Technostress: Day-level effects of an accelerating pace of technological change
Roman Prem, Christian Korunka, Bettina Kubicek

BACKGROUND

Over the last decade research on the phenomenon of technostress has steadily gained momentum. Technostress refers to stress experienced by end users of information and communication technologies (ICTs) (Ragu-Nathan et al., 2008). It has been called “a modern disease of adaptation caused by an inability to cope with new computer technologies in a healthy manner” (Brod, 1984, p. 16).

RESEARCH QUESTION

As many scholars describe a general process of acceleration (e.g., Rosa, 2003) that increases the pace of technological change, the aim of the current study is to shed light on the everyday processes in which the general accelerating pace of technological change affects day-level stressor-strain relationships. We expect that the general perception of an increasing pace of technological change intensifies the relationship between daily workload and fatigue.

METHOD

Participants

64 of 71 railway signalers and controllers working in 12-hr shifts at a fully computerized railway control center (return rate: 90%); all Ψ; age: M = 47.11 yrs, SD = 4.94; job tenure: M = 26.51 yrs, SD = 6.73;

Procedure

Paper and pencil diary study (cf. Bolger et al. 2003; Ohly et al., 2010); face-to-face instructions and questionnaire at the start of the study; 4 diary entries per 12-hr shift over 10 consecutive shifts; data of 549 shifts from 62 participants could be used in the analyses

Questionnaire measures

(Accelerated) pace of technological change:
3-item scale, α = .71; Kubicek et al. (2012): “The extent to which new technologies are employed…” has (1) decreased strongly - (5) increased strongly

Diary measures

Fatigue:

single item; each diary entry; adapted from Richter et al. (2002)

Main task workload:
3-item scale, α ≥ .89; Korunka et al. (2012); mean of 4, 8, and 12 hrs after shift onset

Administrative task workload & underload:
single items; mean of 4, 8, and 12 hrs after shift onset

RESULTS

HLM analyses (HLM 7, Raudenbush et al., 2011); Level 1: entries per shift, person-mean-centered;
Level 2: persons, grand-mean centered;
Outcome: fatigue at shift end (12 hrs after shift onset);
Steps: null model, (1) controls (day/night shift, fatigue at shift onset), (2) L1 predictors, (3) L2 predictor, (4) cross-level interactions

Table 1. Results from hierarchical regression analyses predicting fatigue after 12 hours of shift work.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1.11***</td>
<td>1.11***</td>
<td>1.11***</td>
<td>1.11***</td>
</tr>
<tr>
<td>Shift type</td>
<td>3.54***</td>
<td>3.54***</td>
<td>3.54***</td>
<td>3.54***</td>
</tr>
<tr>
<td>Fatigue at shift onset</td>
<td>0.14*</td>
<td>0.14*</td>
<td>0.14*</td>
<td>0.14*</td>
</tr>
<tr>
<td>Main task workload</td>
<td>-0.02</td>
<td>-0.02</td>
<td>-0.02</td>
<td>-0.02</td>
</tr>
<tr>
<td>Administration task workload</td>
<td>-0.09</td>
<td>-0.09</td>
<td>-0.09</td>
<td>-0.09</td>
</tr>
<tr>
<td>Underload</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.01</td>
</tr>
<tr>
<td>Pace of technological change</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.01</td>
<td>-0.01</td>
</tr>
<tr>
<td>Main task &amp; Pace of change</td>
<td>0.10**</td>
<td>0.10**</td>
<td>0.10**</td>
<td>0.10**</td>
</tr>
<tr>
<td>Administration task &amp; Pace of change</td>
<td>0.07***</td>
<td>0.07***</td>
<td>0.07***</td>
<td>0.07***</td>
</tr>
<tr>
<td>Underload &amp; Pace of Change</td>
<td>0.40***</td>
<td>0.40***</td>
<td>0.40***</td>
<td>0.40***</td>
</tr>
</tbody>
</table>

Note. Est. = Estimated coefficient; SE = standard error; *p < .05; **p < .01; ***p < .001.

DISCUSSION

Our results show that similar levels of workload can result in higher levels of fatigue, when employees perceive a strongly accelerated pace of technological change. This technostress creator should therefore be considered when introducing new ICTs.

To reduce technostress due to an accelerating pace of technological change we suggest paying close attention to known technostress inhibitors, such as technical support provision, involvement facilitation, and (technological) literacy facilitation (Ragu-Nathan et al., 2008).

Above all, we suggest assessing positive and negative effects at the individual and the organizational level before, during, and after the implementation of ICTs.

REFERENCES