share their knowledge with them for fear of being replaced. Therefore, we posit the following hypothesis:

H2e: Individuals scoring high on espoused long-term orientation will perceive technostress creators positively.

2.3. Joint influence of personality and espoused culture on technostress creators

Can the Big-Five personality traits and espoused cultural values jointly predict technostress creators? In other words, can certain espoused cultural values interact with the Big-Five personality traits in affecting technostress creators? While this question is undoubtedly interesting and important to both academic and practitioner communities, we note the following from our extensive review of extant literature on personality and culture. Firstly, in a joint study by McCrae and Hofstede (1983) that explored the relationship between personality dimension scores and national culture dimension scores, it was found that the mean scores on the personality dimensions for comparative samples from thirty-three countries correlated significantly with the four dimensions of culture (the fifth dimension of long-term vs. short-term orientation was not included in their study). This joint study showed that personality and culture are not independent. Secondly, while there are a few behavioral studies that present insights on the possibility of "personality–culture" interaction (e.g., Bock, 2000; McCrae, 2000), there are no well-established theoretical or conceptual frameworks for deriving logical predictions dealing with the combined effects of personality traits and espoused cultural values. Consequently, there are no empirical studies examining the joint influences of personality traits and espoused cultural values with the dependent construct(s) of research interest. And thirdly, while there are a handful of studies on personality and work behavior that have analyzed interactions among personality variables (e.g., high conscientiousness in the presence of extraversion), there are no similar studies either in the context of culture or in the context involving both personality and espoused culture. For instance, Witt, Burke, Barrick, and Mount (2002) in their study on "personality–job performance" found that "highly conscientious workers who lack interpersonal sensitivity may be ineffective, particularly in jobs requiring cooperative interchange with others" (p. 164). Another study by Witt (2002) found that "additional units of extraversion led to increments in performance among high-conscientious workers but to decrements in performance among low-conscientious workers" (p. 835). Similarly, King, George, and Hebl (2005) in their study on personality and helping behaviors at work found that "the impact of conscientiousness in a social context depends on a positive interpersonal orientation" (p. 585). Recently, a study by Krishnan (2016), in the context of cyber incivility via work email, found that "extraversion and emotional stability can be linked to cyber incivility more closely when each of them is accompanied by conscientiousness than when without it" (p. 545). Taken together, these studies are based on the notion that a personality "trait is depicted by the two factors, a primary and a secondary, that best describe it" (Johnson, 1994, p. 312), and it is evident that there exists a gap in the literature that this study strives to address by examining the joint effects of espoused cultural value of long-term orientation on the relationships of the Big-Five personality traits with technostress creators. We chose to examine Hofstede's fifth dimension of culture (i.e., long-term orientation) in particular, due to its focus on Asian value systems (Hofstede et al., 2010; Srite & Karahanna, 2006); and moreover, data for our study was collected from full-time employees based in India.

Relating to the hypotheses pertaining to the Big-Five personality traits, we predicted that while agreeable individuals will perceive technostress creators positively, individuals scoring high on other traits of conscientiousness, extraversion, neuroticism and openness to experience will perceive them negatively. Perhaps it is counter-intuitive to think that individuals scoring high on agreeableness would perceive technostress creators negatively, and individuals scoring low on conscientiousness, extraversion, neuroticism and openness to experience would perceive them positively. Other factors being equal, for agreeable individuals, there is much more of a tendency to perceive technostress creators positively. Similarly, for individuals scoring low on conscientiousness, extraversion, neuroticism and openness to experience, when other factors are equal, there is much more of a tendency to perceive technostress creators negatively. However, if other factors, such as espoused long-term orientation are not equal, for agreeable individuals, while there is much more of a tendency to perceive technostress creators negatively, for individuals scoring high on conscientiousness, extraversion, neuroticism and openness to experience, there is much more of a tendency to perceive technostress creators positively. This is because, as shown by extant studies examining interactions among personality traits with work behavior constructs (e.g., King et al., 2005; Krishnan, 2016; Witt, 2002; Witt et al., 2002), the way in which the Big-Five traits operate depends, in part, on the pattern of espoused long-term orientation. In other words, the Big-Five traits can be linked to technostress creators more closely when each of them is accompanied by espoused long-term orientation than when without it. Hence, we posit the following hypotheses:

H3: The relationships of **(a)** agreeableness; **(b)** conscientiousness; **(c)** extraversion; **(d)** neuroticism; and **(e)** openness to experience with technostress creators are contingent on espoused long-term orientation.

3. Research design

Survey method was chosen for collecting data to test our

hypotheses as it enhances the generalizability of our findings (Dooley, 2001; Kankanhalli, Tan, & Wei, 2005).

3.1. Sample

Our sample consisted of part-time students (now alumni) who did their two-year executive post graduate program at a large public institute in India between 2011 and 2016. The alumni database (i.e., EPGAlumDB) maintained by the institute contained details like name, roll number, personal email id and phone number, among others for a total of 1042 students who had graduated so far across six batches. While the first batch (containing 32 students) was conferred their degree in 2011, the sixth batch (containing 167 students) had their conferment in 2016. To test if the email addresses available in the EPGAlumDB database were active, a greeting email from the institute webmail account was broadcasted, of which 32 (3.07%) bounced back. We used the remaining 1011 entries for data collection, to which an email containing the survey link was broadcasted from the institute webmail account. Each email was personalized by adding the name and roll number of the alumnus (as contained in the EPGAlumDB database). Further, in the email, we briefed about the study and requested the participants to respond to the survey within a week. Confidentiality was promised; and to increase the response rate, we assured to share with them the findings of our study. We obtained 322 usable responses (i.e., response-rate of 31.8%) by the end of the survey period of one week.

Non-response bias tests found no significant differences in demographics between respondents and non-respondents (Hoehle et al., 2015). We did not compare early vs. late responses as all responses were collected during a single weekend and no reminders were employed (Churchill, 1979; Hair, Anderson, Tatham, & Black, 1998). *T*-tests indicated that the data collected from 6 batches could be pooled and treated as a single sample (McElroy, Hendrickson, Townsend, & DeMarie 2007). Of 322 respondents, 293 (91%) were men, and were employed in a variety of positions (e.g., recruiting head, project lead, information systems manager, financial officer, operations manager, and lead engineer). Nine participants (3%) were <30 years old, 199 (62%) were 30 to <40 years, 108 (33%) were 40 to <50 years, and 6 (2%) were ≥50 years old.

3.2. Measures

All the constructs used in our study were measured using scales adapted from prior studies (see Appendix) to enhance validity (Stone, 1978). The Big-Five personality traits were measured using Saucier's (1994) Mini-Markers scale consisting of 40 adjectives, which are organized in five sets of eight items according to the appropriate Big-Five dimensions. Participants were asked to indicate how accurately each item described them on a scale of 1 ("Extremely inaccurate") to 7 ("Extremely accurate"). Example items for (1) agreeableness are "Cooperative" and "Kind"; (2) conscientiousness are ""Efficient" and "Organized"; (3) extraversion are "Bold" and "Energetic"; (4) neuroticism are "Envious" and "Jealous"; and (5) openness to experience are "Creative" and "Deep". Measures for espoused cultural values were adapted from Hoehle et al. (2015) and Srite and Karahanna (2006). Participants were asked to indicate to what extent they disagreed/agreed on each of the item on a scale of 1 ("Strongly disagree") to 7 ("Strongly agree"). Sample items included: (1) group success is more important than individual success (espoused individualism); (2) it is preferable to a have a man at a high level position rather than a woman (espoused masculinity); (3) managers should make most decisions without consulting subordinates (espoused power distance); (4) order and structure are very important in a work environment (espoused uncertainty avoidance); and (5) thrift is important in private life (espoused long-term orientation).

Technostress creators were measured using Tarafdar et al.'s (2007) twenty-three item scale in which the participants were asked to indicate to what extent they disagreed/agreed on each of the item on a scale of 1 ("Strongly disagree") to 7 ("Strongly agree"). Sample items included: (1) do not know enough about the new ICTs to handle my job satisfactorily (techno-complexity); (2) feel constant threat to my job security because of new ICTs (techno-insecurity); (3) spend less time with my family because of ICTs (techno-invasion); (4) forced by ICTs to work much faster (techno-overload); and (5) there are always new developments in the ICTs used in my organization (techno-uncertainty). As noted above, previous studies have found that a few surface-level traits can predict our theoretical construct of interest (i.e., technostress creators). Hence, in line with Ragu-Nathan et al. (2008), we controlled for the effects of traditional antecedent measures of age (in years), gender (male vs. female), education (high school/bachelors/masters/doctorate/others) and computer confidence (measured on a 1 "Not at all confident" to 10 "Totally confident" point scale) in our study.

4. Data analysis and results

4.1. Reliability and validity

We used Cronbach's alpha for assessing the reliability of our constructs (Cronbach, 1951). Nunally, (1978) suggested that a value of at least 0.70 indicates adequate reliability. All constructs in our study had at least adequate reliability except for the espoused cultural variable of long-term orientation, which had a Cronbach's alpha of 0.69 (see column 3 of Table 4). Nevertheless, we proceeded to test for validity using factor analysis with principal components analysis and varimax rotation. Whereas convergent validity was assessed by checking loadings to see if items within the same construct correlated highly amongst themselves, discriminant validity was assessed by examining the factor loadings to see if items loaded more highly on their intended constructs than on other constructs (Cook & Campbell, 1979; see Table 5). According to Comrey, (1973), loadings of 0.45–0.54 are considered fair, 0.55 to 0.62 are considered good, 0.63 to 0.70 are considered very good, and above 0.71 are considered excellent. Factor analysis yielded fifteen components with eigenvalues above 1. These fifteen components corresponded to the fifteen constructs. One item each for conscientiousness, neuroticism and espoused long-term orientation, two items for extraversion, and three items for agreeableness and openness to experience tapped on to other constructs and were omitted. All other items had at least fair loadings on their intended constructs. After omitting the items that tapped onto other constructs, reliability of the constructs improved (see column 5 of Table 4).

4.2. Descriptive statistics, correlations and multicollinearity

Table 6 presents the descriptive statistics and correlations of study variables (including the control variables). As shown, among the Big-Five personality traits, except agreeableness, the remaining four traits were significantly correlated with technostress creators. Among them, while neuroticism was positively correlated, the remaining three traits of conscientiousness, extraversion and openness to experience were negatively correlated with technostress creators. Similarly, within the espoused cultural values, while masculinity and power distance were positively correlated with technostress creators, the remaining three espoused cultural values were not correlated with it. Further, as most correlations among the

Table 4
Reliability of constructs.

Construct	Number of items	Cronbach's alpha	Number of items omitted	Improved Cronbach's alpha
Agreeableness	8	0.71	3	0.75
Conscientiousness	8	0.81	1	0.83
Extraversion	8	0.72	2	0.75
Neuroticism	8	0.71	1	0.74
Openness to experience	8	0.73	3	0.76
Espoused individualism	3	0.75	–	–
Espoused masculinity	3	0.84	–	–
Espoused power distance	3	0.73	–	–
Espoused uncertainty avoidance	3	0.72	–	–
Espoused long-term orientation	3	0.69	1	0.71
Technostress creators	23	0.88	–	–

variables were below the threshold value of 0.8, the concern for multicollinearity would be minimal (Gujarati & Porter, 2009; Gujarati, 2003). Nevertheless, we followed up with the diagnostic statistical collinearity tests that measured variance inflation factor (VIF). VIF assesses the effect that the other independent variables have on the standard error of a regression coefficient (Hair et al., 1998). The results revealed that our VIFs ranged from 1.04 to 1.56 (all tolerance levels above 0.64). A VIF of above 4.0, or a tolerance level below 0.25, may indicate the potential for multicollinearity (Fox, 1991); thus, the concern appeared to be minimal.

4.3. Hypotheses testing

To test our hypotheses H1a-e and H2a-e, we conducted hierarchical regression analysis. In Step 1, we entered the control variables of age, gender, education, and computer confidence into the regression equation. And, in Step 2, we entered the variables of Big-Five personality traits and espoused cultural values. A summary of our results is presented in Table 7. The R^2 value of 0.23 and the adjusted R^2 value of 0.19 ($F = 6.47$, $p < 0.001$) indicated that the overall model was effective in explaining the variance in technostress creators. The change in R^2 value between Steps 1 and 2 of regression was 0.21 (change in $F = 8.46$, $p < 0.001$), indicating that the outcome of the second step (i.e., testing of main effects) could be interpreted.

Pertaining to the Big-Five personality traits, we predicted that while agreeableness will be associated with individuals' positive perception of technostress creators, other four traits will be associated with their negative perception of technostress creators. Results, as shown in Table 7 (Step 2), indicated that among the personality traits, only agreeableness ($\beta = 0.21$, $p < 0.001$), neuroticism ($\beta = 0.17$, $p < 0.001$) and openness to experience ($\beta = -0.23$, $p < 0.001$), were significantly associated with technostress creators. Within them, while the relationships of agreeableness and openness to experience were in line with our initial prediction, the relationship of neuroticism was not. Hence, H1a and H1e were supported, and H1b-d were not supported. Relating to the espoused cultural values, we hypothesized that while espoused masculinity, espoused power distance and espoused long-term orientation will be associated with individuals' positive perception of technostress creators, the remaining two espoused cultural values will be associated with their negative perception of technostress creators. Results (see Step 2 of Table 7) indicated that among the espoused cultural values, only espoused masculinity ($\beta = 0.19$, $p < 0.001$) and espoused power distance ($\beta = 0.16$, $p < 0.01$) were significantly associated with technostress creators, which were in line with our initial prediction. Therefore, H2b and H2c were supported, whereas H2a, H2d and H2e were not supported.

To test our hypotheses pertaining to the joint effects of personality and espoused culture on technostress creators (i.e., H3a-e), we utilized moderating multiple regression analysis, a hierarchical regression technique for testing interaction effects. As recommended by Aiken and West (1991) for examining interactions in regression methods, we first "centered" or "linearly-rescaled" each of the two variables by subtracting the mean from each person's score for each variable to reduce the effect of multicollinearity between the interacting term and the main effect. Interaction terms were assessed simultaneously so that their effects could be seen in the context of the overall model (i.e., in the presence of other interaction effects) (Kankanhalli et al., 2005; Krishnan & Lymm, 2016; Krishnan, 2016). As a first step, controls were entered into the regression equation. Along with the controls, espoused masculinity and espoused power distance were also entered into the regression equation based on our results from previous analysis. In Steps 2 and 3 of the regression equation, we entered independent (and moderating) variables and interaction terms respectively. A summary of our results is presented in Table 8. The R^2 value of 0.25 and adjusted R^2 value of 0.21 ($F = 6.08$, $p < 0.001$) indicated that the overall model was effective in explaining the variance in technostress creators. The change in R^2 value between Steps 2 and 3 of regression was 0.03 (change in $F = 2.65$, $p < 0.01$), indicating that the outcome of the third step (i.e., testing of interaction effects) could be interpreted. As shown in Table 8 (Step 3), while the relationships of agreeableness ($\beta = -0.10$, $p < 0.05$), conscientiousness ($\beta = -0.11$, $p < 0.05$) and extraversion ($\beta = -0.10$, $p < 0.05$) with technostress creators were contingent on espoused long-term orientation, the relationships of neuroticism ($\beta = -0.04$, n.s.) and openness to experience ($\beta = 0.02$, n.s.) with technostress creators were not. Hence, H3a, H3b and H3c were supported, and H3d and H3e were not supported. To determine the patterns characterizing the significant interactions and to examine the consistency of the direction throughout the range of independent variable, we graphed the interaction effects and performed simple slope analyses respectively (Aiken & West, 1991; Cohen & Cohen, 1983).

Figs. 1–3 depict the interactions of espoused long-term orientation on the relationships of (1) agreeableness; (2) conscientiousness; and (3) extraversion with technostress creators respectively. As shown in Fig. 1, while there was a significant positive relationship between agreeableness and technostress creators at low espoused long-term orientation, there was an insignificant positive relationship between them at high espoused long-term orientation. Further, it is evident from the figure that there was little or no difference in technostress creators values between low and high levels of espoused long-term orientation when agreeableness was high but there was a substantial difference in technostress creators values between low and high levels of espoused long-term orientation in favor of low espoused long-term orientation when agreeableness was low. Confirming this, simple slope

Table 5
Validity assessment.

Item	Factor														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
AGR2	0.07	0.00	−0.03	0.01	0.07	**0.61**	0.07	0.06	0.18	−0.07	−0.07	0.07	−0.07	0.09	0.18
AGR4	0.05	0.03	0.00	0.08	0.06	**0.67**	−0.08	0.11	0.19	−0.03	0.00	0.12	0.03	−0.03	0.10
AGR6	0.07	0.05	0.09	0.05	0.01	**0.72**	−0.02	0.02	0.15	0.08	0.13	0.07	0.09	−0.14	−0.02
AGR7	0.18	0.11	−0.01	−0.01	−0.05	**0.64**	−0.18	0.04	0.11	−0.04	−0.07	0.08	−0.11	−0.17	−0.02
AGR8	0.11	0.09	−0.09	0.08	−0.05	**0.57**	0.09	0.07	0.00	−0.15	−0.06	0.08	−0.19	−0.19	0.09
CON1	**0.67**	0.07	−0.06	0.01	−0.10	0.07	−0.12	−0.08	−0.09	−0.16	−0.16	−0.04	−0.09	−0.05	0.08
CON2	**0.82**	−0.06	−0.13	0.08	0.00	−0.05	−0.03	−0.03	−0.06	−0.13	−0.02	0.03	−0.12	0.01	0.08
CON3	**0.52**	−0.01	−0.03	−0.02	0.03	0.12	−0.05	0.18	0.17	0.05	−0.04	0.12	0.00	−0.12	−0.14
CON4	**0.65**	−0.02	−0.19	−0.01	0.00	0.13	−0.08	0.14	0.15	−0.07	0.02	0.07	0.03	−0.04	−0.08
CON5	**0.82**	−0.12	0.01	0.10	0.03	0.01	0.07	0.03	0.05	0.08	0.02	0.07	−0.09	−0.01	0.06
CON7	**0.54**	0.01	−0.14	0.06	−0.11	0.05	−0.15	0.07	0.02	−0.17	−0.03	0.05	−0.13	−0.09	−0.02
CON8	**0.68**	−0.09	−0.06	0.07	0.03	0.14	0.06	0.08	0.11	0.16	0.03	0.02	−0.01	0.03	0.18
EXT3	0.19	0.03	−0.10	0.03	0.06	0.09	−0.01	**0.55**	0.16	−0.13	−0.05	0.04	−0.02	−0.16	−0.01
EXT4	−0.02	0.07	0.01	0.02	−0.09	0.05	−0.07	**0.65**	0.16	0.04	0.06	0.14	0.16	0.00	0.09
EXT5	−0.06	−0.02	−0.09	0.01	−0.09	0.06	−0.14	**0.72**	−0.14	0.08	−0.14	−0.05	0.08	0.01	0.01
EXT6	0.18	−0.11	0.00	0.12	−0.06	−0.06	0.00	**0.66**	0.00	−0.13	−0.13	0.00	−0.16	0.04	0.03
EXT7	0.00	0.01	0.07	−0.05	0.03	0.05	−0.03	**0.74**	0.09	0.16	−0.01	0.01	0.06	0.05	0.13
EXT8	0.10	0.09	−0.06	−0.09	−0.04	0.15	−0.03	**0.52**	0.01	−0.19	−0.03	0.04	−0.08	−0.07	−0.07
NEU1	−0.17	0.03	0.09	0.02	0.01	−0.09	0.15	0.04	−0.04	**0.78**	0.14	0.03	0.13	0.00	−0.01
NEU2	−0.12	−0.05	0.03	0.07	0.17	−0.09	0.00	0.10	0.10	**0.54**	0.12	0.00	0.11	0.10	0.06
NEU3	−0.12	−0.03	0.14	−0.03	0.06	−0.12	0.12	0.06	−0.10	**0.66**	0.16	−0.04	0.19	−0.03	−0.10
NEU4	−0.01	0.06	0.04	0.04	0.00	−0.10	0.00	−0.13	0.01	**0.69**	−0.02	−0.05	0.18	0.09	−0.17
NEU6	−0.08	0.09	0.05	0.01	0.01	−0.08	−0.05	−0.02	0.02	**0.72**	0.01	−0.03	0.03	−0.05	−0.10
NEU7	0.03	0.12	−0.03	0.05	0.06	0.12	0.11	0.04	0.01	**0.63**	0.09	0.12	0.04	−0.11	−0.02
NEU8	−0.09	0.04	0.06	0.03	−0.06	0.03	−0.01	0.02	0.00	**0.79**	−0.04	0.03	0.19	0.09	0.04
OPE2	−0.01	−0.07	−0.15	−0.03	0.11	0.14	0.04	0.13	**0.72**	−0.09	−0.07	0.01	0.00	0.06	0.06
OPE3	0.11	0.03	−0.04	0.05	−0.03	−0.01	−0.09	−0.10	**0.61**	0.08	0.12	0.06	−0.13	−0.14	0.15
OPE4	−0.06	0.01	−0.17	0.04	0.04	0.18	−0.08	0.08	**0.69**	0.12	−0.02	0.08	0.03	0.07	0.04
OPE5	0.16	0.08	−0.12	−0.03	−0.15	0.19	−0.07	0.12	**0.59**	0.08	−0.10	0.14	−0.06	0.04	0.05
OPE7	0.13	−0.07	−0.19	−0.04	0.00	0.15	−0.09	0.01	**0.51**	−0.10	−0.11	0.08	0.03	0.05	−0.02
IDV1	0.05	0.13	0.05	−0.07	0.03	0.01	−0.02	0.05	−0.08	−0.11	0.13	0.15	0.15	0.11	**0.62**
IDV2	0.14	0.03	0.02	0.02	−0.09	0.17	−0.07	0.03	0.18	−0.11	0.01	0.03	−0.10	−0.10	**0.69**
IDV3	0.00	−0.01	−0.01	0.03	−0.03	0.09	−0.06	0.11	0.14	−0.02	0.05	0.02	−0.07	−0.12	**0.81**
MAS1	0.00	0.08	0.09	−0.04	0.06	−0.06	0.07	−0.11	−0.09	0.09	**0.80**	0.03	0.03	0.13	0.06
MAS2	−0.12	0.09	0.04	0.03	0.04	0.04	0.08	−0.10	−0.02	0.07	**0.83**	0.06	0.05	0.08	0.04
MAS3	0.01	0.11	0.08	0.04	0.08	−0.05	0.13	−0.01	0.01	0.00	**0.81**	−0.01	0.10	0.16	0.08
PDI1	0.01	0.10	0.10	−0.03	0.08	−0.17	−0.02	−0.07	0.02	−0.07	0.13	−0.06	0.12	**0.69**	−0.09
PDI2	−0.04	0.11	0.17	−0.05	0.02	−0.19	0.12	−0.01	0.05	0.00	0.15	−0.07	−0.01	**0.67**	−0.12
PDI3	−0.10	0.10	0.18	0.00	−0.04	−0.05	−0.02	0.04	−0.08	−0.02	0.13	0.11	−0.03	**0.55**	−0.01
UAI1	0.11	−0.02	−0.01	0.06	0.03	0.13	0.03	0.07	0.06	−0.09	−0.04	**0.78**	0.06	−0.03	0.09
UAI2	0.04	0.08	0.12	0.02	0.00	0.14	0.00	−0.02	0.11	−0.02	0.08	**0.80**	0.00	−0.04	−0.04
UAI3	0.02	−0.06	0.07	0.03	0.03	0.02	0.06	0.09	0.12	0.03	0.05	**0.70**	0.02	0.07	0.05
LTO1	0.08	0.06	−0.18	0.05	0.02	0.18	0.09	−0.07	−0.07	0.17	−0.09	0.18	**0.61**	0.11	0.12
LTO2	−0.10	−0.08	−0.19	−0.01	0.08	0.17	0.17	0.01	−0.11	0.14	−0.07	0.13	**0.64**	0.19	0.14
COM1	−0.15	0.07	**0.72**	−0.07	0.18	−0.04	0.12	−0.02	−0.06	0.10	0.07	0.03	0.06	0.19	0.02
COM2	−0.07	0.07	**0.71**	−0.16	0.14	0.01	0.17	0.01	−0.16	0.04	0.09	0.04	−0.02	0.12	−0.02
COM3	−0.17	0.04	**0.84**	0.02	0.14	−0.01	0.14	0.01	−0.15	0.02	0.05	0.06	0.08	0.06	0.05
COM4	−0.18	0.07	**0.83**	−0.03	0.04	0.01	0.16	0.04	−0.17	0.02	0.09	0.03	0.08	0.08	−0.01
COM5	−0.01	0.10	**0.52**	0.02	−0.16	0.01	0.18	−0.15	−0.08	−0.02	−0.03	0.01	0.11	0.00	0.03
INS1	−0.06	0.11	0.16	0.07	0.05	−0.05	**0.72**	−0.07	−0.11	0.09	0.17	0.06	−0.02	0.03	−0.06
INS2	−0.08	0.14	0.04	0.08	0.08	0.00	**0.69**	−0.02	−0.07	0.02	0.08	0.13	0.13	−0.15	−0.10
INS3	−0.08	0.12	0.12	0.09	0.10	0.01	**0.80**	−0.08	−0.10	0.05	0.08	0.03	0.06	0.04	0.02
INS4	0.01	0.05	0.16	0.03	0.13	−0.19	**0.61**	−0.06	−0.01	−0.02	0.09	−0.05	0.11	0.18	−0.04
INS5	−0.04	0.10	0.18	0.08	0.19	−0.07	**0.52**	−0.15	0.12	−0.10	−0.06	0.00	−0.02	0.11	0.02
INV1	−0.03	0.15	0.11	0.04	**0.72**	0.02	0.11	−0.08	−0.05	−0.03	−0.02	0.02	0.02	−0.04	0.03
INV2	−0.04	0.17	0.08	0.01	**0.75**	0.04	−0.01	−0.08	0.02	0.07	0.16	0.11	0.01	−0.05	−0.11
INV3	−0.05	0.17	0.14	−0.03	**0.82**	0.00	0.11	0.00	0.04	0.11	0.07	−0.04	0.00	0.07	0.02
INV4	0.04	0.18	0.07	−0.03	**0.79**	0.02	0.19	−0.03	−0.01	0.09	−0.01	0.00	−0.05	0.10	−0.03
OVE1	−0.04	**0.82**	0.05	0.06	0.04	−0.01	0.11	0.05	0.04	0.06	0.09	0.04	0.08	0.00	0.01
OVE2	−0.10	**0.83**	0.13	0.02	0.14	0.04	0.06	0.01	0.02	0.04	0.11	−0.05	0.04	0.06	0.06
OVE3	−0.01	**0.82**	0.10	0.08	0.16	0.03	0.08	0.04	−0.05	0.04	0.05	−0.05	0.00	0.07	0.04
OVE4	0.01	**0.72**	−0.04	0.05	0.16	0.08	0.19	−0.07	0.01	−0.01	0.03	0.07	−0.04	0.06	−0.02
OVE5	−0.08	**0.72**	0.08	−0.03	0.18	0.08	0.17	0.04	0.01	0.13	0.02	0.00	−0.01	0.10	0.07
UNC1	0.08	0.02	−0.17	**0.79**	−0.01	0.11	0.05	−0.01	0.06	0.01	0.01	0.06	0.01	−0.08	−0.05
UNC2	0.05	0.07	−0.01	**0.90**	0.00	0.03	0.06	0.00	0.01	0.05	−0.04	−0.02	0.01	−0.07	0.01
UNC3	0.02	0.04	0.02	**0.89**	−0.02	−0.04	0.07	0.03	−0.03	0.03	0.03	0.07	0.02	0.02	0.01
UNC4	0.10	0.05	0.01	**0.90**	0.01	0.05	0.05	0.00	−0.02	0.05	0.02	0.02	−0.01	0.05	0.02

Notes: Validity test was performed using factor analysis, with principal components analysis and varimax rotation; AGR: Agreeableness; CON: Conscientiousness; EXT: Extraversion; NEU: Neuroticism; OPE: Openness to experience; IDV: Espoused individualism; MAS: Espoused masculinity; PDI: Espoused power distance; UAI: Espoused uncertainty avoidance; LTO: Espoused long-term orientation; COM: Techno-complexity; INS: Techno-insecurity; INV: Techno-invasion; OVE: Techno-overload; UNC: Techno-uncertainty; Items AGR1, AGR3, AGR5, CON6, EXT1, EXT2, NEU5, OPE1, OPE6, OPE8 and LTO3 were dropped during factor analysis.

Table 6
Descriptive statistics and correlations.

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. AGE	2.34	0.57	–													
2. GEN	1.09	0.29	−02	–												
3. EDU	2.85	0.38	09	−02	–											
4. CCF	6.17	2.11	26**	01	−01	–										
5. AGR	5.87	0.57	07	−04	01	−01	–									
6. CON	5.53	0.87	13*	02	11*	−02	27**	–								
7. EXT	4.49	0.99	−07	07	05	−05	19**	16**	–							
8. NEU	3.82	0.98	−13*	02	−02	01	−16**	−29**	−05	–						
9. OPE	5.65	0.68	01	−00	05	−04	50**	29**	22**	−08	–					
10. IDV	5.25	1.04	08	−08	06	05	24**	12*	14*	−11*	15**	–				
11. MAS	2.74	1.37	−00	−21**	02	−01	−11*	−13*	−17**	21**	−14*	10	–			
12. PDI	2.19	0.91	03	−08	−05	−01	−24**	−16**	−07	09	−18**	−04	30**	–		
13. UAI	5.74	0.81	03	−11*	06	03	27**	12*	11*	02	21**	16**	07	06	–	
14. LTO	5.56	0.95	−11	−13*	07	−04	10	01	00	12*	14*	11*	06	04	21**	–
15. TSTCR	3.88	0.84	−02	−01	−11*	05	00	−19**	−12*	24**	−21**	01	30**	25**	10	05

Notes: N = 322; M: Mean; SD: Standard Deviation; AGE (coded as <30 years = 1, 30 to <40 years = 2, 40 to <50 years = 3, and ≥ 50 years = 4); GEN: Gender (coded as Male = 1 and Female = 2); EDU: Education (coded as High school = 1, Bachelors = 2, Masters = 3, Doctorate = 4, and Others = 5); CCF: Computer Confidence (1 "Not at all confident" to 10 "Totally confident"); AGR: Agreeableness; OPE: Openness; EXT: Extraversion; NEU: Neuroticism; CON: Conscientiousness; IDV: Espoused individualism; MAS: Espoused masculinity; PDI: Espoused power distance; UAI: Espoused uncertainty avoidance; LTO: Espoused long-term orientation; TSTCR: Technostress creators; Decimal points are omitted for correlations; $^{**}p < 0.01$ $^{*}p < 0.05$ (2-tailed).

Table 7
Summary of regression results.

Variables and statistics	β [a]		Hypothesis test
	Model 1	Model 2	
Step 1: Controls			
AGE	−0.03	−0.02	
GEN	−0.01	0.06	
EDU	−0.11*	−0.08*	
CCF	0.06	0.04	
Step 2: Main effects			
AGR		0.21***	H1a was supported
CON		−0.07	H1b was not supported
EXT		−0.06	H1c was not supported
NEU		0.17***	H1d was not supported
OPE		−0.23***	H1e was supported
IDV		−0.01	H2a was not supported
MAS		0.19***	H2b was supported
PDI		0.16**	H2c was supported
UAI		−0.09	H2d was not supported
LTO		0.02	H2e was not supported
R^2	0.02	0.23	
Adjusted R^2	0.00	0.19	
F	1.22	6.47***	
R^2 Change	–	0.21	
F Change	–	8.46***	

Notes:
$^{***}p < 0.001$ $^{**}p < 0.01$ $^{*}p < 0.05$ (2-tailed).
[a] The betas reported are based on standardized coefficients; N = 322; Refer to notes in Table 6 for description of abbreviations.

analysis revealed that when espoused long-term orientation was high, the relationship of agreeableness with technostress creators was positive and not significant (slope = 0.15, t = 1.16, n.s.). And when espoused long-term orientation was low, the relationship was positive and significant (slope = 0.45, t = 4.93, p < 0.001).

Relating to the joint effect of conscientiousness and espoused long-term orientation on technostress creators, as shown in Fig. 2, while there was a significant negative relationship between conscientiousness and technostress creators at high espoused long-term orientation, there was an insignificant positive relationship between them at low espoused long-term orientation. Further, it is evident from the figure that there was little or no difference in technostress creators values between low and high levels of espoused long-term orientation when conscientiousness was high but there was a substantial difference in technostress creators values between low and high levels of espoused long-term orientation in favor of high espoused long-term orientation when conscientiousness was low. Confirming this, simple slope analysis revealed that when espoused long-term orientation was high, the relationship of conscientiousness with technostress creators was negative and significant (slope = −0.17, t = −2.14, p < 0.05). And when espoused long-term orientation was low, the relationship of conscientiousness with technostress creators was positive and not significant (slope = 0.04, t = 0.65, n.s.).

Similarly, relating to the combined effect of extraversion and espoused long-term orientation on technostress creators, as shown in Fig. 3, while there was a significant negative relationship between extraversion and technostress creators at high espoused long-term orientation, there was an insignificant positive relationship between them at low espoused long-term orientation. Further, it is evident from the figure that there was little or no difference in technostress creators values between low and high levels of espoused long-term orientation when extraversion was high but there was a substantial difference in technostress creators values between low and high levels of espoused long-term orientation in favor of high espoused long-term orientation when extraversion was low. Confirming this, simple slope analysis revealed that when espoused long-term orientation was high, the relationship of extraversion with technostress creators was negative and significant (slope = −0.14, t = −1.98, p < 0.05). And, when espoused long-term orientation was low, the relationship of extraversion with technostress creators was positive and not significant (slope = 0.01, t = 0.30, n.s.).

Finally, among the four control variables, only education was significantly associated with technostress creators in both the analyses (see Step 1 in Tables 7 and 8). In the following section, we discuss the implications, limitations and future research directions of our study.

5. Discussion

Motivated by the dearth of studies examining the effects of deep-level traits such as personality and espoused culture on technostress, this research investigated the influences of (and among) the Big-Five personality traits and espoused cultural values on technostress creators, beyond its traditional antecedent surface-level traits of age, gender, education, and computer confidence.

Table 8
Summary of moderated multiple regression results.

Variables and statistics	β [a]			Hypothesis test
	Model 1	Model 2	Model 3	
Step 1: Controls				
AGE	−0.04	−0.02	−0.02	
GEN	0.06	0.06	0.04	
EDU	−0.10*	−0.08	−0.09*	
CCF	0.06	0.05	0.03	
MAS	0.26***	0.20***	0.17***	
PDI	0.17**	0.17***	0.17***	
Step 2: Main Effects				
AGR		0.23***	0.20***	
CON		−0.06	−0.07	
EXT		−0.05	−0.06	
NEU		0.17***	0.18***	
OPE		−0.22***	−0.21***	
LTO		0.03	0.06	
Step 3: Interaction Effects				
AGR × LTO			−0.10*	H3a was supported
CON × LTO			−0.11*	H3b was supported
EXT × LTO			−0.10*	H3c was supported
NEU × LTO			−0.04	H3d was not supported
OPE × LTO			0.02	H3e was not supported
R^2	0.13	0.22	0.25	
Adjusted R^2	0.12	0.19	0.21	
F	8.04***	7.31***	6.08***	
R^2 Change	–	0.09	0.03	
F Change	–	5.84***	2.65**	

Notes:
***p < 0.001 **p < 0.01 *p < 0.05 (2-tailed).
[a] The betas reported are based on standardized coefficients; N = 322; Refer to notes in Table 6 for description of abbreviations.

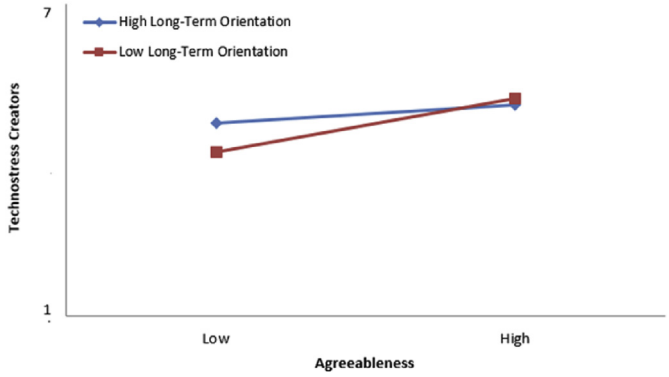

Fig. 1. Interaction plot for agreeableness × espoused long-term orientation.

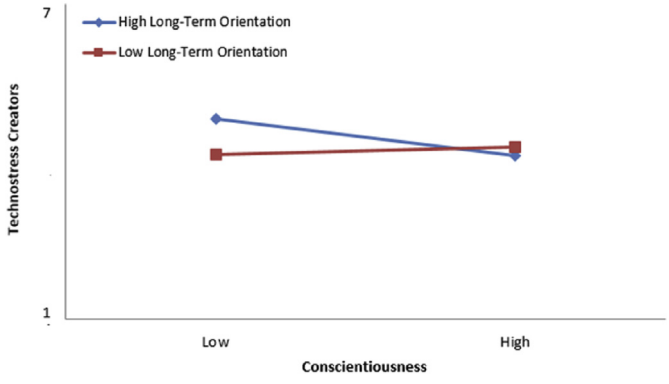

Fig. 2. Interaction plot for conscientiousness × espoused long-term orientation.

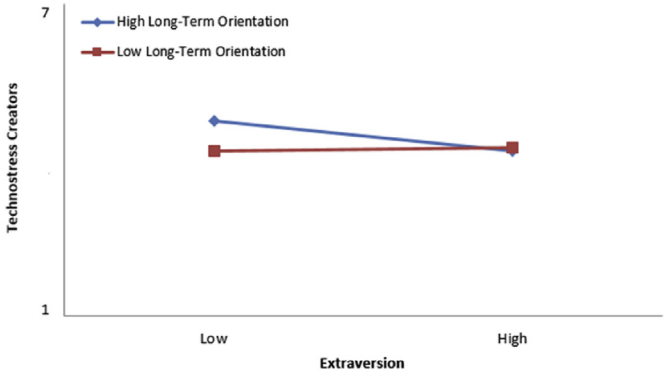

Fig. 3. Interaction plot for extraversion × espoused long-term orientation.

Analyses of data obtained from 322 full-time employees in India led to several interesting findings that deserve mention. First, within the Big-Five personality traits, agreeableness was the strongest predictor of technostress creators, followed by openness to experience (see Table 7). That is, agreeable individuals and those scoring high on openness to experience perceived technostress creators positively and negatively respectively. This finding indicates that as agreeable individuals tend to be likeable, socially adaptable and communally oriented (Devaraj et al., 2008; Zellars & Perrewé, 2001), they will be more willing to change their work habits when new ICTs are introduced at their workplace. On the other hand, as individuals scoring high on openness to experience are motivated towards self-set work goals accomplishment (Judge et al., 1999), they will feel that ICT-based disruptions at their workplace causing technostress will affect their learning experiences and proficiency negatively (Williams & Anderson, 1991). As for "neuroticism–technostress creators" relationship, though the result obtained was not in line with our initial prediction (and

hence requires further exploration), extant studies (e.g., Gray et al., 2005) by drawing on Eysenck and Calvo's (1992) Processing Efficiency Theory have argued that neurotic individuals who are anxious and score less on their job performance can strive towards improvement in their work by expending additional efforts. In our context, it is plausible that neurotic individuals might have seen technostress creators as situations for improving their job performance, and hence may have perceived them positively. Second, among the espoused cultural values, espoused masculinity was the strongest predictor of technostress creators followed by espoused power distance (see Table 7). This finding indicates that as individuals espousing masculine values underscore ego-enhancing goals (Hofstede et al., 2010), they will perceive technostress creators as positive opportunities leading them to be more competitive (Srite & Karahanna, 2006) in comparison with their counterparts. Similarly, as individuals scoring high on espoused power distance tend to be complying with their superiors' opinions and suggestions (Srite & Karahanna, 2006), they will see the ICT-related disruptions as a key requirement for their organization, and hence will adjust to the resulting technostress. Third, relating to the interactions among the Big-Five personality traits and espoused cultural values with technostress creators, our results showed that espoused long-term orientation was the key moderating variable on the relationships of agreeableness, conscientiousness and extraversion with technostress creators. In other words, there was a more close linkage between each of these personality traits with technostress creators in the presence of espoused long-term orientation than without it. This finding highlights that like extant studies that have argued for interactions among personality traits with constructs such as job performance (Witt, 2002; Witt et al., 2002), helping behavior at work (King et al., 2005) and cyber incivility via work email (e.g., Krishnan, 2016), interactions between the Big-Five personality traits and espoused cultural values also exist when explaining individual differences in technostress creators. And lastly, turning to the insignificant direct effects of the (1) personality traits of conscientiousness and extraversion; and (2) espoused cultural values of individualism, uncertainty avoidance and long-term orientation, while their effects on technostress creators may have been masked by stronger predictors with which they were correlated (see Table 6), it is gratifying to note that the direction of the relationships are in line with our initial prediction. We believe that further research in different settings are required to delve deep into insights relating to them. Taken together, these findings indicate that our assumptions about the effects of deep-level traits on technostress are justifiably dependent on the Big-Five personality traits and espoused cultural values.

This study contributes to the literature on "personality, culture and technostress" and to practice in following ways. While there is a dearth of studies on individual differences in technostress, extant studies have focused solely on traditional antecedent measures of age, gender, education, and computer confidence, which are often called surface-level traits. Our study adds to the extant literature on technostress by focusing on individuals' deep-level traits like personality and espoused culture and their linkages with technostress creators. Specifically, our study argues that individuals with varied personality traits and espoused cultural values will perceive technostress creators differently (i.e. either as causing negative implications or as providing chances for them to engage in and learn new things at workplace). Further, while a study by Ragu-Nathan et al. (2008) found that males experienced more technostress than females, and that technostress decreased with increase in age, education and computer confidence, our study found that of these four antecedents, only education was significantly associated with technostress creators (i.e., individuals with the higher level of education perceived technostress creators to be negative). This finding adds to technostress literature by suggesting that the effects of surface-level traits could be sample-specific (or context-dependent), and capturing the influences of deep-level traits are substantial in explaining the phenomenon of technostress among individuals. Also, while there are a handful of studies that have analyzed interactions among personality traits with behavioral constructs (e.g., King et al., 2005; Krishnan, 2016; Witt, 2002; Witt et al., 2002) and though there exists a few behavioral studies highlighting the possibility of "personality–culture" interactions (e.g., Bock, 2000; McCrae, 2000), to our knowledge, our study is the first to empirically show the connections among personality traits and espoused cultural values in the context of technostress. Lastly, from a practical standpoint, our findings from direct effect results and interaction plots imply that by recruiting employees based on certain personality traits and espoused cultural values, managers can better understand whether such individuals will perceive technostress creators as opportunities or as threats. Further, our findings can inform managers on whether or not any training programs or support (based on individuals' personality and cultural differences) is required for employees in managing their technostress effectively.

Findings of this study should be interpreted in the light of a few limitations. First, the data for our study variables were derived from the same source and were collected at a single point in time. As this research design may lead to common method variance concerns (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), future research may consider adopting different approaches for data collection (e.g., a research design using significant others or co-workers as sources for data collection, a research design comprising two points in time data collection in which the data for personality and espoused cultural values could be collected in Week-1 and the data for technostress creators could be collected in Week-2, etc.). Second, we examined individuals' differences in technostress creators within a single country (i.e., India). Although personality traits and espoused cultural values are a stable set of traits, future research may consider replicating our study findings in different settings and contexts. And third, our study has examined the linkages of (and among) the Big-Five personality traits and espoused cultural values with technostress creators as a whole. Future researchers may look into how the personality traits and espoused cultural values (and the interactions between them) could be linked to each of the five technostress creators (i.e., techno-complexity, techno-insecurity, techno-invasion, techno-overload, and techno-uncertainty) separately. We believe that such research studies are likely to contribute to the knowledge base of 'personality, culture and technostress' to a great extent as they would help in understanding the patterns of deep-level traits' effects on each of the technostress creators.

6. Concluding remarks

In summary, despite awareness on the prevalence of technostress and its consequences, academic and practitioner communities know relatively little on how different individuals perceive technostress creators differently. As an initial step towards understanding them, by grounding the discussion on the Five-Factor model of personality and Hofstede's cultural values framework and by drawing on the extant behavioral studies on "personality–culture" interaction, we theorized the (1) linkages of each of these deep-level traits with technostress creators; and (2) contingent effect of espoused long-term orientation on the relationships of the Big-Five personality traits with technostress creators, and empirically validated them using data collected from 322 full-time employees in India. Findings indicate that our assumptions about

the effects of deep-level traits on technostress were justifiably dependent on the Big-Five personality traits and espoused cultural values, beyond its traditional antecedent surface-level traits of age, gender, education and computer confidence.

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Appendix

Measurement scales.

Construct	Items
Big-Five personality traits (Saucier, 1994). Indicate how accurately each trait describes you (1–7 point scale; "1" represent "Extremely inaccurate" and "7" represent "Extremely accurate")	
Agreeableness (AGR1–8)	*Cold*, Cooperative, *Harsh*, Kind, *Rude*, Sympathetic, *Unsympathetic*, Warm.
Conscientiousness (CON1–8)	*Careless*, *Disorganized*, Efficient, *Inefficient*, Organized, Practical, *Sloppy*, Systematic.
Extraversion (EXT1–8)	*Bashful, Bold,* Energetic, Extraverted, *Quiet*, *Shy*, Talkative, *Withdrawn.*
Neuroticism (NEU1–8)	Envious, Fretful, Jealous, Moody, *Relaxed*, Temperamental, Touchy, *Unenvious*.
Openness to experience (OPE1–8)	Complex, Creative, Deep, Imaginative, Intellectual, Philosophical, *Uncreative*, *Unintellectual*.
Espoused cultural values (Hoehle et al., 2015; Srite & Karahanna, 2006). Indicate to what extent you disagree or agree with each statement (1–7 point scale; "1" represent "Strongly disagree" and "7" represent "Strongly agree")	
Espoused individualism (IDV1–3)	Being accepted as a member of a group is more important than having autonomy and independence. Group success is more important than individual success. Being loyal to a group is more important than individual gain.
Espoused masculinity (MAS1–3)	It is preferable to a have a man in a high level position rather than a woman. It is more important for men to have a professional career than it is for women to have a professional career. Solving organizational problems requires the active forcible approach which is typical of men.
Espoused power distance (PDI1–3)	Managers should make most decisions without consulting subordinates. Managers should not ask subordinates for advice, because they might appear less powerful. Decision making power should stay with top management in the organization and not be delegated to lower level employees.
Espoused uncertainty avoidance (UAI1–3)	Rules and regulations are important because they inform workers what the organization expects of them. Order and structure are very important in a work environment. It is important to have job requirements and instructions spelled out in detail so that people always know what they are expected to do.
Espoused long-term orientation (LTO1–3)	Personal steadiness and stability is important in private life. Thrift is important in private life. Respect for tradition is important in private life.
Technostress creators (Tarafdar et al., 2007). Indicate to what extent you disagree or agree with each statement (1–7 point scale; "1" represent "Strongly disagree" and "7" represent "Strongly agree")	
Techno-complexity (COM1–5)	I do not know enough about the new ICTs to handle my job satisfactorily. I do not find enough time to study and upgrade my ICT skills. I need a long time to understand and use new ICTs. I often find it too complex for me to understand and use new ICTs. I find new recruits to this organization know more about ICTs than I do.
Techno-insecurity (INS1–5)	Because of new ICTs, I feel constant threat to my job security. Because of new ICTs, I feel constant need to update my skills to avoid being replaced. Because of new ICTs, I feel constant threat by coworkers with newer ICT skills. For fear of being replaced, I do not share my knowledge with my coworkers. For fear of being replaced, I feel there is less sharing of knowledge amongst coworkers.
Techno-invasion (INV1–4)	Because of ICTs, I spend less time with my family. Because of ICTs, I have to be in touch with my work even during my vacation. Because of ICTs, I have to sacrifice my vacation and weekend time to keep current on new ICTs. Because of ICTs, I feel my personal life is being invaded.
Techno-overload (OVE1–5)	I am forced by ICTs to work much faster. I am forced by ICTs to do more work than I can handle. I am forced by ICTs to work with very tight time schedules. I am forced by ICTs to change my work habits to adapt to new technologies. I am forced by ICTs to handle higher workload because of increased technological complexity.
Techno-uncertainty (UNC1–4)	In my organization, there are always new developments in the ICTs we use. In my organization, there are always constant changes in ICT software. In my organization, there are always constant changes in ICT hardware. In my organization, there are always frequent upgrades in ICT networks.

Note: Italicized items were reverse coded, and underlined items were dropped during validity assessment.

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