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Designing an electronic commerce interface: attention and product memory as elicited by web design

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Abstract

This paper describes a study conducted to understand, in part, the effects of web interface features (image size, fidelity, and motion) on responses such as attention, and memory. The increasing proliferation of B2C web sites and their attempts to enhance the experience of customers shopping on-line has made the work of Reeves and Nass on the psychological responses elicited by interactions with media relevant to the electronic commerce domain. This study is an attempt to validate the claims of Reeves and Nass and extend their theory to web-based media. We have conducted a laboratory experiment to test the influence of three web design features—image size, fidelity (clarity of an image), and motion—for an experimental electronic commerce website. Subjects were instructed to search for information on the web, and given attention and memory tasks that were then used to measure the impact of these three web design features. Results indicated that, at the early stages of a subject's interaction with a web site: (1) higher visual fidelity images on a web interface lead to greater user attention to the product examined than lower visual fidelity images; (2) motion on a dynamic web interface demands greater user attention than a static web interface; and (3) an interface with higher fidelity and motion leads to greater attention span in comparison to one associated with only one feature manipulated. In addition, compared to smaller images, larger images on a web interface enhance user memory performance for images. In terms of practical applications, the study indicates that interface features, such as fidelity and motion, which are instrumental in keeping customers at one's web site longer, are important and may lead to an eventual purchase. Second, it is becoming evident that a key role of the web site is not only to lead to the purchase of a company's product over the web, but also to lead customers to visit one's physical store, and eventually to an "off-site" purchase. The results of this study show that size is an important variable that influences customers to remember the image aspects of a product, and this might lead to a higher likelihood of off-line buying. Overall, this study confirms the relevance of Reeves and Nass' studies in the area of human–media interaction. Also, it sheds new light on the application of their work to the electronic commerce context. It also contributes knowledge to the research community with a relatively new paradigm of studying interface and human–computer interaction.
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1. Introduction

Web design technologies have developed at a staggering rate in recent years. In particular, pre-

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sentation enhancement tools, such as Flash, Shockwave, and Illustrator, dynamic HTML, and Java, have gained popularity among web designers to create effects such as animation, audio, and photorealistic images. As a result, there has been a trend to incorporate these technologies into the design of electronic commerce (e-commerce) websites. However, little research has been done to measure the effectiveness of these interface enhancements, that is, do these add-ons actually affect customers' reactions towards the products displayed? This paper attempts to examine some of the issues involved in this complex subject.

E-commerce research in the academic community has proliferated in recent years. B-to-C issues such as Trust [2], Image/Branding [3,4], Perception [5], Consumer Behavior [6], and Interface Design [7–10] have been examined in the last few years. This study intends to add to the pool of B-to-C research by examining some of the issues involved in the area of *interface design within the e-commerce context*, specifically whether attention and memory of products could be affected in user interactions with e-commerce sites by manipulating website interfaces.

The paper proceeds as follows. Section 2 reviews relevant previous research in this area. Section 3 presents the research model and hypotheses. Section 4 describes the experimental design and methodologies used during the data collection phase of the study. Section 5 summarizes and discusses the data analysis process. Section 6 presents a discussion of the findings. Finally, Section 7 summarizes the conclusions of the study.

2. The media equation and interface design

Drawing from works in psychology, sociology, and communications, the major thesis of Reeves and Nass' [1] work, *The Media Equation*, is that ''media equals real life''. They claim that equating mediated and real life is neither rare nor unreasonable. It applies to everyone, it applies often, and it is highly consequential. The only time when this equation does not apply is when people make a conscious effort *not* to treat media as real. The automatic and natural response is to accept what seems to be real as in fact real. Reeves and Nass argue that the basic assumption that people treat media as merely tools is

fundamentally wrong. Further, they suggest that psychological and social rules that apply to human–human interactions also apply to human–media interactions.

These experts in the communications field posit that individuals' interactions with computers, television, and other media are fundamentally social and natural, just like interactions in real life. If there are social and natural values associated with media (including computers), then we can design them to best capture these values to our advantage. Within this broad context, they further suggest that *emotions* are generated from interactions with media. Work that has been done in the marketing domain is of particular interest to our study. It is now well accepted that moods, feelings, and emotions are important aspects of consumer behavior [11–13]. This undoubtedly applies to the e-commerce context.

This study seeks to apply Reeves and Nass' research on traditional media (e.g., television, video, static images) to the web medium, particularly in the e-commerce context.

2.1. Emotion, attention, and memory

According to Reeves, emotion, an innate human characteristic, associated with cognitive processes, is important for social interaction and organization. The distinguishing feature in this view is that emotion is involved in the interaction with *media*. Emotion can be simplified into two basic components: Valence (simply as good or bad) and Arousal (the volume of things good and bad). However, it is very difficult to measure emotion, even in its simplified components, *directly*. Physiological measurements (e.g. EEG) are among the few techniques available to measure emotion directly. Therefore, psychologists have developed different methods to measure emotion *indirectly*. The most reliable ones are those based on the relationship between emotion (in particular, arousal), attention and memory. In this study, we focus on attention and memory for two reasons: they are important issues in an e-commerce context and they can be measured reliably.

2.1.1. Emotion and attention
Most of the theories proposed in the study of attention in relation to emotion have an emphasis on the arousal aspect of emotion. One of the most