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Julia Theresia Zielonka

*Johannes Gutenberg-University, julia.zielonka@uni-mainz.de*

Rebecca Maria Heigl

*Johannes Gutenberg-University, rmheigl@gmail.com*

Franz Rothlauf

*Johannes Gutenberg-University, rothlauf@uni-mainz.de*

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# **Technostress Revisited at Work-From-Home: The Impact of Technostress Creators on the Perception of Eustress Moderated by Work- Home-Conflict and Job Satisfaction**

*Completed Research*

**Julia Theresia Zielonka**

Johannes Gutenberg-University Mainz  
julia.zielonka@uni-mainz.de

**Rebecca Maria Heigl**

Johannes Gutenberg-University Mainz  
rheigl@students.uni-mainz.de

**Franz Rothlauf**

Johannes Gutenberg-University Mainz  
rothlauf@uni-mainz.de

## **Abstract**

With the COVID-19 pandemic, organizations were ultimately forced to introduce remote work where possible. Many companies have introduced information and communication software to replicate on-site teamwork as closely as possible that keeps employees in close contact with the team, such as Microsoft Teams. Studies confirm that the use of technology, and thus software, is related to the perception of stress, known as technostress. So far, research has predominantly focused on the negative concept of stress, namely distress. To examine the effects of technostress creators on perceived eustress, data of 207 employees using regularly Microsoft Teams during the pandemic were collected with an online survey. The analysis reveals that the classic technostress creators are generally negatively associated with perceived eustress. However, this study shows that techno-insecurity particularly induces positive stress. Furthermore, the analysis reveals that work-home conflict and job satisfaction moderate the effects of technostress creators on perceived eustress.

## **Keywords**

Techno-Eustress, technostress creators, job satisfaction, work-home conflict.

## **Introduction**

Over the past decade, information and communication technologies (ICT) have become increasingly embedded in our daily lives (de Wet and Koekemoer 2016). ICT offer numerous advantages, such as the possibility to work with one another regardless of time and physical restrictions, increasing the effectiveness of processes, and enhancing employee creativity (Sun et al. 2019). Since COVID-19, the line between work and leisure is blurring even more through the inevitable use of ICT for remote work. Consequently, the risk of perceiving stress in association with ICT use, which is referred to as technostress, is rising even more (Wolor et al. 2020; Yu et al. 2021). With its negative associations and consequences in terms of perceived distress, technostress has been widely studied. However, the concept of stress originally also includes positive associations and consequences, such as increased motivation and higher efficiency due to the so-called perceived eustress. The perception of positive stress in associations with the use of technology (techno-eustress) is equally essential, yet only limited research on this subject is available (Ayyagari et al. 2011; Tarafdar et al. 2019; Wajcman and Rose 2011). Additionally, ICT implementations and upgrades in organizations will continue to grow, which again is a growing source for technostress and emphasizes the need for a deeper and more holistic understanding of technostress with its negative and positive associations. Therefore, we draw on a prominent study of Ragu-Nathan et al. (Ragu-Nathan et al. 2008), who investigated the impact of technostress creators on perceived distress. We, however, complement the

findings by introducing perceived eustress as the dependent variable. Therefore, the first aim of this study is to examine the relationship between the widely studied and adopted technostress creators (techno-overload, techno-invasion, techno-complexity, techno-insecurity, techno-uncertainty) developed by Tarafdar et al. (2007) and the perception of eustress in a work-related context.

In addition, the increase in remote work shifted the attention to work-life balance concerning ICT use (Wolor et al. 2020). Similarly, job satisfaction is a constant issue for organizations and has been widely researched as an outcome variable of technostress creators (Jena 2015; Ragu-Nathan et al. 2008; Tarafdar et al. 2007). However, we argue that work-home conflict and job satisfaction cannot only be seen as outcome variables enforced by the perception of technostress. They rather affect how technostress is perceived due to the exposure to technostress creators. Nevertheless, there still is a lack of research regarding how job satisfaction and work-home conflict moderate the relationship between technostress creators and perceived eustress. Therefore, the second aim of this study is to examine the impact of work-home conflict and job satisfaction as moderators on the relationship between technostress creators and perceived eustress in a work-related context. We chose Microsoft Teams (MS Teams) as ICT because this software experienced an incredible rise of demand of over 50% through the pandemic and has more than 115 million daily active users (Warren 2020).

The following section provides an overview of relevant theoretical and empirical technostress research and derives the hypotheses and conceptual framework the study revolves around. Afterward, the study design, a quantitative online survey, and data analysis are presented. The article subsumes with a discussion of the results and concluding remarks, including avenues for future research.

## Conceptual Framework and Hypotheses

Craig Brod (1984) coined technostress as “a disease of adaptation caused by an inability to cope with the new computer technologies in a healthy manner”. A more recent definition by Tarafdar et al. (2015) describes technostress as the concept of the individual’s inability to adapt to ICT demands. Building on these definitions, most researchers in the past have focused on the negative side of technostress. Tarafdar et al. (2007) conceptualized technostress with five now widely used components, which are referred to as technostress creators. First, techno-overload describes a situation where employees feel like they are faced with a higher workload, longer work hours, and faster pace demand as a consequence of using the ICT. Second, techno-invasion refers to the potential that ICT have to constantly connect the employee with work and induces the need to sacrifice leisure time and invade private life. Third, techno-complexity describes the intimidation of employees by the perceived lack of their own skills to deal with the complexity of ICT. Fourth, techno-uncertainty refers to the constant changes in ICT that require employees to adapt quickly to new systems. Fifth, techno-insecurity relates to the fear of employees losing their job to colleagues who have higher knowledge about ICT (Tarafdar et al. 2007). These technostress creators have been studied to be determinants of performance, productivity, job satisfaction, or even perceived technostress itself (Ayyagari et al. 2011; Jena 2015; Ragu-Nathan et al. 2008; Tarafdar et al. 2015). In these studies, however, technostress is always referred to in a negative sense. Conversely, a nascent stream of scholarly information systems research acknowledges the ambivalence of stress (Califf et al. 2020; Tarafdar et al. 2019; Zielonka 2022; Zielonka and Rothlauf 2021). Stress has not only detrimental effects but can also be perceived as motivating and positively challenging, which refers to the notion of eustress. This study draws on the definition of Quick et al. (2004), who define eustress as a “healthy, positive, constructive outcome of stressful events and the stress response”. In contrast, distress occurs when the individual does not feel able to cope with the environmental demands imposed on the individual (Lazarus and Folkman 1984). Based on the fundamentals of the ambivalent stress concept, we argue that the five technostress creators do not only affect distress perception but can also be related to the perception of eustress. Ragu Nathan (2008) tested the negative impact of technostress creators on distress perception which resulted in decreasing job satisfaction, productivity, and performance. Since these dependent variables are regularly associated with the perception of eustress, we argue that technostress creators are negatively related to perceived eustress.

*H1=Techno-overload / H2=Techno-invasion / H3=Techno-complexity / H4=Techno-insecurity / H5=Techno-uncertainty ... is negatively related to perceived eustress.*

Zielonka and Rothlauf (2021) investigated how work-related stressors (measured by workload, job scope, responsibility, and pace of work), perceived usefulness, and perceived ease of use of ICT impact perceived

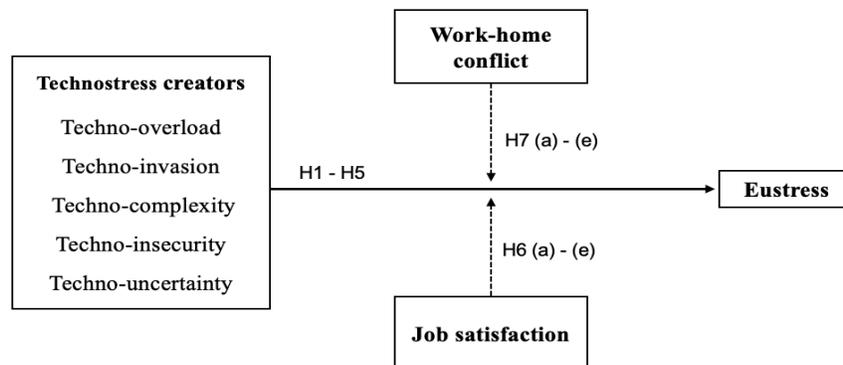
eustress at work. Their results confirm the important influence of technology characteristics on perceived techno-eustress. For instance, ICT that are perceived as useful can increase perceived eustress (Zielonka and Rothlauf 2021). Similarly, Califf et al. (2020) acknowledged that usefulness of ICT has a positive impact on eustress, which in turn leads to higher job satisfaction and lower job turnover. Besides antecedents and outcomes, studies examined the influence of situational factors/inhibitors on technostress (Ragu-Nathan et al. 2008; La Torre et al. 2019). Situational factors are a means to buffer the effects of technostress creators on organizational outcomes (Fuglseth and Sørøbø 2014). For instance, technical support, end-user training, literacy facilitation, and organizational support are possible moderator variables that have the potential to mitigate technostress (Fuglseth and Sørøbø 2014; Ragu-Nathan et al. 2008; Tarafdar et al. 2015). Interestingly, scholars found no overall significant effect of technostress inhibitors as moderators on organizational outcomes such as job satisfaction (Hung et al. 2011; Ragu-Nathan et al. 2008). This point was echoed by Fuglseth and Sørøbø (2014), who indicated a non-significant moderating effect of technostress inhibitors on user satisfaction. While past research revealed that higher technostress experience harms employees' job satisfaction, it remains to be explored whether job satisfaction can moderate the relationship between technostress creators and perceived eustress (Ayyagari et al. 2011; Jena 2015; Ragu-Nathan et al. 2008; Tarafdar et al. 2019). In contrast to previous studies, job satisfaction will not serve as the dependent variable. Building on Nelson and Simmons (2003), who observed a positive relationship between work eustress and job satisfaction and other positive outcomes, the hypothesis is formulated that higher job satisfaction of employees has the potential to reduce the adverse effects of technostress creators on eustress. Additionally, Chen et al. (2019) found that the variable job satisfaction as a moderator positively impacts individuals' well-being. To broaden the existing technostress research, job satisfaction is proposed as a moderator in the model:

*H6: The effect of ... H6(a)=techno-overload / H6(b)=techno-invasion / H6(c)=techno-complexity / H6(d)=techno-insecurity / H6(e)=techno-uncertainty ... on perceived eustress is moderated by job satisfaction, such that higher job satisfaction leads to higher perceived eustress.*

Similar to job satisfaction, work-home conflict has been previously researched as a predictor variable in the context of technostress (Ayyagari et al. 2011). According to Pavithra and Sivakumar (2020), a positive relationship between eustress and lower work-home conflict of employees exists. While higher work-home conflict was a significant predictor for strain (Ayyagari et al. 2011), employees who have lower work-home conflict might be able to cope better with the stress resulting from ICT use (Nam 2014; Pavithra and Sivakumar 2020). Therefore, we derive that lower work-home conflict will weaken the negative effects of technostress creators on eustress. This leads to the following hypotheses:

*H7: The effect of ... H7(a)=techno-overload / H7(b)=techno-invasion / H7(c)=techno-complexity / H7(d)=techno-insecurity / H7(e)=techno-uncertainty ... on perceived eustress is moderated by work-home conflict, such that lower work-home conflict leads to higher perceived eustress.*

Based on the presented hypotheses, we derive the research model which is illustrated in Figure 1. The dotted lines indicate the moderation relationship which will be tested, while the straight line indicates the direct relationship between the technostress creators and eustress.



**Figure 1. Research Model**

## Method

This paper aims to examine the effects of technostress creators on perceived eustress and to study the moderating effects of job satisfaction and work-home conflict. In order to empirically test the proposed conceptual model, we collected data and applied multiple regression analysis. The data were collected with an online survey of employees. After a successful pretest of the questionnaire, we shared the invitation to participate in the survey within our social media channels (with a combined number of +101,000 followers on YouTube and Instagram). As we intended to investigate the relationship between technostress creators and perceived eustress in general work settings where employees regularly work with Microsoft Teams, the sample was controlled for the daily amount of time of Microsoft Teams usage. We acquired 207 respondents who met the screening criteria and who are included in our analysis (male = 64%; female = 36%). On average, the respondents worked for 6.19 hours (SD = 2.59) per day with MS Teams and had 4.5 years (SD = 3.34) of work experience. The sample consists of rather younger participants (i.e., 44% of age 20-25; 33% of age 26-34; 16% of age 35-44) with mixed educational backgrounds (i.e., 22% A-levels; 42% Bachelor's degree; 30% Master's degree). The questionnaire started with an introduction and motivation for the survey without revealing the hypotheses to avoid common method bias such as hypotheses guessing (Jakobsen and Jensen 2015). The introduction stated that the reason for the survey was to analyze "the perception of information technologies at work" and pointed out that the survey was only intended for employees who regularly work with MS Teams.

All measures were taken and adapted from existing validated scales, and the items are measured on a seven-point Likert-Scale (1 = Strongly disagree, 7 = Strongly agree). The variables for technostress creators are operationalized with 23 items developed by Tarafdar et al. (2007). All items were adjusted by substituting "technology" with "Microsoft Teams" to investigate that particular form of ICT exclusively. The reliability of the construct measures was checked by calculating Cronbach's Alpha (techno-overload  $\alpha=0.936$ ; techno-invasion  $\alpha=0.944$ ; techno-complexity  $\alpha=0.935$ ; techno-insecurity  $\alpha=0.849$ ; techno-uncertainty  $\alpha=0.864$ ). Eustress was measured through ten items adapted to fit the research question taken from O'Sullivan (2011). The construct also proved to be reliable ( $\alpha=0.936$ ). The items for measuring the construct of job satisfaction were taken from Ragu-Nathan et al. (2008) ( $\alpha=0.925$ ). To measure work-home conflict, we adapted three items from Ayyagari et al. (2011), Kreiner (2006), and Netemeyer et al. (1996) ( $\alpha = 0.937$ ).

## Data Analysis

The statistical data analysis was carried out using the statistical software IBM SPSS® Version 26.0. Previous research examining similar relationships found significant results using multiple linear regression analysis; thus, a regression analysis is used (Fuglseth and Sørøbø 2014; Ragu-Nathan et al. 2008). Before testing the hypotheses through a multiple linear regression analysis, the data were checked for multicollinearity, homoscedasticity, normality, auto-correlation, and linearity to ensure a reliable analysis (Saunders et al., 2016). Correlations with a probability of error less than or equal to 5% ( $p \leq .05$ ) are considered to be statistically significant. First, to include the items measured through seven-point Likert scales, the scores of each construct were mean-centered. Second, Pearson's correlation was used for the independent variables to test for multicollinearity. According to Tabachnick and Fidell (1996), independent variables showing a correlation of 0.8 or higher should be removed from the model. The reason to use variance inflation factor and tolerance value as an additional measure for multicollinearity was twofold: techno-overload and techno-invasion showed a higher correlation of .768, and the correlation between job satisfaction and techno-insecurity was not significant.

	Tolerance	VIF	1	2	3	4	5	6	7
1. Techno-overload	.361	2.773	1						
2. Techno-insecurity	.535	1.868	.225**	1					
3. Techno-uncertainty	.418	2.393	.474**	.639**	1				
4. Techno-invasion	.264	3.790	.768**	.281**	.503**	1			
5. Techno-complexity	.320	3.129	.711**	.312**	.539**	.795**	1		
6. Job satisfaction	.632	1.583	-.447**	.041 <sup>n.s.</sup>	-.284**	-.388**	-.402**	1	
7. Work-home conflict	.612	1.633	.409**	.168**	.400**	.516**	.431**	-.495**	1

\*\* Significant at the level of  $p = 0.01$ . n.s = not significant

**Table 1. Collinearity Statistics**

Table 1 displays the collinearity statistics; neither the tolerance value falls below 0.10 nor the VIF exceeds 10, and therefore it can be concluded that there are no multicollinearity issues (Pallant 2005). Finally, linearity and homoscedasticity were tested by assessing the Residual Scatterplots and P-P Plot, which met the requirements. In addition, the model has no auto-correlation as the value of the Durbin-Watson statistic is 2.134. Altogether, it can be assumed that the data is suitable for multiple regression analysis.

Three models were applied to gain insights into the relationship between technostress creators and eustress and possible confounding variables. Table 2 summarizes the results of the regression analysis for all three models. As a first step, a regression analysis was conducted with the mean score of all technostress creators as independent variable and eustress as the dependent variable. The  $R^2$  for the overall model 1 is .377 (adjusted  $R^2 = .373$ ), which is indicative of a high goodness-of-fit according to Cohen (1988). The technostress creators overall are able to predict eustress statistically significant  $F(1, 205) = 123.80, p = .000$ . A significant negative association between the averaged technostress creators and eustress is found ( $B = -.560, p = .000$ ). In the next step, to test hypotheses 1 - 5, the five technostress creators were included respectively in model 2 as the independent variables and eustress as the dependent variable. The  $R^2$  in model 2 is .434 (adjusted  $R^2 = .420$ ), meaning that the independent variables explain 42% of the variance. In line with H1, H3 and H5, techno-overload ( $B = -.146, p = .014$ ), techno-complexity ( $B = -.222, p = .001$ ) and techno-uncertainty ( $B = -.294, p = .000$ ) negatively predict eustress. However, techno-invasion ( $B = .023, p = .704$ ) does not significantly contribute to the model. More specifically, the analysis reveals that techno-insecurity has a significant positive association with eustress ( $B = .225, p = .009$ ). While findings support hypotheses 1, 3, and 5, hypotheses 4 and 2 are rejected.

	Unstandardized coefficients		Standardized coefficients		T	Sig.	$R^2$	adjusted $R^2$
	Beta	Std. error	Beta					
Model 1 Constant	6.595	.193			34.198	.000**	.377	.373
IV Averaged technostress creators	-.560	.050	-.614		-11.127	.000**		
Model 2 Constant	5.997	.288			20.749	.000**	.434	.420
Techno-overload	-.146	.059	-.216		-2.491	.014*		
Techno-complexity	-.222	.065	-.318		-3.408	.001**		
IV Techno-insecurity	.225	.085	.184		2.646	.009**		
Techno-uncertainty	-.294	.063	-.368		-4.636	.000**		
Techno-invasion	.023	.060	.038		.380	.704 <sup>n.s</sup>		
Model 3 Constant	5.497	.380			14.473	.000**	.542	.517
Techno-overload	-.203	.058	-.302		-3.522	.001**		
Techno-complexity	-.163	.062	-.235		-2.627	.009**		
Techno-insecurity	.201	.079	.163		2.536	.012*		
Techno-uncertainty	-.322	.059	-.398		-5.406	.000**		
Techno-invasion	-.016	.058	-.027		-.279	.780 <sup>n.s</sup>		
IV Gender	.100	.118	.047		.848	.398 <sup>n.s</sup>		
Age	-.070	.091	-.057		-.767	.444 <sup>n.s</sup>		
Education	.181	.075	.142		2.414	.017*		
Hourly use per work day	.066	.025	.164		2.637	.009**		
Work experience	-.003	.021	-.009		-.140	.889 <sup>n.s</sup>		

\*\* Significant at the level of  $p < 0.01$ . \*Significant at the level of  $p \leq 0.05$ . n.s = not significant

Dependent variable: Eustress

## Table 2. Regression Analysis Results

Moreover, since other factors may influence the dependent variable eustress, the control variables age, gender, hourly MS Teams use per workday, education, and work experience were included in the next model to get more insights on this subject. The  $R^2$  in model 3 increased to .542 (adjusted  $R^2 = .517$ ). Hence, 9.7% of the variance in eustress can be explained by demographic factors. Among the control variables only hours of use of MS Teams ( $B = .066, p = 0.009$ ) and education ( $B = .181, p = 0.017$ ) are significant predictors for eustress.

In order to evaluate the moderating effects proposed in H6 (a)-(e) and H7 (a)-(e) a moderation analysis through PROCESS macro with model 1 of Hayes (Hayes 2013) and for control, a moderated regression analysis in SPSS was conducted. The outcome variable for the analyses is perceived eustress. First, to determine whether the interaction between job satisfaction and technostress creators significantly predicts

eustress (H6 (a)-(e)), each technostress creator was used as predictor. The conditional values for all moderation analyses are the mean and +/- SD from the mean. The interaction between techno-invasion and job satisfaction is found to be statistically significant ( $B = .0457$ ,  $SE = .0222$ ,  $p = .041$ ). The conditional effects show corresponding results: at high moderation the conditional effect is strongest ( $B = -.1235$ ,  $SE = .0462$ , 95% CI[-.2145, -.0324],  $p = .008$ ), confirming H6 (b) that higher job satisfaction weakens the negative effect of techno-invasion on eustress. Similarly, the interaction between techno-complexity and job satisfaction is found to be significant ( $B = .0506$ ,  $SE = .0251$ ,  $p = .045$ ). Again, high moderation in the conditional effects provides the strongest effect ( $B = -.2077$ ,  $SE = .0499$ , 95% CI[-.3062, -.1092],  $p = .000$ ), compared to low moderation ( $B = -.3395$ ,  $SE = .0485$ , 95% CI[-.4351, -.2439],  $p = .000$ ), confirming H6 (c). While techno-invasion and techno-complexity generate significant results, the analysis does not confirm that job satisfaction moderates the effect between techno-overload ( $B = .0356$ ,  $p = .193$ ), techno-uncertainty ( $B = .0493$ ,  $p = .055$ ), and techno-insecurity ( $B = .0566$ ,  $p = .302$ ) and eustress significantly. Hence, the results offer support for H6 (b) and H6 (c), but not for H6 (a), H6 (d) and H6 (e).

Hypothesis	Outcome
<b>H1:</b> Techno-overload is negatively related to perceived eustress.	Supported
<b>H2:</b> Techno-invasion is negatively related to perceived eustress.	Rejected
<b>H3:</b> Techno-complexity is negatively related to perceived eustress.	Supported
<b>H4:</b> Techno-insecurity is negatively related to perceived eustress.	Rejected
<b>H5:</b> Techno-uncertainty is negatively related to perceived eustress.	Supported
<b>H6a:</b> The effect of techno-overload on perceived eustress is moderated by job satisfaction, such that higher job satisfaction leads to higher perceived eustress.	Rejected
<b>H6b:</b> The effect of techno-invasion on perceived eustress is moderated by job satisfaction, such that higher job satisfaction leads to higher perceived eustress.	Supported
<b>H6c:</b> The effect of techno-complexity on perceived eustress is moderated by job satisfaction, such that higher job satisfaction leads to higher perceived eustress.	Supported
<b>H6d:</b> The effect of techno-insecurity on perceived eustress is moderated by job satisfaction, such that higher job satisfaction leads to higher perceived eustress.	Rejected
<b>H6e:</b> The effect of techno-uncertainty on perceived eustress is moderated by job satisfaction, such that higher job satisfaction leads to higher perceived eustress.	Rejected
<b>H7a:</b> The effect of techno-overload on perceived eustress is moderated by work-home conflict, such that lower work-home conflict leads to higher perceived eustress.	Supported
<b>H7b:</b> The effect of techno-invasion on perceived eustress is moderated by work-home conflict, such that lower work-home conflict leads to higher perceived eustress.	Rejected
<b>H7c:</b> The effect of techno-complexity on perceived eustress is moderated by work-home conflict, such that lower work-home conflict leads to higher perceived eustress.	Supported
<b>H7d:</b> The effect of techno-insecurity on perceived eustress is moderated by work-home conflict, such that lower work-home conflict leads to higher perceived eustress.	Rejected
<b>H7e:</b> The effect of techno-uncertainty on perceived eustress is moderated by work-home conflict, such that lower work-home conflict leads to higher perceived eustress.	Rejected

**Table 3. Hypotheses Test Results Overview**

Second, similarly, Hayes' (2013) PROCESS macro (model 1) was applied to estimate whether work-home conflict moderates the effect of technostress creators on eustress. The analyses reveals a significant interaction effect between techno-overload ( $B = .0932$ ,  $SE = .0225$ ,  $p = .000$ ) and work-home conflict on eustress. High moderation in the conditional effect weakens the negative effect of techno-overload ( $B = -.1354$ ,  $SE = .0547$ , 95% CI[-.2433, -.0275],  $p = .0141$ ), compared to low moderation ( $B = -.4432$ ,  $SE = .0555$ , 95% CI[-.5526, -.3338],  $p = .000$ ). Likewise, the interaction between techno-complexity ( $B = .0854$ ,  $SE = .0212$ ,  $p = .000$ ) and work-home conflict on eustress is significant. The conditional effect for high moderation is significant ( $B = -.1710$ ,  $SE = .0562$ , 95% CI[-.2819, -.0601],  $p = .002$ ). The conditional effect for low moderation ( $B = -.4530$ ,  $SE = .0512$ , 95% CI[-.5540, -.3519],  $p = .000$ ) and medium moderation is significant as well ( $B = -.3120$ ,  $SE = .0409$ , 95% CI[-.3926, -.2314],  $p = .000$ ). While the interaction effect between techno-invasion ( $B = .0866$ ,  $SE = .0197$ ,  $p = .000$ ) and work-home conflict is significant, at high

moderation the conditional effect is found to be not significant ( $B = -.0809$ ,  $SE = .0503$ , 95% CI $[-.1800, .0183]$ ,  $p = .109$ ). Further, no significant interaction appears through techno-uncertainty ( $B = .0397$ ,  $SE = .0255$ ,  $p = .121$ ), and techno-insecurity ( $B = .0257$ ,  $SE = .0459$ ,  $p = .576$ ). Thus, H7 (a) and H7 (c) are supported, while H7 (b), (d) and (e) are rejected. Table 3 provides an overview of all hypotheses test results.

## Discussion and Implications

Results from the multiple regression analysis (model 1) provide evidence that, as expected, averaged technostress creators are negatively related to the perception of eustress. However, the subsequent analyses with model 2 and model 3 provide deeper insights and identify only the technostress creators techno-overload, techno-complexity, and techno-uncertainty as significant predictors for eustress. While techno-invasion did not significantly contribute, techno-insecurity surprisingly had a positive association with eustress. Considering that the items asked in techno-insecurity relate primarily to competition and comparison among colleagues, this perceived threat might drive individuals' motivation to perform better at work and, in turn, increase eustress (Murayama and Elliot 2012; Zielonka and Rothlauf 2021). This reasoning for the significant positive relationship between techno-insecurity and eustress is consistent with the transactional model of stress (Lazarus and Folkman 1984; Ragu-Nathan et al. 2008), demonstrating that stressors can also lead to positive stress responses, which is known as eustress. Interestingly, the results contradict previous findings that associate techno-insecurity with a negative stress response (Califf et al. 2020; Fuglseth and Sørebo 2014). Observing the sample statistics of previous research, it is noteworthy that their samples included older participants on average compared to the present study, where the majority of participants are in their twenties, and only a small number of individuals is above 30. The implication of this is discussed within the limitations section of this study. However, this difference offers a possible explanation for the contradicting results: younger individuals were born in a time with technology on the rise and were generally more exposed and used to ICT than older generations. Thus, older employees may feel more threatened by colleagues with higher ICT skills compared to younger ones (Tu et al. 2005). Contrary to previous findings (Qi 2019; Srivastava et al. 2015), gender, age, and work experience had no significant impact on perceived eustress in the model with technostress creators. Interestingly, the control variable hours of use of MS Teams positively impacts eustress, meaning that employees who work more hours per day with MS Teams are more prone to have a positive stress response. This is because people working more with MS Teams inevitably have to understand the functions of using the ICT for their work and are therefore more likely to see and feel the benefits of this tool (Califf et al. 2020). In contrast, employees whose primary work has little to do with ICT and only use MS Teams for a few hours per day do not have the time and opportunities to understand it sufficiently and therefore might see it as a nuisance and a hindrance. Likewise, education is found to influence eustress positively. Consequently, this expands existing literature (Nimrod 2018; Tarafdar et al. 2010), who found that higher education is negatively related to technostress levels. An explanation might be that higher educated employees are generally more exposed to ICT and, therefore, feel more comfortable dealing with them (Tarafdar et al. 2010).

Another major objective of the study was to examine the moderating effects of work-home conflict and job satisfaction between technostress creators and eustress. While current research mainly showed that inhibiting factors have no significant moderation effect on technostress (Fuglseth and Sørebo 2014; Hung et al. 2011; Ragu-Nathan et al. 2008), our study found that the previously often examined dependent variables, job satisfaction and work-home conflict, can weaken the effect of some technostress creators on eustress. At low levels of job satisfaction, the negative relationship between techno-complexity/techno-invasion and eustress is stronger than at high levels of job satisfaction. For techno-complexity, employees who are fond of their job might see the complexity of MS Teams more as a necessity to do the job they are proud of and, therefore, are less stressed by it (Quick et al. 2004). However, the significant interaction effect of job satisfaction and techno-invasion has to be viewed cautiously, considering that techno-invasion was originally not significant in model 2 and model 3, where all independent variables are included. Nevertheless, it implies that satisfied employees feel less invaded by ICT because their job enjoyment decreases the strain of working, for instance, outside regular hours or on weekends. However, job satisfaction does not function as the expected buffer when employees experience high levels of techno-overload, techno-uncertainty, and techno-insecurity. This indicates that even if job satisfaction is high, employees feel overburdened with workload through MS Teams, anxious about changes in the technology, and threatened by competition. Additionally, the study is the first to demonstrate that lower work-home conflict can weaken the negative effects of certain techno stressors on eustress. This confirms the findings

of Pavithra and Sivakumar (2020) that a positive relationship between eustress and lower work-home conflict of employees exists. Considering the logical relationship between techno-overload and work-home conflict, the significant moderating relationship is not surprising. Employees who suffer from high work demand through the use of MS Teams benefit from lower work-home conflict and, as a result, are more prone to experience eustress compared to high work-home conflict (Ayyagari et al. 2011). In line with this, lower work-home conflict served as a buffer for techno-complexity. According to Bataineh (2019), employees with low work-home conflict are less vulnerable to stress and generally more productive. Hence, this study's finding implies, when employees can deal more flexibly with complex ICT, they are more likely to experience eustress. On the contrary, techno-insecurity, techno-invasion, and techno-uncertainty were not significantly moderated by work-home conflict. One explanation may be that work-life balance does not touch the points these items address, such as the threat of the changing technological environment or ICT skill competition among colleagues. Further research is necessary to clarify these results. However, a trend in the direction expected, that lower work-home conflict and higher job satisfaction mitigate the negative outcomes of technostress creators was apparent for the moderation analyses.

This study also offers concrete activities for managers and organizations. First, organizations can use the technostress creators as a diagnostic tool to determine the level and sort of technostress the employees experience. Accordingly, based on their analysis, specific measures can be implemented (Ragu-Nathan et al. 2008). For instance, for high levels of techno-complexity, it is recommended that additional training and information about MS Teams should be provided to increase individual ICT skills (Ragu-Nathan et al. 2008). Second, when managers introduce MS Teams, they should ensure that employees have more time to become familiar with MS teams. Specifically, the study's findings indicate that increasing employees' MS Teams working hours can facilitate eustress and counteract technostress. For this reason, managers might offer incentives to their employees to encourage MS Teams usage and incrementally integrate tasks and meetings in MS Teams (Fuglseth and Sørebo 2014). Third, the study implies that higher competition among colleagues regarding ICT skills (techno-insecurity) can increase eustress. Therefore, managers could introduce a monthly meeting where each team member introduces a new ICT system, which the respective employee finds helpful (e.g., MS OneNote or Kanban). Then, the whole team votes on which suggestions should be implemented. Finally, this study also indicates that low work-home conflict and high job satisfaction buffer the negative effects of some technostress creators. Hence, managers should increase work-life balance through offering flexible working hours and actively lead by example to implement this practice. Along with this, organizational mantras like "no MS Teams usage after midnight" reduce the pressure of constant connectivity from ICT and, consequently, could reduce fears of work overload and work invasion (Ayyagari et al. 2011).

## **Conclusion and Future Research Directions**

The current study explores the understudied field of techno-eustress. Many studies focused on the effects of technostress creators on strain but considered it as a negative stress response (Jena 2015; Ragu-Nathan et al. 2008; Tarafdar et al. 2010), whereas the present study is the first to provide insights into the direct effects of technostress creators on positive stress responses and investigating moderating factors through a quantitative survey. This study sheds light on the less researched construct eustress and demonstrates that most technostress creators reduce the perception of eustress; however, contrary to the assumptions, a positive relationship exists between the technostress creator techno-insecurity and eustress. Additionally, we discovered that job satisfaction and work-home conflict can weaken the negative effects of some technostress creators on eustress.

Although this study significantly contributes to current techno-eustress research, future studies are called for to overcome its limitations. First, a longitudinal study could provide more insights into the changes over time and possible cause-and-effect relationships (Califf et al. 2020; Tarafdar et al. 2019). In particular, examining the consequences of technostress against the background of the increasing use of ICT due to COVID-19, where employees are obliged to work with ICT, which they may have been able to avoid in previous years. Second, as some of the identified results were only non-significant by a slight deviation, a larger sample size could be of advantage to provide more generalized results and provide a smaller margin of error (Saunders et al. 2016). It has to be noted that our sample size resulted from the focus on the particular ICT MS Teams, answering the call of Califf et al. (2020) for more specialized analyses. Future research could overcome this limitation by replicating this study, using a general approach in the

questionnaire but adding a control variable to ask for the particular ICT that is used in daily work life. Third, this study generated data through self-reporting, which bears the risk of willful or accidental distortion and receiving only socially desirable answers from participants (Paunonen and O'Neill 2010). Future studies could overcome this limitation with a multi-method approach, including peer-reported data and physiological measurements (Zielonka and Rothlauf 2021). While the lack of studies in this research area is evident (Simmons and Nelson 2001; Tarafdar et al. 2019; La Torre et al. 2019), this study provides important comprehension. As presented in our study, a quantitative analysis can expand the research of previous work in a meaningful way. The current study provides insights about the effects of technostress creators on eustress and the moderating factors; however, there are still many factors to analyze for an even better understanding of this complex subject.

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