Operational Transparency Feedback and Perceived Web Site Delay

Nicholas Lockwood, Hong Sheng

Corresponding author: lockwoodn@mst.edu

Web site delays have consistently been a major complaint of users online. To alleviate some of the problems associated with delays, users can be provided with various forms of feedback indicating system status. Examples of this feedback include text messages, static images, sequentially-moving dots, and percent-done progress bars.

One form of feedback described by Buell and Norton (2011) is operational transparency. This feedback allows users to view the amount of work (i.e., processing) that is being done by a Web site during a delay. By making this work more salient, users perceive that the site is exerting greater effort on their behalf. Such effort then leads users to value the service offered by the Web site more highly. Given the ease with which effort can be simulated in online environments, operational transparency feedback (OTF) may not be reflective of actual effort. Instead, the mere appearance of effort—termed the labor illusion—can increase perceptions of value.

Value is the trade-off between benefit (i.e., effort) and cost (i.e., time), but OTF has only been associated with perceptions of effort. Interestingly, the nature of OTF may also impact a user's perceptions of wait time during a delay. This is because OTF is characterized by continually changing status messages. The effect of this feedback is largely dependent on the time estimation process being used by an individual. Attentional gate theory serves as a theoretical foundation here by describing two different time estimation paradigms: prospective and retrospective (Zakay and Block 1997).

Under the *prospective* paradigm, individuals are aware that they will be asked to judge some duration of time a priori. An internal timing mechanism, called a pacemaker, produces a stream of pulses that are passed to a cognitive counter used to keep track of time. Pulses must first pass through an attentional gate—which is only open when an individual is attending to time—before they are accumulated by the counter. Thus attention to time would lead to longer estimates of time duration, whereas attention directed away from time would lead to shorter estimates of time duration.

Under the *retrospective* paradigm, individuals are not aware that they will be asked to judge time a priori. Attention to time is much less influential in retrospective time estimation. Instead, individuals must rely on memories of contextual information encoded during the focal time period. Contextual changes refer to discrete events that are perceived and stored in an individual's memory. A greater number of contextual changes in memory are associated with longer durations of time.

The visual characteristics of OTF (i.e., continually changing status messages) can have very different effects under each of these paradigms. For prospective estimation, OTF may serve as a distraction. Thus the feedback may direct attention away from the passing of time and lead to shorter perceived delays. Alternatively, OTF may increase a user's arousal. This would increase the speed of the pacemaker and lead to longer perceived delays. For retrospective estimation, the visual changes of OTF may be encoded as discrete events (i.e., contextual changes) in working memory. Thus the feedback would lead to longer perceived delays.

The goal of this study is to examine how OTF can impact various perceptions of a Web site by changing both perceptions of effort *and* perceptions of delay.

The interaction of OTF and time estimation will be examined using a simulated Web-based search task. Three OTF conditions will be included (none, slow, and fast) to identify potential speed effects related to the feedback. Such speed effects may include increased arousal and/or increased perceptions of effort due to a greater number of status updates. The time estimation manipulation will be within-subjects, so each participant will engage in both a retrospective and prospective search task. Perceptual measures of delay, value, satisfaction, and intention to return will be collected.

The current theoretical arguments rely on the effects of attention and arousal. Multiple measures of the subjects' physiological responses will be captured then to more accurately evaluate how attentional gate theory applies to OTF. These measures include eye tracking, skin conductance, and electroencephalography (EEG).

REFERENCES

❖ Buell, R. W., and Norton, M. I. 2011. "The Labor Illusion: How Operational Transparency Increases Perceived Value," *Management Science* (57:9), pp. 1564-1579.
❖ Zakay, D., and Block, R. A. 1997. "Temporal Cognition," *Current Directions in Psychological Science* (6:1), pp. 12-16.