The Effects of Progress Cues, Color, and Gender on Online Wait

Emergent Research Forum Paper

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Abstract

As online wait has become pervasive and its negative impacts on online users’ perception and behaviors were well recognized, a waiting screen is suggested as one of the proactive mechanisms to manage this concern. However, to date only a few studies have investigated how to develop an effective waiting screen. In addition, despite the presence of significant gender differences in traditional wait, a lack of studies of this aspect has been acknowledged in online wait context. This study proposes a research model of online wait management based on the theories of time perception and cognitive absorption theory to test the effects of waiting interfaces by manipulating the types of a progress cue and a background color on waiting time perception and gender in a simulated online context. Controlled experiments with the ANOVA and MANOVA tests will be conducted.

Keywords

Online Wait, Perceived Waiting Time, Gender, Theory of Time Perception, Cognitive Absorption Theory

Introduction

Online users usually experience wait while searching products, downloading documents or software, or completing online transactions, often leading to negative perception and reactions such as resentment, anxiety, frustration, distrust of e-vendors, and site abandonment. A number of industry-based studies have noted the importance of practical management of online waits. As a result, academic studies have responded by focusing on managing perceived waiting time (e.g., Buell & Norton 2011). One promising approach to control perceived waiting time involves designing a waiting screen - a web page shown to users during online waiting situations. It consists of various interface cues, including progress cues, background color, image, text, and multimedia, to attract customers’ attention, help them forget about the passage of time, perceive having some control over wait, and experience enjoyment. While recent empirical studies (e.g., Hong et al. 2013) have confirmed significant positive effects of waiting screens on reducing perceived waiting time and providing positive user experience, there still are ample avenues for further exploration as described in the following.

First, even though a waiting screen can be designed using a variety of interface cues that users view while waiting, previous studies focused on only a few design components such as images and text (e.g., Lee et al., 2012). Second, prior research has suggested that individual factors, such as gender, age, race, and Internet experience, can play a crucial role in affecting users’ waiting time perception (e.g., Hong et al. 2013); however, to our knowledge, the impact of gender in relation to online wait has been investigated in only one study (i.e., Chebat et al. 2010). Third, most previous studies (e.g., Buell & Norton 2011) tested the effect of waiting screens only in the simulated hospitality and travel websites. In addition, progress cue and color have been known to significantly affect customers’ perceptions in various online contexts (Gorn et al. 2003; Harrison et al. 2010). Given this background, the goals of the present study are to (a) investigate how waiting screens with different interface cues (i.e., progress cues and background color) affect waiting time perception, and (b) examine the effect of gender. Specifically, this study investigates the effect of interface cues in an online music purchase/download context. We plan to specifically manipulate the presentation mode of a progress cue (explicit vs. implicit), type of progress cue (low vs. high)
Progress Cues, Color and Gender on Online Wait

Literature Review

**Progress Cues:** The use of progress cues is a common practice in waiting screens. A progress cue can be designed to provide feedback on the waiting time progress and remaining wait in a text format, a visual or graphical format, both text and visual formats, or through other means such as tactile feedback (e.g., touch). A simple text message (e.g., “Your request has been processed ...”), a continuous filling bar or circle, random blinking dots, or other progress cues that do not explicitly showing the percentage or exact progression of the processing are classified as implicit progress cues. On the other hand, explicit progress cues consist of cues (usually in a visual or graphical format) whereby a rectangular bar or a circle is gradually filled or a character is moving from a starting point to an ending point to show online processing progress. A few studies have examined the effects of progress cues, but they mainly used a simple rectangular progress bar and investigated its effects by manipulating its presence and accumulation speed (e.g., Harrison et al. 2010). Due to this lack of scientific investigation of effects of progress cues in waiting situations, there is an obvious need for IS researchers to advance our understanding of using progress cues to manage online wait.

**Color Perception:** In daily life, color is a ubiquitous and unavoidable part of our experience. In the psychology and HCI literature, color has been utilized to manipulate people’s perception and behaviors (Elliot & Maier 2014). In the web environment, researchers found that the use of certain colors could affect online shoppers’ perception towards websites. For example, Gorn et al. (2004) found that a blue background color can relax users whereas a red background color tends to arouse and excite people. Color may also be perceived differently based on gender. Cyr and Bonanni (2005) found that women are more sensitive to color on a website than men. Therefore, we set out to investigate whether color can play a role in online waiting context.

**Gender Difference:** Studies have found significant gender difference in various traditional wait contexts. For example, a meta-analysis of 87 studies by Block et al. (2010) confirmed the existence of gender differences in waiting duration judgments. Females were found to focus attention on time more than males, with the result that they accumulated subjective temporal memory units at a faster rate. However, they investigated the main effect of gender on time estimation, not the role of gender in overall waiting experience. Meanwhile, HCI researchers have examined the potential role of gender in the relationship between website designs and online users’ perception and behaviors. For example, Cyr and Bonanni (2005) found that men are more attracted by interactive design components, whereas women are more attracted by the colors of the website. Stenstrom et al. (2008) found significant gender differences in navigation, location, rotation, and movement in mock online bookstores. To best of our knowledge, the study of Chebat et al. (2010) is the only one that empirically validated the presence of gender differences in online wait context. Thus, there is a need for further investigation of gender effect in online wait contexts using a different variety of design cues.

**Theory of Time Perception:** While people usually refer to time from a clock (i.e., objective time), we strongly rely upon and emphasize perceived time, which is a product of cognitive functioning. It is important to recognize that perceived time is sensitive to the conditions under which it is measured, including the external “cues” in the environment and how they influence the internal perception of time. The Resource-Allocation Model (Zakay 1989) postulates that (a) we have a limited pool of processing resources (e.g., attention or cognitive effort); (b) we are naturally occupied with the passage of time and are actively engaged in time estimation during the entire waiting period; and (c) increasing task demands can limit the mental processing resources available for time estimation. In the context of time perception, this implies that we pay less attention to the waiting time if distracting stimuli are introduced. If more resources are consumed for processing non-temporal information, fewer resources are available for processing time estimation, resulting in a shorter perceived waiting time. The Cognitive Control Model (Averill 1973) suggests that a provision of any information about the wait makes wait felt more predictable and controllable and, therefore, result in more positive affective responses to the wait. In addition, when customers have to wait, any information regarding the wait is likely to stimulate cognitive reappraisal and result in their perceiving the wait as more acceptable.
Cognitive Absorption Theory (CAT): As hedonic and experiential features are increasingly included in information systems, researchers have proposed and applied theories that explain users' holistic responses to experiencing these technologies and CAT is one of them. By defining cognitive absorption as “a state of deep involvement with software”, Agrawal and Karahanna (2000) proposed cognitive absorption consists of multiple constructs including (a) time distortion, (b) focused attention, (c) heightened enjoyment, and (d) control. Time distortion refers to the phenomenon where a person engages in an activity and loses track of time passage. Focused attention refers to the situation where a person devotes her full attention to a specific activity and ignores other surrounding activities. During a person’s interaction with an activity, increased pleasure is referred as heightened enjoyment; perception of being in charge is referred to as control. While research consistently supports the influence of cognitive absorption on technology-related beliefs and acceptance, less research has examined factors that may induce cognitive absorption. Thus, we have very limited knowledge of the actual design artifacts (e.g., interface cues) that may induce cognitive absorption. By manipulating waiting screen design elements, this study explores the formation process for cognitive absorption. Specially, this study considers cognitive absorption constructs as waiting perception because they are what online users perceive while seeing a waiting screen during wait. We conjecture that well designed waiting screens can help people cognitively being absorbed in waiting experience, resulting in a shorter perceived waiting time.

Hypotheses

We develop a research model (Figure 1) that refer to theories of time perception and cognitive absorption (Agarwal & Karahanna 2000) to investigate the effects of progress cue design and background color on four cognitive absorption variables including focused attention, time distortion, perceived control, and heightened enjoyment that influence perceived waiting time.

Implicit vs Explicit Progress Cue: Implicit progress cues simply convey that a task is in progress by exhibiting the repeated movement of symbols (e.g., three dots that flicker to convey movement at Orbitz.com), but explicit others convey task progress as well as additional information about the percentage of waiting time that has passed and/or remains (e.g. Hotels.com). Based on the resource allocation model and cognitive control model, an explicit progress cue that provides additional information about the waiting situation, should influence users' perception of greater attention and increased control. That is, when people see an explicit progress cue, they become more attentive toward it and perceive more control during the wait. Thus, we predict:

H1: During an online wait, users experience MORE perceived control (H1a) and focused attention (H1b) when viewing a waiting screen with an explicit progress cue than an implicit progress cue.

High- vs Low-Affect Progress Cue: High-affect (i.e., hedonic) progress cues may use symbols such as an animated airplane followed by clouds, a bear’s footprints, or a cartoon character to invoke enjoyment, whereas low-affect (i.e., utilitarian) cues would utilize functional symbols such as plain dots or rectangular bars; both types are evident on the Internet. Based on the resource allocation model and cognitive control model, an explicit progress cue that provides additional information about the waiting situation, should influence users' perception of greater attention and increased control. That is, when people see an explicit progress cue, they become more attentive toward it and perceive more control during the wait. Thus, we predict:

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High- vs Low-Affect Progress Cue: High-affect (i.e., hedonic) progress cues may use symbols such as an animated airplane followed by clouds, a bear’s footprints, or a cartoon character to invoke enjoyment, whereas low-affect (i.e., utilitarian) cues would utilize functional symbols such as plain dots or rectangular bars; both types are evident on the Internet. Based on the resource allocation model, we expect that high-affect progress cues attract more attention than low-affect progress cues, as the affective shapes or symbols are more eye-catching and attractive. We also predict that seeing high-affect progress cues, users seem to be unconscious of the passage of time. Similarly, people perceive greater enjoyment when seeing
high-affect progress cues than their low-affect counterparts (Lowry et al. 2014). Thus, we hypothesize:

H2: During an online wait, users perceive MORE focused attention (H2a), time distortion (H2b), and heightened enjoyment (H2c) when viewing a waiting screen with a high-affect progress cue than a low-affect progress cue.

**Background Color:** A trend of interface design seems to suggest that modern systems and websites should consider some level of aesthetic value and inject fun and pleasure. As mentioned earlier, certain colors are more effective at inducing affective feelings such as excitement. For example, warm colors, especially red, have been found to be physically and emotionally arousing and exciting, triggering affective feelings (e.g., Gorn et al. 2004). Therefore, we conjecture that a red background color on a waiting screen would induce a more exciting and affective state, which in turn would make online users feel more enjoyment and pleasure about the waiting situation. Thus, we hypothesize:

H3: During an online wait, users perceive MORE heightened enjoyment when viewing a waiting screen with a red background color than a blue background color.

**Gender:** Gender is believed to be one of the individual factors that influence online attitudes and behavior. Previous studies (e.g., Garbarino and Strahilevitz 2004) noted that women are risk averse and are positively influenced by information presented in a website that helps reduce their concerns and perceive more control while purchasing products or services online. Meanwhile, explicit progress cues render extra progress information during wait, including the amount of time that has been passed and that is left, whereas implicit progress cues show only the progress itself. Based on the cognitive control model, the provision of any information about a wait makes the wait felt more predictable and controllable. Therefore, we hypothesize:

H4: During an online wait, differences in perceived control between an explicit progress and implicit progress cue are greater for females than males.

The term “hedonic,” derived from Greek where hedonism, means pleasure. Hedonic design elements can either implicitly or explicitly cause heightened enjoyment. Previous studies found that females provided lower aesthetic ratings than male of websites, and males are more significantly influenced by perceived enjoyment while searching and purchasing products or services online than females (Coursaris et al. 2008). In addition, men have been known to show more immersive behavior and spend more time (resulting in losing track of time) while playing computer games and navigating virtual worlds sites than females. Thus, we hypothesize:

H5: During an online wait, the differences in time distortion (H5a) and heightened enjoyment (H5b) between a low-affect progress cue and high-affect progress cue are larger for males than females.

**Antecedents of Perceived Waiting Time:** A wait is perceived to be shorter when people perceive that they have control over the waiting situation. Researchers have found that a sense of control significantly influences individuals’ reactions to waiting (e.g., Hui and Bateson 1993). When a person is immersed in an experience to such a degree that his attention is distracted from other things, this focused attention may reduce perceived time because she does not attend to the passage of time. According to the resource allocation model, if an individual’s attention is focused on cues (or tasks) while waiting, she has fewer cognitive resources available for processing temporal information. Time distortion occurs when the thought of time passing does not enter into a person’s consciousness and the estimate of time duration, therefore, is distorted. Research has found that while people are absorbed in an interaction, they are unable to register the passage of time accurately, and thus usually perceive that time is flying by quickly. Finally, heightened enjoyment is another factor that can affect perceived waiting time. To the extent that cues provided in waiting screens are enjoyable, empirical studies suggest that perceived waiting time can be reduced. For example, North and Hargreaves (1999) found that individuals perceived less waiting time when they encountered stimuli that they liked (e.g., music). Based on the above reasoning, we hypothesize that:

H6: Users’ experience of higher perceived control (H6a), higher focused attention (H6b), higher time distortion (H6c) and higher heightened enjoyment (H6d) while viewing a waiting screen is related to shorter perceived waiting time during an online wait.
Research Methodology and Expected Contributions

Controlled experiments with a simulated online commercial website with 600 subjects who have online music download experience will be carried out to examine the effects of progress cues and color on online waiting perception. A pilot test was conducted to test the validity and reliability of instrument items developed based on previous studies and confirmed their convergent and discriminant validity and reliability. After completing the main experiments, ANOVA and MANOVA tests are used for data analysis.

Our contribution is multifold. First, this study provides new insights into the effects of design components of a waiting screen on online waiting perception by manipulating progress cues and background color in a music download waiting context. Second, given the lack of scientific investigation on gender differences in online wait contexts, the study contributes to the advancement of the online wait management literature. Finally, by proposing and validating a research model of online wait management, the study provides a solid foundation for better understanding the underlying process of the relationship between waiting screens and perceived waiting time.

References


