Technostress-induced SCR Patterns and Performance

Christoph Weinert, University of Bamberg, Christian Maier, University of Bamberg, Sven Laumer, University of Bamberg

Corresponding author: christoph.weinert@uni-bamberg.de

Prior research reveals that performance between individuals under stress varies (Matthews 2000). Differences in technostress-induced physiological responses might lead to a different end-user performance. Therefore, this research in progress aims to analyze technostress-induced skin conductance response (SCR) patterns and whether these patterns lead to different end-user performances.

Using stressful technology influences an individual's physiology through affective and cognitive processes and basic brain mechanisms. Research shows that such usage causes an increase in the activity of human sweat glands through multiple brain mechanisms (Randolph et al. 2005). SCR is a well-established measurement method for stress (Boucsein 2012) and has been used to measure technostress (Eckhardt et al. 2012; Riedl et al. 2013).

Burk (2005) determines based on various SCR courses four different SCR patterns. The patterns describe the SCR course after the stressor is triggered. To actually determine the patterns Burk (2005) divides the SCR course after the stressor onset in three different blocks of five reactions each and calculates the mean values. By interpreting the mean values of each block Burk (2005) identifies four response patterns. The first is characterized by the strongest and highest reaction in the first block followed by a constant decrease over block two and three (pattern A). The second follows the shape of an inverted U-curve (pattern B). The third is characterized by a general increase of the reaction in which the reaction is lowest in the first block and increases constantly over block two and three (pattern C). The fourth is shaped as a U-curve (pattern D). Patterns A and B can be summarized as regular reaction courses because despite the temporal awareness within pattern B the reactions decrease, whereas patterns C and D are determined as irregular reaction courses, because the response increases rather than decreases. All patterns are displayed in Figure 1.

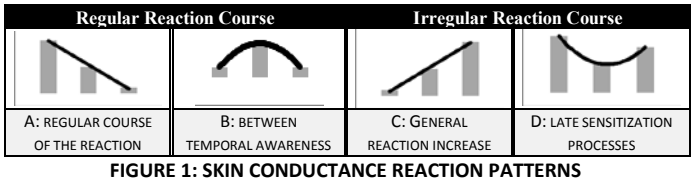

FIGURE 1: SKIN CONDUCTANCE REACTION PATTERNS

Technostress research claims that end-user performance is negatively influenced by technological stressors (Maier et al. 2014, Tarafdar et al. 2010). Thereby, prior research shows that negative consequences of technology usage such as low performance can be mitigated by stabilizing the negative reactions towards the technology (Beaudry and Pinsonneault 2005), such that we argue that individuals who recover from technostress perform better than those who show an increase in their technostress level. Therefore, we assume that individuals who respond in a regular pattern A or B perform better than those who follow the irregular reaction patterns.

To provide first indicative evidence for this proposition we conducted a laboratory experiment. We captured the SCR of 18 participants while working with an unreliable computer, which froze for one minute. We analyzed the first 15 seconds of the SCR after the computer froze to determine the SCR patterns as described by Burk (2005). In addition, end-user performance was calculated by assessing the task results into faulty and correct results, and we analyzed the values of the time needed to accomplish the task.

The results of our pilot study indicate that the subjects react differently towards technostress. In general, 7 out of 18 (39%) react in a regular pattern A or B, whereas 11 out of 18 (61%) follow an irregular reaction course C or D. The majority of the participants followed the irregular pattern C. Results also show differences in the end-user performance. For example, subjects who followed pattern C indicate the best performance, whereas the participants that showed pattern D demonstrate the lowest performance. In addition, the subjects who respond in a regular pattern A and B perform worse, than those who respond in an irregular reaction in terms of pattern C and D. In conclusion, our first results demonstrate that we found no support for the developed proposition in our pilot study, which might be explained by the small sample. Despite the mean comparison results, we will realize a lager laboratory experiment in order to test the proposition with adequate statistical methods. By extending this experiment we intend to contribute to IS research by showing that technostress-induced physiological responses influence end-user performance and by explaining in-depth how technostress influences end-user performance through the mediation of physiological responses in terms of the SCR patterns.

References

- Beaudry, A., and Pinsonneault, A. 2005. "Understanding User Responses to Information Technology: A Coping Model of User Adaptation," *MIS Quarterly* (29:3), pp. 493–524.
- Boucsein, W. 2012. *Electrodermal Activity*, New York: Springer Science+Business Media, LLC.
- Burk, C. L. 2005. *Phasische Elektrodermale Aktivität als Persönlichkeitsindikator*.
- Eckhardt, A., Maier, C., and Buettner, R. 2012. "The Influence of Pressure to Perform and Experience on Changing Perceptions and User Performance: A Multi-Method Experimental Analysis," *ICIS 2012 Proceedings Proceedings of the 33rd International Conference on Information Systems*.
- Maier, C., Laumer, S., Eckhardt, A., and Weitzel, T. 2014. "Giving Too Much Social Support: Social Overload on Social Networking Sites," Forthcoming in: European Journal of Information Systems.
- Matthews, G. 2000. *Human Performance*: *Cognition, Stress, and Individual Differences*, Hove, East Sussex, Philadelphia, PA: Psychology Press; Taylor& Francis Group.
- Randolph, A. B., McCampbell, L. A., Moore, M. M., and Mason, S. G. 2005. "Controllability of Galvanic Skin Response," *Proceedings of the International Conference on Human-Computer Interaction*.
- Riedl, R. 2013. "On the Biology of Technostress: Literature Review and Research Agenda.," *DATA BASE for Advances in Information Systems* (44:1), pp. 18–55.
- Riedl, R., Kindermann, H., Auinger, A., and Javor, A. 2013. "Computer Breakdown as a Stress Factor During Task Completion Under Time Pressure: Identifying Gender Differences Based on Skin Conductance," *Advances in Human-Computer Interactions* (2013), pp. 1–7.
- Tarafdar, M., Tu, Q., and Ragu-Nathan, T. S. 2010. "Impact of Technostress on End-User Satisfaction and Performance," *Journal of Management Information Systems* (27:3), pp. 303–334.