# A DUAL-PROCESS MODEL OF INTERACTIVITY EFFECTS

**Yuping Liu and L. J. Shrum**

ABSTRACT: Although interactivity is often considered to have a positive influence on persuasion, research on interactivity effects is actually very mixed. This paper argues that under certain circumstances, interactivity may either enhance or inhibit persuasion. A dual-process model of interactivity effects is proposed and tested that posits differential effects of interactivity on persuasion depending on person and situation factors. Results of an experiment that manipulated level of Web site interactivity and task involvement, and measured user ability (Internet usage experience), show that under low-involvement conditions, the mere presence of interactivity served as a peripheral cue that led to more positive attitudes regardless of ability (experience). Under high-involvement conditions, however, interactivity elicited more positive attitudes for experienced users but less positive attitudes for inexperienced users. Implications for the use of interactivity in advertising and promotions are discussed.

Over the last decade, on-line advertising and promotion have grown into an important sector of the advertising industry that accounted for $18.5 billion in ad revenue in 2005 and is expected to exceed $30 billion in total spending in 2008 (Burns 2006). This success can be at least partially attributed to the unique appeal of interactivity in on-line media. Interactive on-line advertising formats allow consumers to selectively process information and engage in real-time two-way communication with companies and other consumers. Instead of being passive recipients as with traditional advertising, consumers can now actively participate in the advertising and marketing process through the interactive media (Stewart and Pavlou 2002).

The appeal of interactivity is especially evident in Web sites. Web sites, which not only provide advertising space but also function as advertisements themselves for the hosting companies and brands (Arens 2006), typically involve much longer exposure time than traditional advertising. With less space and time constraints and more creative flexibility than other advertising formats, a Web site can include considerably more interactive features and detailed product information. Furthermore, rather than being forcibly exposed to an ad, consumers usually make the voluntary decision to visit a Web site, making it a potentially more effective tool for conveying brand information than traditional media (Sicilia, Ruiz, and Munuera 2005). Because of these advantages, Web sites have become an increasingly important component of on-line marketing communication (Greenspan 2004). According to an eMarketer report (2006), Web site redesign and update alone accounted for 39% of companies' planned on-line advertising spending in 2006.

Although it is intuitive that interactivity should improve brand and Web site attitudes, research on the effects of interactivity on such variables as memory, learning, attitudes, and purchase intentions has produced remarkably inconsistent results. For example, greater interactivity in the form of information control has been shown to improve memory and learning, but only when processing resources are sufficiently high (Ariely 2000). However, control of ad viewing has also been shown to decrease time spent viewing ads and purchase intentions (Bezjian-Avery, Calder, and Iacobucci 1998). In other studies, interactivity has produced no effects on learning (Haseman, Nuipolatoglu, and Ramamurthy 2002) or attitudes (Coyle and Thorson 2001), and has even led to decreased usage through click-throughs (Lohtia, Donthu, and Hershberger 2003). Still other research has produced asymmetric findings with regard to interactivity effects, with moderate levels of interactivity producing more positive attitudes than low or high levels of interactivity (Sundar, Kalyanaraman, and Brown 2003), and lower levels of interactivity producing more positive attitudes when expectations of interactivity are low than when they are high (Sohn, Ci, and Lee 2007).

Although the differences across experimental designs and operationalizations preclude drawing any firm conclusions that can reconcile the disparate findings, it is clear that there are factors that moderate the effect of interactivity on advertising effectiveness measures. In other words, aspects of either persons or situations may dictate when interactivity facilitates, inhibits, or has no effect on persuasion. In the study reported here, we investigate both person and situation moderators. Built

**Yuping Liu** (Ph.D., Rutgers University) is an associate professor of marketing, College of Business and Public Administration, Old Dominion University.

**L. J. Shrum** (Ph.D., University of Illinois at Urbana–Champaign) is a professor of marketing, College of Business, University of Texas at San Antonio (UTSA).

Portions of this research were supported by a UTSA College of Business Summer Research Grant to the second author.

*Journal of Advertising,* vol. 38, no. 2 (Summer 2009), pp. 53–68.

ISSN 0091-3367 / 2009 $9.50 + 0.00.
DOI 10.2753/JOA0091-3367380204

on the theoretical framework of the Elaboration Likelihood Model (ELM) of persuasion (Petty and Cacioppo 1986), we propose and test the notion that people react to the presence of interactivity in different ways, and these reactions vary as a function of person factors (level of experience) and situation factors (task involvement). Specifically, we propose a dual-process model of interactivity effects in which interactivity works in distinct ways under low- versus high-involvement conditions. When involvement level is low, consumers may not engage in extensive interaction with a Web site, even when interactive features are available. Rather, the mere presence of interactivity may lead to more positive attitudes. In contrast, when involvement level is high, interactivity can play two roles. On the one hand, interactivity may play a facilitating role by giving consumers more control and enhancing central processing, which produces more positive attitudes. On the other hand, interactivity may play an inhibiting role by occupying precious cognitive resources and making processing and task completion more difficult, leading to more negative attitudes. The eventual effect of interactivity under such conditions depends on the various factors that affect the relative dominance of the facilitating versus inhibiting roles. This dual-process model and the supportive results that are reported provide at least one explanation for the contradictory findings from previous research.

## THEORETICAL DEVELOPMENT

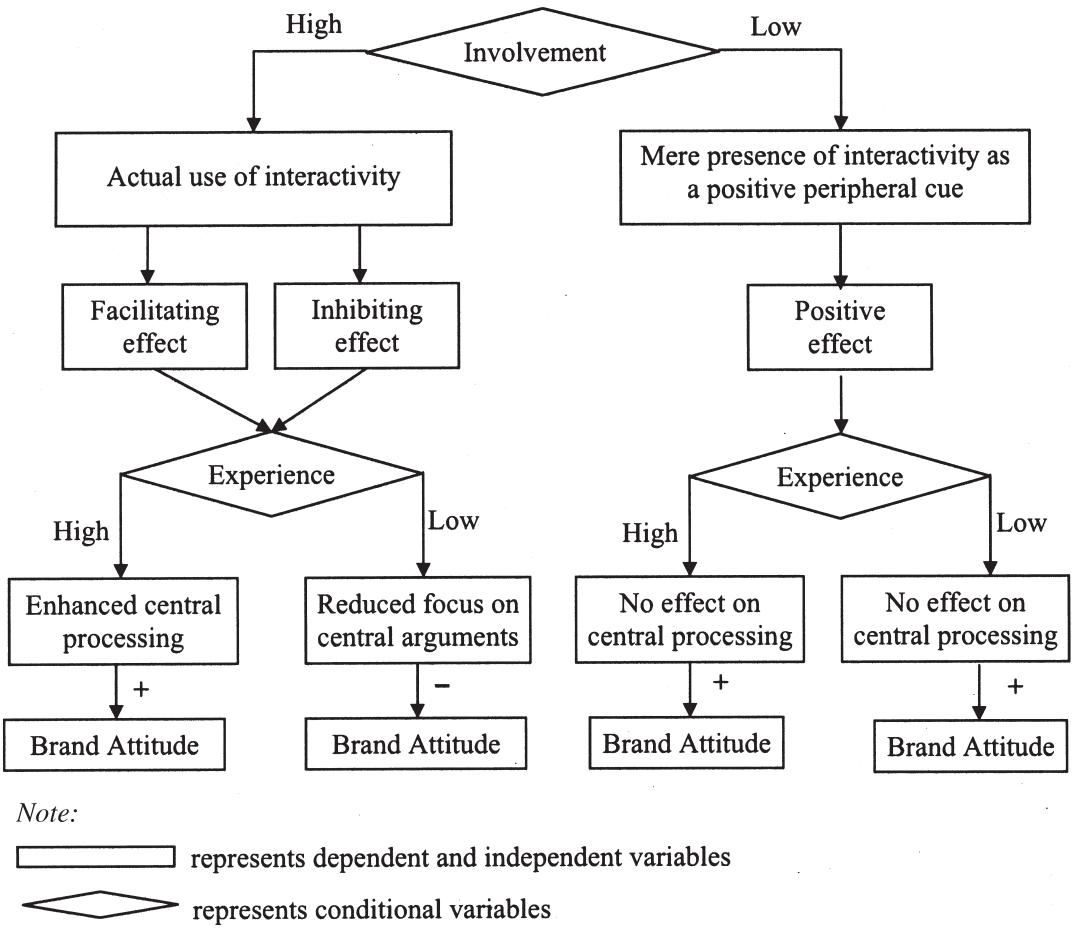
The ELM is useful for making predictions about how attributes such as interactivity may be processed as a function of motivation and ability to process information. The ELM posits an elaboration continuum that reflects the extent to which people will elaborate on message-relevant information in constructing their attitudes. Anchoring the ends of this continuum are two routes to persuasion: a central route and a peripheral route. The point along this continuum at which an individual's processing resides is a function of the individual's degree of elaboration. Moreover, the processes by which persuasion occurs, as well as its consequences, differ as a function of degree of elaboration. Central route processing is taken when both the motivation and ability to process information is sufficient. Attitudes formed through this route are based on close and extensive scrutiny of message-relevant arguments (high elaboration) and tend to be more stable than those formed through the peripheral route. Conversely, attitudes formed through the peripheral route are characterized by noticeably less elaboration. Peripheral route attitudes may be formed through less scrutiny of message arguments or scrutiny of fewer arguments, which represents a quantitative difference in elaborative processing relative to the central route (Petty 1997; Petty and Wegener 1999). Alternatively, peripheral route processing may occur through elements of a message that are unrelated to message argument content, and such elements are referred to as peripheral cues. Examples of peripheral cues include the number of arguments presented, source attractiveness, and pleasant pictures in an ad. These peripheral cues influence attitudes through processes such as use of heuristics (e.g., experts can be trusted; Chaiken 1980), classical conditioning (Staats and Staats 1958), and mere exposure (Zajonc 1968). Because these processes are qualitatively different from scrutiny of message arguments, this type of peripheral processing represents a qualitative difference in elaborative processing relative to the central route (Petty 1997).

The basic tenets of the ELM just outlined imply that elements of a message can influence persuasion in different ways. In particular, an element may function as an argument, a peripheral cue, or may affect the extent of elaboration (Petty and Cacioppo 1986, Postulate 3). Thus, it is important to note that even though a particular message element may be more consistently related to a particular function (e.g., source attractiveness is often considered a peripheral cue), the element can serve any of the three functions, depending on the situation. For example, endorser attractiveness for a restaurant has been shown to influence attitudes through peripheral processing when sensory gratification attributes such as taste and aroma are primed. However, when image-related attributes such as creating a good impression are primed, endorser attractiveness influences attitudes through central route processing (Shavitt et al. 1994). Similarly, the impact of pleasant pictures with low product relevance has been shown to decrease as involvement increases. In contrast, when the pleasant pictures are relevant to the product, their impact increases as involvement increases (Miniard et al. 1991). In both of these examples, a particular message element was shown to function as either an argument or a peripheral cue, depending on the situation. Meyers-Levy and Peracchio (1995) also demonstrated that a message element could either function as a peripheral cue or affect extent and type of processing. Under low-motivation conditions, color highlights in an ad functioned as a peripheral cue. However, under high-motivation conditions, color directly interacted with consumers' processing of central product-related information.

## A DUAL-PROCESS MODEL OF INTERACTIVITY EFFECTS

The ELM has important implications for understanding the effects of interactivity on persuasive communications. For one, it suggests that interactivity may function in different ways: as an argument, a peripheral cue, or a factor that affects the extent of elaboration. Second, it suggests that the role of interactivity will vary according to level of motivation and ability to process

**FIGURE 1**
**A Dual-Process Model of Interactivity Effects**




information that people bring to the interactive situation. Based on the elements of the ELM and these implications, we present and test a dual-process model of interactivity effects that specifies the conditions under which interactivity should be effective and under which it should not. Because the model predicts that under certain conditions interactivity should have favorable effects on advertising-related outcomes but that under other conditions it should have detrimental effects, it has the potential to account for the conflicting findings noted earlier with respect to the effects of interactivity.

The model presented here suggests that the role of interactivity varies according to the level of involvement. When involvement is high, consumers will attempt to fully utilize the interactive features offered, which can have both a facilitating and an inhibiting effect on central processing. The outcome of the persuasion process depends on the consumer's ability to maximize the facilitating effect and minimize the inhibiting effect of interactivity. In contrast, when involvement is low, consumers will be less likely to actually use the interactive features. Rather, the mere presence of interactivity may function as a peripheral cue that can have a direct impact on attitudes regardless of individual ability. The complete model is shown in Figure 1.

### Interactivity Effects Under High Involvement

The ELM suggests an inclination toward more extensive processing when consumers' involvement levels are high (Petty, Cacioppo, and Schumann 1983). Under such conditions, consumers are motivated to allocate substantial cognitive resources to process a message and attempt to evaluate relevant claims about the product advertised. Attitudes are subsequently based on an extensive and systematic examination of such claims (Chaiken 1980; Petty and Cacioppo 1986). In this mainly cognitive route, interactive features are likely to be truly utilized, and interactivity can play two opposing roles.

On the one hand, to the extent that an interactive Web site offers a wide range of choices (Steuer 1992) and a high level of control (Ariely 2000; Liu and Shrum 2002; Steuer 1992), it can engage a consumer in the interaction process and offer the consumer a customized browsing experience. As a result, a highly interactive Web site is likely to stimulate systematic elaboration on information that is relevant to the consumer's needs and information-processing style (Ariely 2000; Sicilia, Ruiz, and Munuera 2005). By allowing consumers to selectively focus on the most important information, a highly interactive Web site can reduce consumers' search costs and give consumers more room to process product claims. Furthermore, engaging in interaction has been found to increase arousal and encourage more thoughtful processing (Fortin and Dholakia 2005; Sicilia, Ruiz, and Munuera 2005). This should facilitate central processing and persuasion.

On the other hand, interactivity also presents the challenge of increased demand on consumers' cognitive resources (Ariely 2000). As consumers navigate through a highly interactive Web site, they need to manage the information flow and keep track of their location in the site (Tremayne and Dunwoody 2001). As a result, interactivity can divert consumers' attention away from product-relevant information and become a distracting, and possibly even a frustrating, factor in the environment (Ariely 2000; Cook and Coupey 1998). This can impede effective processing of relevant product claims and undermine the favorable consumer attitudes such claims intend to engender. Assuming that the claims provided on a Web site are strong, the inhibiting effect of interactivity can render a more-interactive Web site even less persuasive than a less-interactive Web site.

The current model argues that the final effect of interactivity is determined by the relative importance of the two opposite roles. For each consumer, the balance between the two roles will depend on the cognitive resources available (Ariely 2000) and the cognitive cost of interactivity for the consumer. This suggests that the consumer's Internet usage experience may play a moderating role. Because less-experienced Internet users are not equipped with the same knowledge and skills as more-experienced users, they may have more difficulty in managing the information flow on a highly interactive Web site. Thus, the cognitive cost of interactivity may be higher for less-experienced consumers than for more-experienced consumers. Although they have the motivation to engage in extensive central processing because of high involvement, high interactivity may distract less-experienced users from issue-relevant thinking and reduce their level of elaborative processing. Moreover, if less-experienced users find navigation and general use of the Web site overly difficult, they may use this as a negative argument for the Web site and the brand. For these consumers, a less-interactive Web site is likely to be more effective and lead to more positive attitudes than a more-interactive Web site. More-experienced Internet users, in contrast, are familiar with navigating through Web sites and have learned to use the interactive features on Web sites to fulfill their goals. As a result, the cost of interactivity for these users is relatively low, and the facilitating role of interactivity is likely to be dominant. For these consumers, the more-interactive Web site will be more persuasive than the less-interactive site. Thus, it is expected that

> *H1: Under high-involvement conditions, Internet experience will moderate the effects of interactivity on brand and Web site attitudes. For inexperienced Internet users, a Web site that is less interactive will produce more positive brand and Web site attitudes than will a Web site that is more interactive. For experienced Internet users, however, a Web site that is more interactive will produce more positive brand and Web site attitudes than will a Web site that is less interactive.*

### Interactivity as a Peripheral Cue Under Low Involvement

Under low-involvement conditions, consumers' processing of a persuasive message is likely to be characterized by less elaboration and potentially more heuristic processing (Chaiken 1980; Petty and Cacioppo 1986). Consumers' attitudes are based primarily on easy-to-identify peripheral cues, such as the likability of celebrity endorsers or the visual layout of an ad. In such situations, interactivity works differently from the way it does under high involvement. Given a low motivation to engage in effortful processing resulting from low involvement, consumers are unlikely to devote the cognitive resources necessary to engage in extensive interaction with a Web site, even when the Web site is highly interactive.

Although low-involvement consumers may not actually engage in extensive interaction, the mere presence of interactivity in a Web site may function as a positive peripheral cue and thus increase persuasion relative to less-interactive Web sites. Sundar, Kalyanaraman, and Brown (2003) have argued that Web users' notions of interactivity may be related to simple cues in an on-line environment. The mere presence of such simple cues in a Web site can increase the perceived sophistication and likability of the Web site. This is in line with past ELM research that shows low-involvement consumers are affected by the mere number of arguments present in a message regardless of argument strength (Petty and Cacioppo 1984). In other words, the large numbers of interactive features present in high-interactivity Web sites may persuade low-involvement users, whether those features will prove relevant or beneficial to them or not. From an affect perspective, interactivity has also been shown to enhance consumers' affective involvement with a Web site (Fortin and Dholakia 2005) and result in a more enjoyable browsing experience (Raney et al. 2003). These

positive effects of interactivity may translate into more positive Web site and brand attitudes.

If the presence or degree of interactivity serves as a peripheral cue, the persuasiveness of interactivity no longer depends on actual usage of interactive features. As a result, lack of experience should not inhibit the enjoyment of such benefits, and a more uniform impact of interactivity should be observed across all consumers. That is, under low-involvement conditions, a more-interactive Web site will be more persuasive than a less-interactive Web site for both more- and less-experienced consumers. This leads to the following hypothesis:

*H2: Under low-involvement conditions, a more-interactive Web site will produce more positive brand and Web site attitudes than will a less-interactive Web site for both experienced and inexperienced Internet users.*

In summary, we expect a two-way interaction between level of interactivity and user experience on attitudes under high-involvement conditions, but expect only a main effect of interactivity on attitudes under low-involvement conditions. Thus, taken together, H1 and H2 suggest a three-way interaction among interactivity, involvement, and experience.

### Elaboration

The ELM posits that the thoughts or cognition that are generated in response to a message influence attitude formation and change (Petty, Ostrom, and Brock 1981). In addition, these cognitive responses are useful in documenting and confirming the hypothesized processes that underlie message effects. Thus, the differential effects of interactivity on consumer attitudes are likely to be reflected in consumers' thought processes while browsing a Web site. If so, then we would expect that the type, magnitude, and direction of the cognitive responses generated should reflect the pattern of results posited in H1 and H2. More specifically, we expect the same three-way interaction between involvement, interactivity, and experience for level of inferential and brand-related thoughts:

*H3: Under high-involvement conditions, the magnitude of inferential thoughts and the magnitude and positivity of brand thoughts will increase as a function of interactivity for experienced users but will decrease for inexperienced users.*

Under low-involvement conditions, if the mere presence of interactivity indeed functions as a peripheral cue, it should impose little extra demand on consumers' cognitive resources. As a result, it should not increase consumers' elaboration levels. Thus, we expect that

*H4: Under low-involvement conditions, interactivity will have no effect on inferential and brand elaborations as a function of user experience.*

## METHOD

### Participants and Design

Participants were 80 undergraduate business students (37 women, 43 men) who completed the study in exchange for extra course credit. Their ages ranged from 19 to 47 (median = 20). The design was a 2 (high versus low interactivity) × 2 (high versus low task involvement) × 2 (high versus low Internet experience) experiment in which interactivity and task involvement were manipulated factors and assignment to groups was random. Internet experience was measured.

### Stimuli

A Web site for a fictitious portable audio company was used as the experimental stimuli. Portable audio products (e.g., MP3 players) were identified through pilot tests as an appropriate and relevant product category for the sample. Two versions of the Web site were constructed. To keep the basic functionality of the two versions consistent, eight feature pairs that fulfill the same functions but differ on the degree of interactivity were first constructed. These features were developed based on existing interactivity studies and are detailed in Table 1. To vary the level of interactivity, the more interactive feature in each pair was used to develop the high-interactivity Web site, and the less interactive feature was used to develop the low-interactivity Web site. The look and information content of the two sites were kept the same to avoid potential confounding. Figure 2 shows a screenshot of a Web page from each site.

### Procedure

The study was conducted in two stages. In the first stage, participants filled out a questionnaire that measured their Internet experience and involvement with portable audio products. Two weeks after filling out the initial questionnaire, participants were asked to come back for the second phase of the study. The experiment was conducted in a computer lab in small group settings. On arriving at the computer lab, participants read the instructions for the study. Following Meyers-Levy and Peraccchio (1995), those assigned to high-involvement conditions were told that they were among a small group of consumers chosen for the study and that their inputs were very important to the company. Participants in low-involvement conditions were told that they were part of a large-scale study involving many consumers and that their individual input would be averaged in the final analysis.

Participants were instructed to browse the site for as long as they wanted. Next, they were asked to write down the thoughts that came across their mind while browsing the site. This is a standard procedure for assessing cognitive responses

**TABLE 1**
**Interactivity Experimental Manipulation**

| Feature | Low interactivity | High interactivity | Reference |
|---|---|---|---|
| 1. Product catalog | A linear product catalog, where users need to go back to a main product list page to jump to another product | A nonlinear product catalog, where users can easily jump from one product to the other | Bezjian-Avery, Calder, and Iacobucci 1998; Gonzalez and Kasper 1997; Sicilia, Ruiz, and Munuera 2005 |
| 2. Product choice | Static product comparison chart | Personalized product choice helper | Ghose and Dou 1998 |
| 3. FAQ | A linear FAQ structure, where users go through a whole list of questions and answers and cannot easily jump from one question to another | A nonlinear FAQ structure, where users can easily jump from one question to another | Ghose and Dou 1998; Gonzalez and Kasper 1997; Sicilia, Ruiz, and Munuera 2005; Sundar, Kalyanaraman, and Brown 2003 |
| 4. Contact | E-mail and phone number | An on-line contact form | Ghose and Dou 1998 |
| 5. Special announcement | Pop-up ad on entry page | Banner ad on entry page | Edwards, Li, and Lee 2002 |
| 6. Navigation guide | Static site map | Site search | Ballantine 2005; Ghose and Dou 1998 |
| 7. Fun stuff | List of product category facts | Interactive product category IQ test | Haseman, Nuipolatoglu, and Ramamurthy 2002; Steuer 1992; Tremayne and Dunwoody 200) |
| 8. Customer stories | List of customer testimonials | Customer stories presented on an on-line bulletin board | Ballantine 2005; Ghose and Dou 1998 |

*Note:* FAQ = frequently asked questions.

in ELM research (e.g., Meyers-Levy and Peracchio 1995; Petty, Cacioppo, and Schumann 1983). Following thought elicitation, participants filled out a questionnaire containing attitude, experience, and perceived interactivity measures as described next. The entire process took approximately 30 to 45 minutes.

## Measures

### *Consumer Attitudes*

Consumer attitude measures adapted from Coyle and Thorson (2001) were used to measure attitude toward the brand ($A_{brand}$) and attitude toward the site ($A_{site}$). Three, seven-point semantic differential scales were used: "The brand (site) is good/The brand (site) is bad"; "My attitude toward the brand (site) is favorable/My attitude toward the brand (site) is unfavorable"; and "I like the brand (site)/I dislike the brand (site)." Participants' ratings on the three items were averaged to form $A_{brand}$ ($\alpha$ = .94) and $A_{site}$ ($\alpha$ = .95).

### *Elaboration*

Participants' thoughts were coded by two independent judges who were blind to the hypotheses and experimental conditions. Each thought was coded as (1) brand-related or site-related; (2) positive, negative, or neutral; and (3) inferential or noninferential. Noninferential thoughts are thoughts that merely state the facts provided on the Web site, whereas inferential thoughts represent more detailed evaluation of the facts (Maheswaran and Sternthal 1990). The initial intercoder agreement was 90%, and differences between the two judges were reconciled through discussion.

### *Internet Experience*

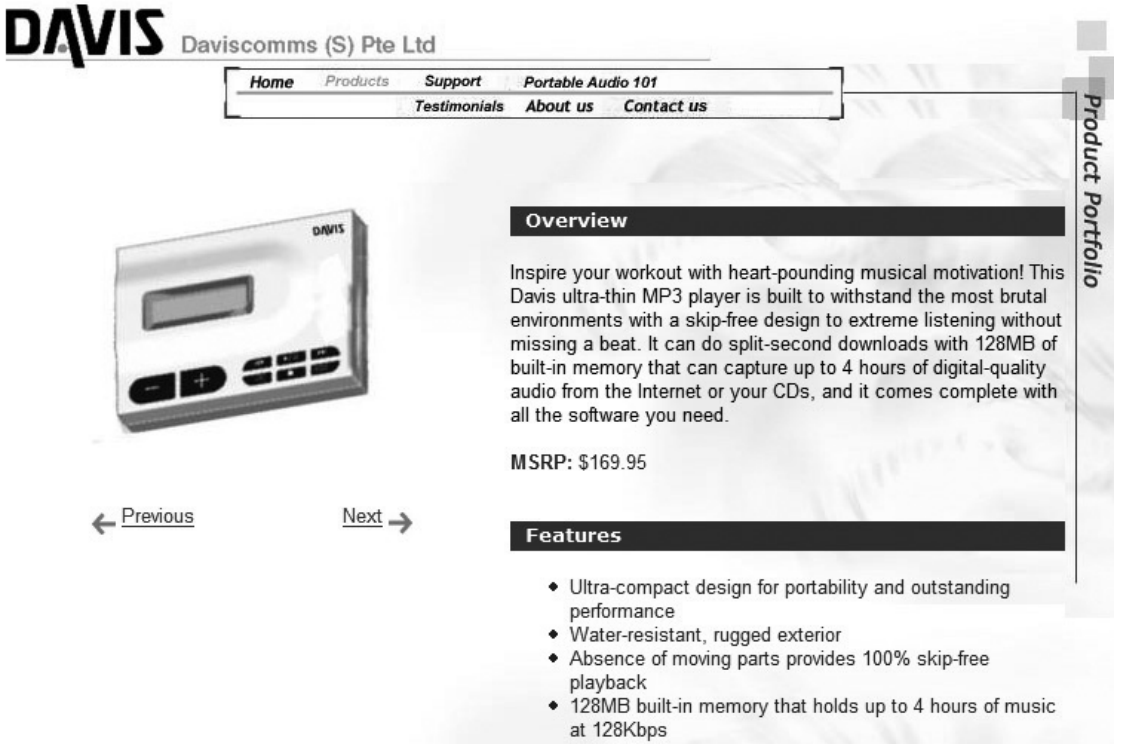
Internet experience was operationalized as the amount of time an individual spends on the Internet each week (e.g., Balabanis and Reynolds 2001; Miyazaki and Fernandez 2001). The participants spent from 1 to 40 hours per week on-line, with an average of 12.17 hours. A median split (*median* = 7.50) was used to create the experienced and inexperienced user groups.

### *Perceived Interactivity*

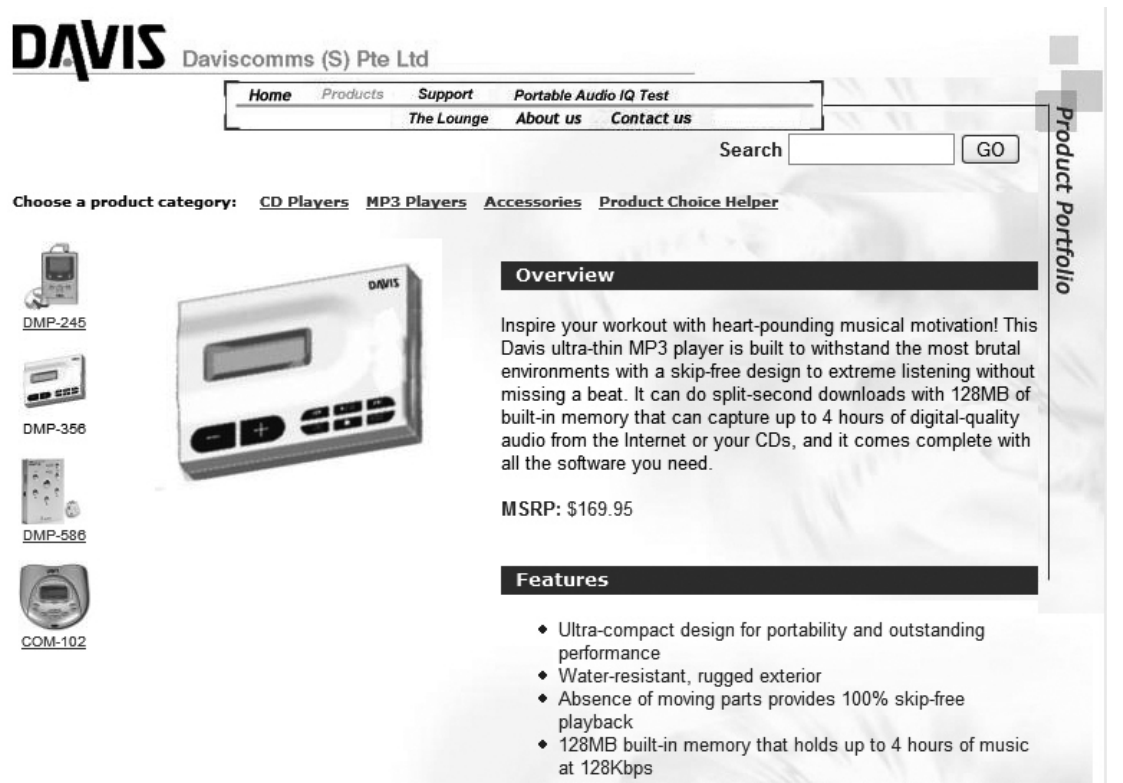
Liu's (2003) perceived interactivity scale was included as a check of the interactivity manipulation. The scale contains 15 items measured on seven-point scales anchored by "strongly disagree" and "strongly agree." Participants' responses to the items were highly correlated ($\alpha$ = .84), and thus were averaged to form a perceived interactivity rating.

**FIGURE 2**
**Experimental Web Sites Screenshot**

**(a) Less Interactive Version**




**(b) More Interactive Version**



*Involvement*

To check the task involvement manipulation, participants' involvement with the site was measured by the revised Personal Involvement Inventory (Zaichkowsky 1994). For this study, the scale items were modified to reflect involvement with a Web site. The 10 items were averaged to form an overall involvement score ($\alpha$ = .89). Individual clickstream data were also collected to determine whether the involvement manipulation influenced Web site usage. A product involvement measure was included in the initial questionnaire to control for individual differences in enduring involvement with the portable audio product category. The 16-item Consumer Involvement Profiles Scale (Laurent and Kapferer 1985) was used. A product involvement index was obtained for each participant by averaging their responses to the 16 items ($\alpha$ = .75).

## RESULTS AND DISCUSSION

### Manipulation Checks

To examine the effectiveness of the interactivity manipulation, an analysis of variance (ANOVA) was conducted with perceived interactivity as the dependent variable and interactivity, involvement, and experience as the independent variables. Results revealed only a significant main effect of interactivity, $F(1, 72) = 11.23$, $p < .01$. The high-interactivity Web site received significantly higher interactivity ratings ($M = 5.09$) than did the low-interactivity Web site ($M = 4.58$), suggesting that the interactivity manipulation was successful.

A similar ANOVA with site involvement as the dependent variable and the same set of independent variables was conducted to check the manipulation of task involvement. (Product involvement was included as a covariate in all ANOVAs below unless otherwise noted.) Only a significant main effect of involvement was observed, $F(1, 71) = 4.24$, $p = .04$. Participants in high-involvement conditions reported more involvement with the site ($M = 4.75$) than did participants in low-involvement conditions ($M = 4.15$).[1] No other effect was significant. More directly, the usage data also supported the validity of the involvement manipulation. Participants in high-involvement conditions used significantly more interactive features ($M = 2.05$) than did participants in low-involvement conditions, $M = 1.06$, $t(34) = 2.62$, $p < .02$,[2] and they also perused more product pages, 4.85 versus 2.69, $t(77) = 3.71$, $p < .01$. These results suggest that more-involved participants were going through more dominantly central processing and focusing on product-related information, whereas those less involved were using comparatively fewer features and utilizing the Web site less, consistent with a more peripheral processing route.

### Tests of Hypotheses: Attitudes

*Brand Attitudes*

The model we have proposed suggests a three-way interaction among interactivity, Internet experience, and involvement. Under high-involvement conditions, there should be a significant two-way interaction between interactivity and Internet experience. Relative to lower levels of interactivity, higher levels of interactivity should produce more positive brand and Web site attitudes for experienced Internet users, but less positive brand and Web site attitudes for inexperienced users (H1). When involvement is low, however, no such two-way interaction should be observed. Instead, higher levels of interactivity should produce more positive brand and Web site attitudes than lower levels of interactivity, regardless of consumers' Internet experience (H2).

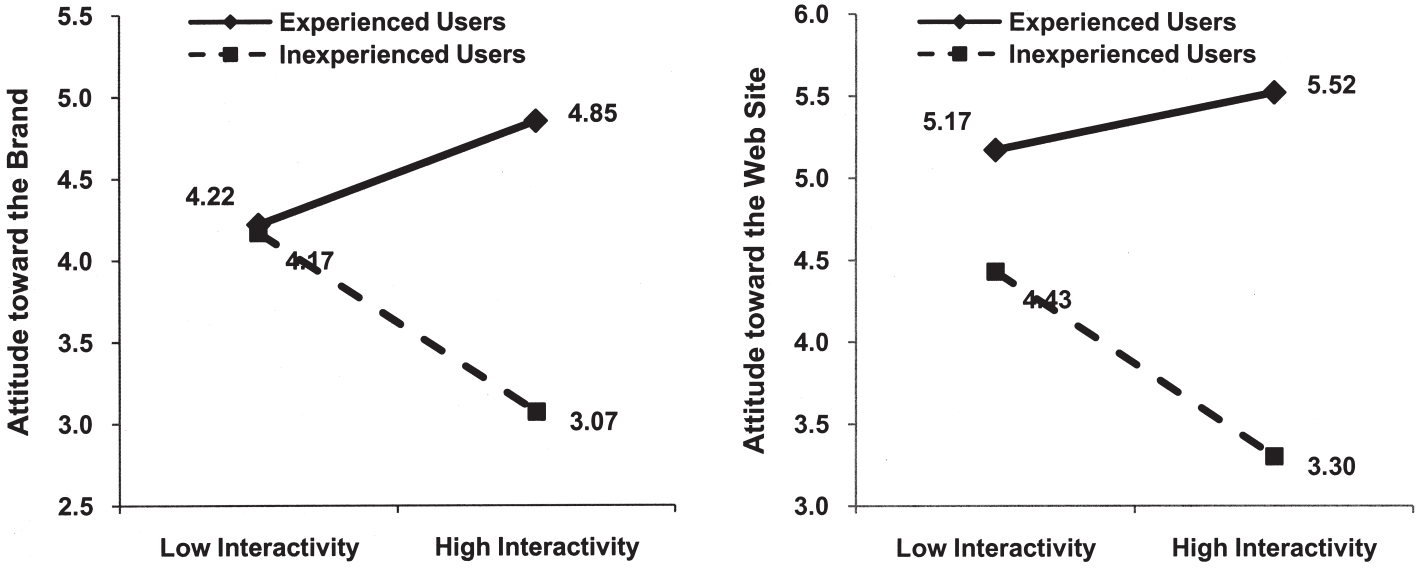
To test these propositions, we conducted an ANOVA with interactivity, task involvement, and Internet experience as the independent variables and $A_{brand}$ as the dependent variable. Consistent with predictions, a significant three-way interaction was observed for $A_{brand}$, $F(1, 71) = 4.98$, $p < .05$. To decompose this interaction, separate two-way ANOVAs were conducted for the high-involvement and low-involvement groups. As can be seen in the left panel of Figure 3a, for the high-involvement group, a two-way interaction between interactivity and user experience was observed, $F(1, 35) = 6.25$, $p < .05$, confirming H1. Planned comparisons indicate that for experienced users, the high-interactivity Web site produced more positive brand attitudes ($M = 4.85$) than did the low-interactivity Web site, $M = 4.22$, $t(15) = 2.23$, $p < .05$. However, the opposite pattern was observed for inexperienced users: the high-interactivity Web site produced significantly less positive brand attitudes ($M = 3.07$) than did the low-interactivity Web site, $M = 4.17$; $t(21) = 2.75$, $p < .05$. The main effect of experience was significant, $F(1, 35) = 4.05$, $p = .05$, but the main effect of interactivity was not ($F < 1$).

In contrast, for the low-involvement group, there was no interaction between interactivity and user experience ($F < 1$), and only the expected main effect of interactivity was observed, $F(1, 35) = 4.39$, $p < .05$. As the left panel of Figure 3b shows, inexperienced Internet users reported more positive brand attitudes in high-interactivity conditions ($M = 4.55$) than in low-interactivity conditions, $M = 3.06$; $t(15) = 3.46$, $p < .01$. A similar pattern was found for experienced Internet users, who also reported more positive brand attitudes in high-interactivity conditions ($M = 4.08$) than in low-interactivity conditions, $M = 3.11$, $t(21) = 3.11$, $p < .01$. This pattern of results supports H2.

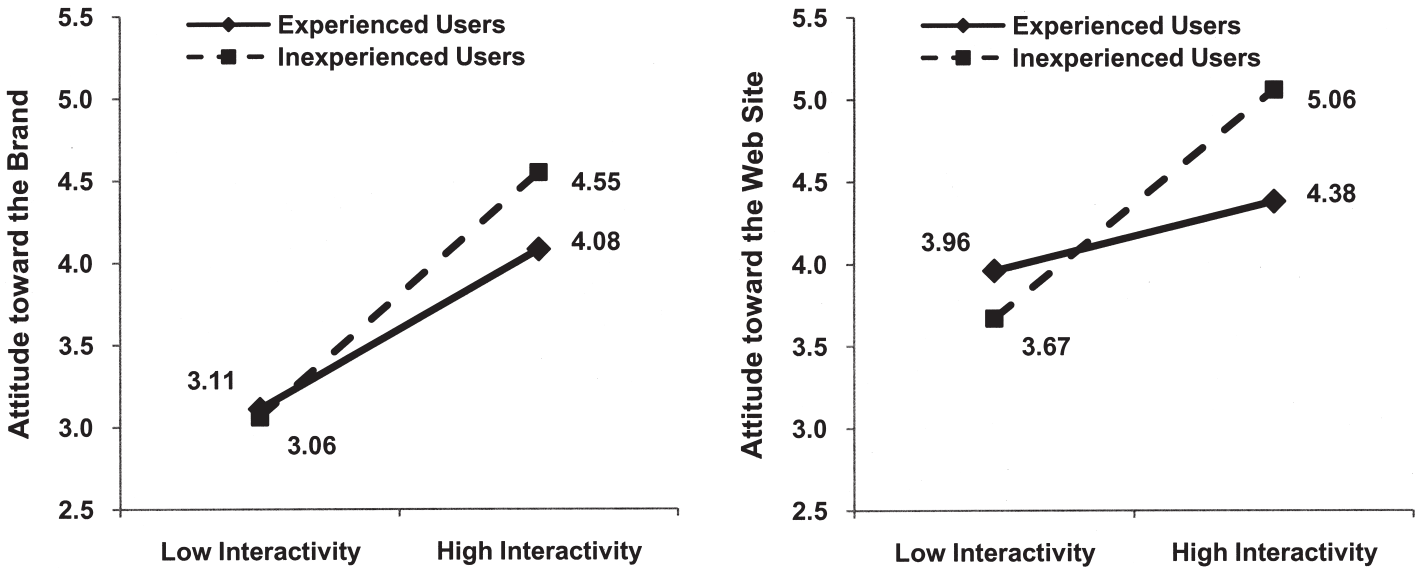
There was also a two-way interaction between involvement and interactivity, $F(1, 71) = 4.04$, $p < .05$. As can be seen in Figure 3, summing across experience levels, there was no effect

FIGURE 3
Interactivity Effects on $A_{brand}$ and $A_{site}$ for High-/Low-Experience Users

(a) High-Involvement Condition




(b) Low-Involvement Condition




of interactivity on brand attitudes in high-involvement conditions ($t < 1$), but there was a positive effect in low-involvement conditions, $t(38) = 2.46$, $p < .05$.

*Web Site Attitudes*

A similar set of findings emerged when the ANOVA was conducted with $A_{site}$ as the dependent variable, which also produced a significant three-way interaction, $F(1, 71) = 4.58$, $p < .05$. Under high-involvement conditions, the two-way interaction between interactivity and user experience was significant, $F(1, 35) = 4.55$, $p < .05$, as shown in the right panel of Figure 3a. For experienced Internet users, the high-interactivity Web site produced more positive Web site attitudes ($M = 5.52$) than did the low-interactivity Web site ($M = 5.17$). However, this difference was not statistically significant, $t(15) = .82$, $p > .40$. For inexperienced users, just the opposite pattern was observed. Web site attitudes were less positive for the high-interactivity Web site ($M = 3.30$) than for the low-interactivity Web site, $M = 4.43$, $t(21) = 2.04$, $p = .05$.

The main effect of experience was significant, $F(1, 35) = 4.05$, $p = .05$, but the main effect of interactivity was not ($F < 1$). Under low-involvement conditions, as predicted, no such two-way interaction emerged ($F < 1$), and only a significant main effect of interactivity was observed, $F(1, 35) = 4.23$, $p < .05$. As the right panel of Figure 3b shows, the high-interactivity Web site produced more positive attitudes than did the low-interactivity Web site for both inexperienced users, $M = 5.06$ versus 3.67, $t(15) = 2.38$, $p < .05$, and experienced users, $M = 4.38$ versus 3.96, $t(21) = 1.98$, $p = .06$.

There was also a two-way interaction between involvement and interactivity, $F(1, 71) = 4.96$, $p < .05$. As can be seen in Figure 3, summing across experience levels, there was no effect of interactivity on Web site attitudes in high-involvement conditions, $t(38) = 1.21$, $p = .24$, but a positive effect in low-involvement conditions, $t(38) = 2.31$, $p < .05$.

### Tests of Hypotheses: Elaboration

In explaining the underlying processes of interactivity effects, the current model suggests that the differential effects of interactivity on attitudes at different involvement levels result from actual utilization and processing of interactive features and information under high-involvement conditions, compared to a mere presence (peripheral cue) effect under low-involvement conditions. If this is indeed the case, it should be reflected in the cognitive responses (elaborations) that users produce. To test this proposition, we conducted the same three-way ANOVAs on the elaborations as we did for the brand and Web site attitudes.

#### *Inferential Thoughts*

ANOVAs on the number and percentage of inferential thoughts (which provide a measure of elaboration depth) were conducted. The three-way interaction was significant for both the number, $F(1, 71) = 4.20$, $p < .05$, and proportion, $F(1, 71) = 4.19$, $p < .05$, of inferential thoughts. The results can be seen in Figure 4. In decomposing the three-way interaction, in high-involvement conditions, the expected interaction between interactivity and experience emerged for both the number, $F(1, 35) = 2.83$, $p = .10$, and proportion of inferential thoughts, $F(1, 35) = 4.77$, $p < .05$, although the former only approached significance. There was also a main effect of interactivity on the number of inferential thoughts, $F(1, 35) = 3.75$, $p = .06$. As shown in Figure 4a, for experienced users, the high-interactivity Web site produced more inferential thoughts ($M = 3.40$) than did the low-interactivity Web site, $M = 1.45$, $t(15) = 2.66$, $p < .05$, and the same pattern held for the percentage of inferential thoughts, $M = 60\%$ versus $43\%$, $t(15) = 2.73$, $p < .05$. For inexperienced users, the number of inferential thoughts did not differ in high- versus low-interactivity conditions, $M = 2.38$ versus 1.98, respectively, $t(21) = .72$, $p > .40$. However, the high-interactivity Web site produced a lower proportion of inferential thoughts than the low-interactivity Web site, $M = 45\%$ versus $55\%$, respectively, $t(21) = 2.14$, $p < .05$.

For low-involvement conditions, there was no interaction between interactivity and user experience, nor were there any main effects for either number or percentage of inferential thoughts ($F < 1$ in all cases; see Figure 4b). This overall pattern of results on elaborations is largely consistent with the pattern observed for brand and Web site attitudes. The expected two-way interaction between interactivity and user experience was noted for high-involvement conditions, but the interaction was eliminated under low-involvement conditions. Low-involvement conditions produced fewer inferential thoughts than did high-involvement conditions in general, and interactivity appears to have little if any effect on depth of elaboration, consistent with the notion that low-involvement participants engage in very little message-related processing.

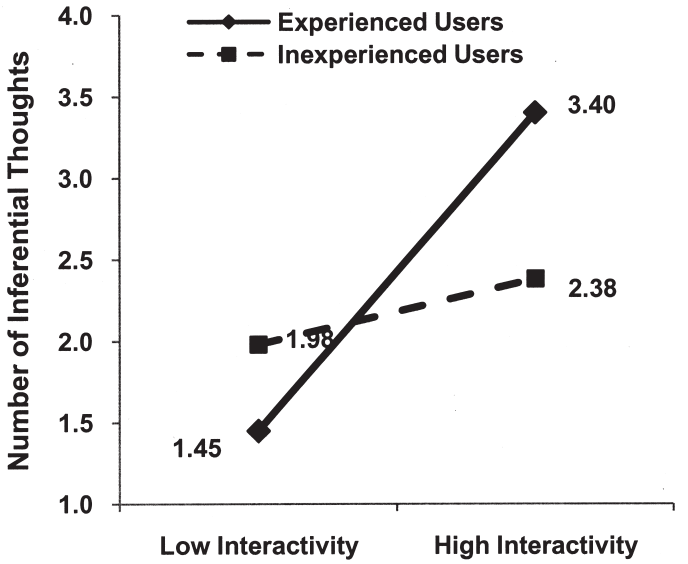
#### *Brand Thoughts*

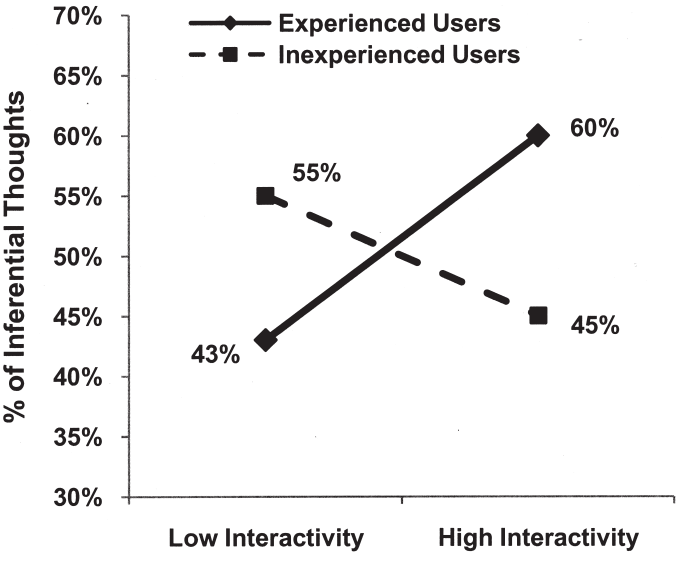
We examined three types of brand thoughts (which provide a measure of thought focus or dominance): number of brand thoughts, percentage of brand thoughts, and brand-thought valence, which was operationalized as the number of positive brand thoughts minus the number of negative brand thoughts. The same set of ANOVAs conducted for inferential thoughts were run for brand thoughts. These analyses showed a significant three-way interaction for the number, $F(1, 71) = 5.41$, $p < .05$, and proportion, $F(1, 71) = 5.51$, $p < .05$, of brand thoughts. The results can be seen in Figure 5. In decomposing the three-way interaction, in high-involvement conditions there was a significant interaction between interactivity and user experience for the number, $F(1, 35) = 3.76$, $p = .06$, and percentage, $F(1, 35) = 4.78$, $p < .05$, of brand thoughts. As shown in Figure 5a, for experienced users, the high-interactivity Web site produced more brand-related thoughts ($M = 1.86$) than did the low-interactivity Web site, $M = 1.12$; $t(15) = 2.03$, $p = .06$, and the same was true for the proportion of brand-related thoughts, $M = 55\%$ and $33\%$, respectively, $t(15) = 2.07$, $p = .05$. The opposite pattern was observed for inexperienced users. The high-interactivity Web site produced fewer brand thoughts ($M = 1.05$) than did the low-interactivity Web site, $M = 1.49$, $t(21) = 1.88$, $p < .08$, and the same was true for the proportion of brand thoughts, $M = 31\%$ versus $44\%$, respectively, $t(21) = 2.23$, $p < .05$.

For low-involvement conditions, there was no interaction between interactivity and user experience, nor were there any main effects for any of the brand-thought measures ($F < 1$ in all cases). Again, these brand thought results are very consistent with the pattern observed for brand and Web site attitudes.

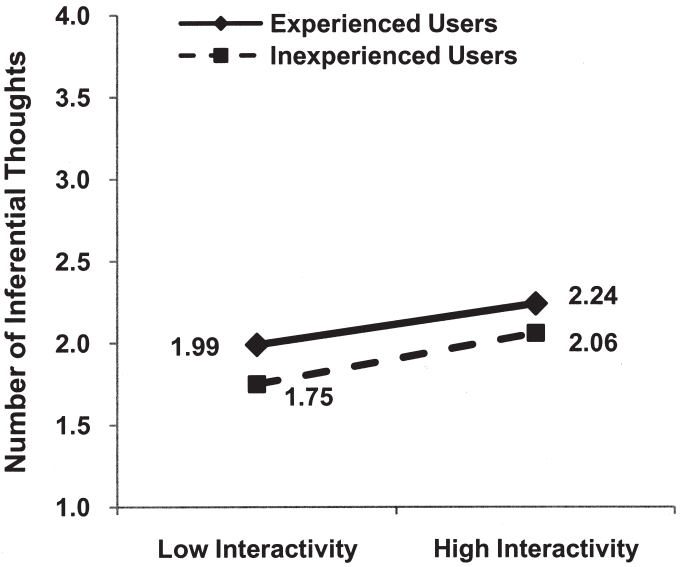
FIGURE 4
Interactivity Effects on Depth of Elaboration

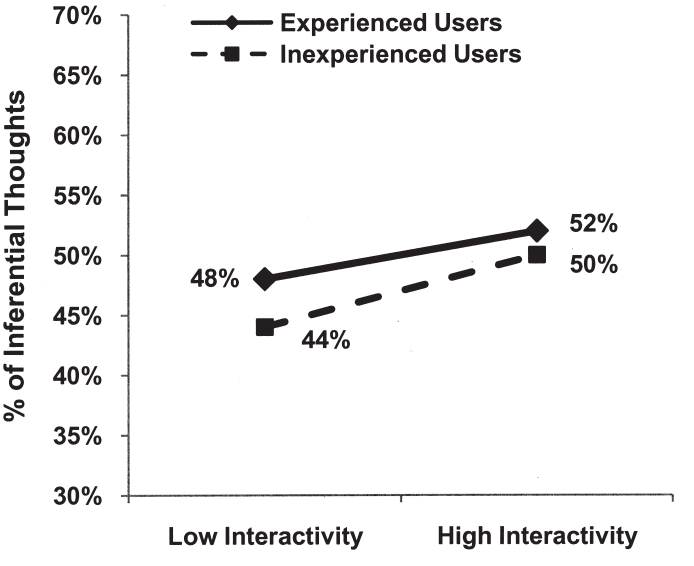
(a) High-Involvement Condition




(b) Low-Involvement Condition



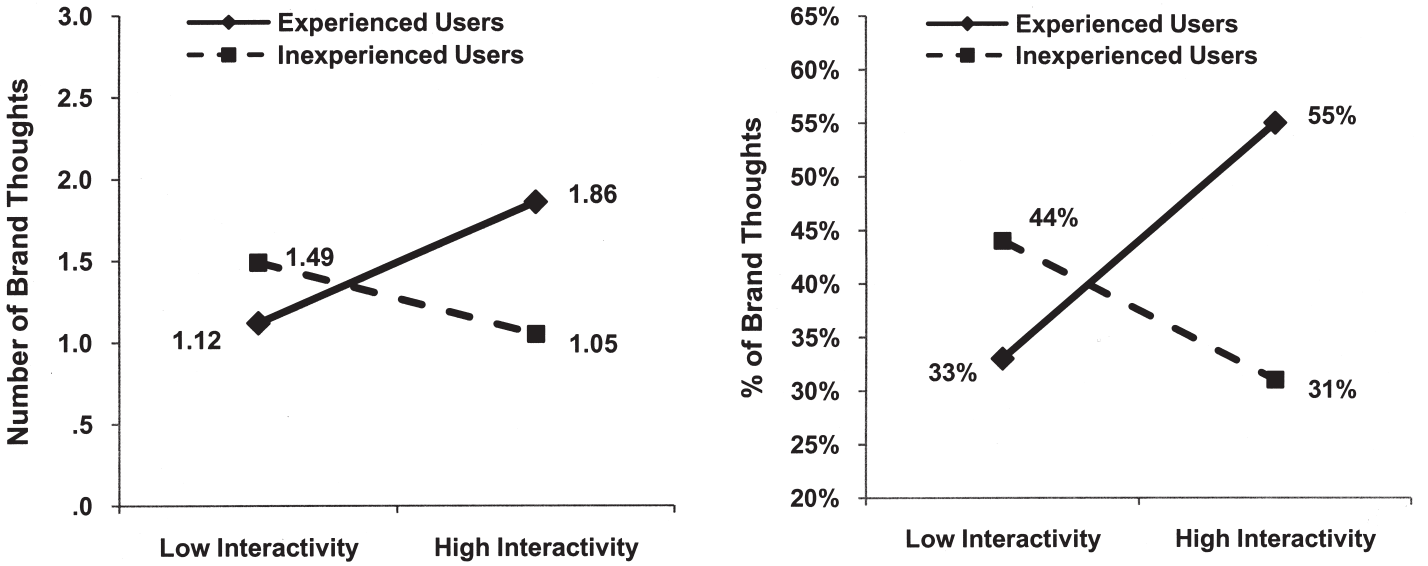




High-involvement conditions resulted in the expected two-way interaction between interactivity and user experience, but the interaction was eliminated under low-involvement conditions. Low-involvement conditions produced fewer brand-related thoughts than did high-involvement conditions in general. Moreover, interactivity appeared to have little if any effect on brand-focused elaboration, again supporting the notion that low-involvement participants engaged in very little brand-related processing and that interactivity affected $A_{brand}$ independently of brand-related thoughts in such conditions.

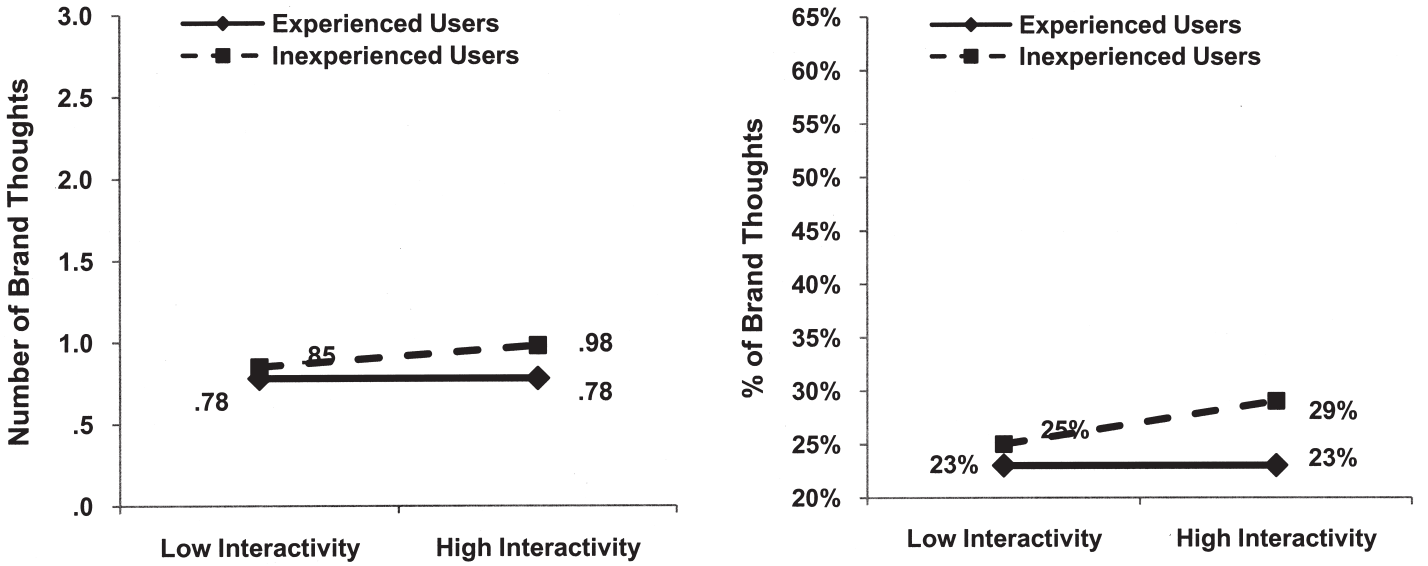
The same pattern of results noted for number and percentage of brand thoughts was found for the valence of brand thoughts. The three-way interaction was significant, $F(1, 71) = 5.52$, $p < .05$. In high-involvement conditions, the two-way interaction between interactivity and experience was significant, $F(1, 35) = 11.79$, $p < .01$. The valence of brand thoughts was more positive in high- than in low-interactivity conditions, $M = 1.47$ versus $-.38$, respectively, $t(15) = 2.38$, $p < .05$. The opposite pattern was observed for inexperienced users. The valence of brand thoughts was more negative in high- than in the

FIGURE 5
Interactivity Effects on Brand-Related Thought Focus

(a) High-Involvement Condition




(b) Low-Involvement Condition




low-interactivity conditions, $M = -1.11$ versus .29, respectively, $t(15) = 2.38, p < .05$. For low-involvement conditions, however, there was no interaction or main effects ($F < 1$ in all cases).

The overall pattern of results from the thought-listing data is very consistent with our predictions for the attitudes as well as the processes that produced them. In terms of the magnitude and valence of attitudes, the data on brand-thought valence track almost identically to the attitude scores observed for both the brand and the Web site in high-involvement conditions. Thus, it appears that high-involvement participants did generate issue-relevant thoughts, which in turn influenced participants' attitudes, consistent with central processing. For low-involvement participants, however, actual thoughts about the brand did not differ as a function of either experience or interactivity level, consistent with peripheral processing. In addition, number and proportion of brand thoughts, number and proportion of inferential thoughts, number of features used, and number of product Web pages perused were generally less in low-involvement than in high-involvement conditions, again consistent with a peripheral process.

## GENERAL DISCUSSION

### Summary

Research to date on the effects of interactivity on measures of or related to advertising effectiveness has been very mixed. We have proposed and tested a dual-process model of interactivity effects that can potentially account for these inconsistent findings. Drawing from the ELM, the model suggests two ways in which interactivity can play a role during consumers' visits to a Web site. When consumers are highly involved, higher interactivity elicits more extensive elaboration. This enhanced elaboration can have a facilitating or inhibiting effect on persuasion, however. On the one hand, interactivity and enhanced elaboration can facilitate persuasion by providing users with more control over issue-relevant information. On the other hand, interactivity and enhanced elaboration may require more cognitive resources and actually make it more difficult to control navigation and process issue-relevant information. Because experienced users can minimize the inhibiting role and benefit more from the facilitating role, a high-interactivity Web site is more effective than a low-interactivity Web site. For inexperienced Internet users, the inhibiting role of interactivity dominates, resulting in less positive attitudes in high-interactivity than in low-interactivity conditions. In contrast, when involvement is low, consumers are not motivated to engage in extensive interaction even when interactivity is high. In such cases, the mere presence of interactive features in a Web site may serve as a peripheral cue that directly affects consumer attitudes. Because no extensive effort is invested in using the interactive features, inexperienced Internet users are no longer at a disadvantage compared to experienced Internet users. Consequently, a high-interactivity Web site is more persuasive than a low-interactivity Web site for both types of consumers.

In sum, the central tenet of the proposed model is that interactivity can affect the effectiveness of persuasion through distinct processes, either by serving as a peripheral cue through its mere presence in a Web site or by directly interacting with central processing (through the facilitating and/or inhibiting effects and through interactivity serving as a central argument itself). It is important to note that although the model presents two types of processes, we do not suggest that it needs to be one way or the other. As the mode of processing often varies along a continuum, in a given interaction, a mixture of processes can occur, and our model thus defines the two anchor points of the continuum.

The dual-process model of interactivity effects can provide useful insight into advertising practice. For example, in designing its Web site, an advertiser needs to keep in mind the involvement and experience level of potential visitors and the corresponding route through which interactivity affects their evaluations of the company and its products. When site visitors' involvement level is likely to be low, providing more "bells and whistles" can impress and better persuade consumers and enhance their attitudes toward the brand. In contrast, when the products are high-involvement and information-intensive, the right level of interactivity needs to be offered so that its facilitating effect is realized without interfering with a stronger need to process rich product information. This appropriate level varies across consumers depending on their ability to navigate the Web site or to process central product information. Overall, these diverse ways in which interactivity operates suggest the value of a customized Web site based on consumers' self-selection of their needs and goals. When a Web site has to constantly deal with a mixture of vastly different visitors, parallel versions of the same Web site combined with self-selection may be more desirable to accommodate different user needs (Hanson and Kalyanam 2007). In making these different versions of the Web site, designers need to consider the various effects of interactivity proposed here to maximize the facilitating role of interactivity for each target user group.

### Extending the Dual-Process Model

Although this study only considers involvement and Internet experience, the current model does not need to be restricted to these moderators. For example, the model can be extended to explain why Sundar et al. (1998) found less politically interested people to be more influenced by the presence of interactivity in a political candidate's Web site than more politically interested people. Because these consumers are less motivated to process extensively, they are more likely to be affected by peripheral cues, including the presence of interactivity. Thus, they may be positively affected by interactivity, as shown in the left panel of Figure 3b (summing over experience). However, for more politically interested consumers who may be more motivated to process extensively, interactivity may have no effect, because the effects of interactivity may be opposite for high- and low-experienced users, and thus cancel each other out (see left panel of Figure 3a). The ELM literature suggests a few other possible factors, such as need for cognition (Cacioppo et al. 1986) and cognitive capacity (Wood 2000), that can affect whether interactivity functions more as a peripheral cue or exerts its influence through central processing. When interactivity is related to central processing, personal and situational variables other than experience can also contribute to the relative balance of its facilitating versus inhibiting effects. For example, when the level of interactivity is too high, the inhibiting role may become dominant, which may explain the ceiling effect and even detrimental persuasive outcomes of interactivity found in previous studies (Coyle and Thorson

2001; Sundar, Kalyanaraman, and Brown 2003). Similarly, as concurrent cognitive load increases, the inhibiting role of interactivity is likely to become more salient while the facilitating effect diminishes. This may explain why the beneficial effect of interactivity has been found to disappear under the high cognitive load conditions (Ariely 2000). By integrating these other variables, the current model can be expanded to encompass a wide variety of interactive situations and account for the conflicting findings in existing studies. This adaptability of the model is especially important in a constantly changing field such as the Internet, where the discriminating power of experience may decrease in the future as consumers spend more time on-line.

### Limitations and Future Research

The current research has several limitations that should be noted. First, although the general predictions of the model, including the underlying processes, were generally supported, it is important to acknowledge that our precision is limited in determining the exact processes that drove the effects we observed. We used the ELM to generate predictions about attitude formation under varying conditions. These conditions included user involvement and experience, which were expected to produce different types of processing (central versus peripheral), as well as different attitudes (positive, negative, or neutral). Given that the ELM is based on an elaboration *continuum,* however, processing is seldom only central or peripheral, but may include mixed processing. Since our involvement manipulations produced mean involvement levels that were still at least moderate for the lower involvement group, and our inexperienced users were less experienced than the experienced users but nevertheless not novices, it is likely that some level of mixed processing was taking place. Thus, we can only claim that certain conditions were more toward the central route or more toward the peripheral route, rather than strictly one or the other. Moreover, as noted in the introduction, peripheral processing may involve attention mainly to peripheral cues (and not arguments), or may involve attention to arguments but simply less of it. Although we cannot say precisely which of these peripheral sorts of processes occurred, it is important to note that both produce the same attitude results, and thus both can explain certain disparate findings in previous research. Future research is needed to tease out these underlying processes.

The proposed dual-process model focuses on interactivity effects based on consumers' motivation to engage in extensive processing, but interactivity itself can also drive the choice of processing mode. Because engaging in interaction can increase elaboration, higher interactivity levels may shift the focus of processing toward a more central route for some consumers (Sundar, Kalyanaraman, and Brown 2003). At the same time, the presence of interactivity as a peripheral cue may become distracting and actually divert consumers' attention away from relevant information. This may be especially the case if the interactive features are not closely tied to central information (Meyers-Levy and Peracchio 1995; Sundar 2004). More research is needed to examine these reciprocal effects of interactivity on the route of processing.

The current model considers the overall level of interactivity without distinguishing among its different implementations. Arguably, different interactive features can aid or impede central processing to different degrees. For example, the personalized product choice helper feature used in the experiment may be more useful and relevant to processing product-related information, whereas the on-line contact feature may be more distantly related to central processing. Furthermore, past research has documented the multidimensional nature of interactivity, out of which the control aspect is likely to be the most cognitively taxing. As a result, interactive features implementing the control dimension of interactivity are more likely to create a hindrance effect when cognitive resources are limited. One can also distinguish interactive features by how much autonomy consumers have in choosing the extent to which they utilize the features. When an interactive feature is forced on consumers (e.g., by requiring user registration on a Web site), it can become incongruent to the amount of effort that low-involvement consumers would like to invest in the interaction process. This can cause interactivity to have a detrimental instead of beneficial effect on consumer attitudes. Future research should consider a wider array of interactivity implementations to identify the effects of different implementation tactics.

Finally, from a methodological perspective, the current study has limited statistical power due to the relatively small sample size. Although the general pattern of results conformed very closely to predictions, some planned paired comparisons only approached significance ($p < .10$). A larger sample size might have produced conventionally significant findings in these cases. That said, the overall pattern of results was very robust.

The dual-process model of interactivity effects proposed here is intended to contribute to a more systematic theory on how interactivity works in the persuasion process. We hope that through such research, our fragmented understanding of interactivity will become integrated into a unifying framework that can account for the different effects of interactivity noted in the literature. Such an integrated framework will greatly enhance our understanding of interactivity as an important characteristic of on-line media.

## NOTES

1. We use the terms *high* and *low* for consistency and ease of reporting. The differences in the two involvement conditions actually reflect only relative differences (e.g., higher, lower).

2. The degrees of freedom for this *t*-test are lower because the comparison of interactive feature usage is only relevant for participants who browsed the high-interactivity Web site.

## REFERENCES


Arens, William F. (2006), *Contemporary Advertising,* New York: McGraw-Hill Irwin.

Ariely, Dan (2000), "Controlling the Information Flow: Effects on Consumers' Decision Making and Preference," *Journal of Consumer Research,* 27 (September), 233–248.

Balabanis, George, and Nina L. Reynolds (2001), "Consumer Attitudes Towards Multi-Channel Retailers' Web Sites: The Role of Involvement, Brand Attitude, Internet Knowledge and Visit Duration," *Journal of Business Strategies,* 18 (2), 105–131.

Ballantine, Paul W. (2005), "Effects of Interactivity and Product Information on Consumer Satisfaction in an Online Retail Setting," *International Journal of Retail and Distribution Management,* 33 (6), 451–471.

Bezjian-Avery, Alexa, Bobby Calder, and Dawn Iacobucci (1998), "New Media Interactive Advertising Vs. Traditional Advertising," *Journal of Advertising Research,* 38 (July/August), 23–32.

Burns, Enid (2006), "Zenithoptimedia Ups Internet Ad Spend Outlook Again," ClickZ Network, available at www.clickz.com/news/article.php/3618951 (accessed July 22, 2006).

Cacioppo, John T., Richard E. Petty, Chuan F. Kao, and Regina Rodriguez (1986), "Central and Peripheral Routes to Persuasion: An Individual Difference Perspective," *Journal of Personality and Social Psychology,* 51 (5), 1032–1043.

Chaiken, Shelly (1980), "Heuristic Versus Systematic Information Processing and the Use of Source Versus Message Cues in Persuasion," *Journal of Personality and Social Psychology,* 39 (5), 752–766.

Cook, Don L., and Eloise Coupey (1998), "Consumer Behavior and Regulatory Issues in Electronic Marketing," *Journal of Business Research,* 41 (3), 231–238.

Coyle, James R., and Esther Thorson (2001), "The Effects of Progressive Levels of Interactivity and Vividness in Web Marketing Sites," *Journal of Advertising,* 30 (Fall), 65–77.

Edwards, Steven M., Hairong Li, and Joo-Hyun Lee (2002), "Forced Exposure and Psychological Reactance: Antecedents and Consequences of the Perceived Intrusiveness of Pop-up Ads," *Journal of Advertising,* 31 (3), 83–95.

eMarketer (2006), "2006 Online Marketing Plans," iMedia Connection, available at www.imediaconnection.com/content/8834.asp (accessed April 22, 2007).

Fortin, David R., and Ruby R. Dholakia (2005), "Interactivity and Vividness Effects on Social Presence and Involvement with a Web-Based Advertisement," *Journal of Business Research,* 58 (3), 387–396.

Ghose, Sanjoy, and Wenyu Dou (1998), "Interactivity Functions and Their Impacts on the Appeal of Internet Presence Sites," *Journal of Advertising Research,* 38 (May/June), 29–43.

Gonzalez, Cleotilde, and George M. Kasper (1997), "Animation in User Interfaces Designed for Decision Support Systems: The Effects of Image Abstraction, Transition, and Interactivity on Decision Quality," *Decision Sciences,* 28 (4), 793–823.

Greenspan, Robyn (2004), "Web Site Spending Picks Up," ClickZ Network, available at www.clickz.com/showPage.html?page=3356871 (accessed April 22, 2007).

Hanson, Ward, and Kirthy Kalyanam (2007), *Internet Marketing and E-Commerce,* Mason, OH: Thomson/South-Western.

Haseman, William D., Vichuda Nuipolatoglu, and K. Ramamurthy (2002), "An Empirical Investigation of the Influences of the Degree of Interactivity on User-Outcomes in a Multimedia Environment," *Information Resources Management Journal,* 15 (2), 31–48.

Laurent, Gilles, and Jean-Noel Kapferer (1985), "Measuring Consumer Involvement Profiles," *Journal of Marketing Research,* 22 (February), 41–53.

Liu, Yuping (2003), "Developing a Scale to Measure the Interactivity of Websites," *Journal of Advertising Research,* 43 (June), 207–216.

———, and L. J. Shrum (2002), "What Is Interactivity and Is It Always Such a Good Thing? Implications of Definition, Person, and Situation for the Influence of Interactivity on Advertising Effectiveness," *Journal of Advertising,* 31 (4), 53–64.

Lohtia, Ritu, Naveen Donthu, and Edmund K. Hershberger (2003), "The Impact of Content and Design Elements on Banner Advertising Click-Through Rates," *Journal of Advertising Research,* 43 (4), 410–418.

Maheswaran, Durairaj, and Brian Sternthal (1990), "The Effects of Knowledge, Motivation, and Type of Message on Ad Processing and Product Judgments," *Journal of Consumer Research,* 17 (June), 66–73.

Meyers-Levy, Joan, and Laura A. Peracchio (1995), "Understanding the Effects of Color: How the Correspondence Between Available and Required Resources Affects Attitudes," *Journal of Consumer Research,* 22 (September), 121–138.

Miniard, Paul W., Sunil Bhatla, Kenneth R. Lord, Peter R. Dickson, and H. Rao Unnava (1991), "Picture-Based Persuasion Processes and the Moderating Role of Involvement," *Journal of Consumer Research,* 18 (June), 92–107.

Miyazaki, Anthony D., and Ana Fernandez (2001), "Consumer Perceptions of Privacy and Security Risks for Online Shopping," *Journal of Consumer Affairs,* 35 (1), 27–44.

Petty, Richard E. (1997), "The Evolution of Theory and Research in Social Psychology: From Single to Multiple Effects and Process Models of Persuasion," in *The Message of Social Psychology: Perspectives on Mind in Society,* Craig McGarty and S. Alexander Haslam, eds., Oxford: Blackwell, 268–290.

———, and John T. Cacioppo (1984), "The Effects of Involvement on Response to Argument Quality and Quantity: Central and Peripheral Routes to Persuasion," *Journal of Personality and Social Psychology,* 46 (1), 69–81.

———, and ——— (1986), *Communication and Persuasion: Central and Peripheral Routes to Attitude Change,* New York: Springer Verlag.

———, and Duane T. Wegener (1999), "The Elaboration Likelihood Model: Current Status and Controversies," in

*Dual-Process Theories in Social Psychology,* Shelly Chaiken and Yaacov Trope, eds., New York: Guilford Press, 41–72.

———, John T. Cacioppo, and David Schumann (1983), "Central and Peripheral Route to Advertising Effectiveness: The Moderating Role of Involvement," *Journal of Consumer Research,* 10 (September), 135–146.

———, Thomas M. Ostrom, and Timothy C. Brock, eds. (1981), *Cognitive Responses in Persuasion,* Hillsdale, NJ: Lawrence Erlbaum.

Raney, Arthur A., Laura M. Arpan, Kartik Pashupati, and Dale A. Brill (2003), "At the Movies, on the Web: An Investigation of the Effects of Entertaining and Interactive Web Content on Site and Brand Evaluation," *Journal of Interactive Marketing,* 17 (4), 38–53.

Shavitt, Sharon, Suzanne Swan, Tina M. Lowrey, and Michaela Wänke (1994), "The Interaction of Endorser Attractiveness and Involvement in Persuasion Depends on the Goal That Guides Message Processing," *Journal of Consumer Psychology,* 3 (2), 137–162.

Sicilia, Maria, Salvador Ruiz, and Jose L. Munuera (2005), "Effects of Interactivity in a Web Site: The Moderating Effects of Need for Cognition," *Journal of Advertising,* 34 (3), 31–45.

Sohn, Dongyoung, Cunhyeong Ci, and Byung-Kwan Lee (2007), "The Moderating Effects of Expectation on the Patterns of the Interactivity–Attitude Relationship," *Journal of Advertising,* 36 (Fall), 109–119.

Staats, Arthur W., and Carolyn K. Staats (1958), "Attitudes Established by Classical Conditioning," *Journal of Abnormal and Social Psychology,* 57 (1), 37–40.

Steuer, Jonathan (1992), "Defining Virtual Reality: Dimensions Determining Telepresence," *Journal of Communication,* 42 (Autumn), 73–93.

Stewart, David W., and Paul A. Pavlou (2002), "From Consumer Response to Active Consumer: Measuring the Effectiveness of Interactive Media," *Journal of the Academy of Marketing Science,* 30 (4), 376–396.

Sundar, S. Shyam (2004), "Theorizing Interactivity's Effects," *Information Society,* 20 (5), 385–389.

———, Sriram Kalyanaraman, and Justin Brown (2003), "Explicating Web Site Interactivity: Impression Formation Effects in Political Campaign Sites," *Communication Research,* 30 (1), 30–59.

———, Kenneth M. Hesser, Sriram Kalyanaraman, and Justin Brown (1998), "The Effect of Website Interactivity on Political Persuasion," paper presented at the Twenty-first General Assembly and Scientific Conference of the International Association for Media and Communication Research, Glasgow, U.K., July.

Tremayne, Mark, and Sharon Dunwoody (2001), "Interactivity, Information Processing, and Learning on the World Wide Web," *Science Communication,* 23 (2), 111–134.

Wood, Wendy (2000), "Attitude Change: Persuasion and Social Influence," *Annual Review of Psychology,* 51, 539–570.

Zaichkowsky, Judith L. (1994), "The Personal Involvement Inventory: Reduction, Revision, and Application to Advertising," *Journal of Advertising,* 23 (December), 59–70.

Zajonc, Robert B. (1968), "Attitudinal Effects of Mere Exposure," *Journal of Personality and Social Psychology,* 9 (1), 1–27.