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CREATING VIRTUAL EXPERIENCES
IN COMPUTER-MEDIATED ENVIRONMENTS*

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KEYWORDS: Internet, interactivity, consumer behavior, telepresence, media, advertising

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Introduction: The Potential for Virtual Experience

Although much excitement has arisen over the potential for “interactivity” on the Web, very little is understood about what exactly creates a sense of interactivity and what impact it has on user behavior. Businesses are spending millions of dollars to add games, animated pictures, and personalization tools to their Web sites, without knowing exactly what effect this has on their customers. Through two experiments, this research investigates the critical components of this computer-mediated interactivity and their role in the creation of virtual product experiences. At the same time, it explores consumers’ interpretations of these experiences and the product-based persuasion that results from them.

Media alternatives vary widely in the quality and quantity of product information they can transmit to consumers in comparison to what is generally considered the consumer’s best source of product information — direct product experience. An oft-repeated proverb summarizes the substantive findings of past research in this area, “Experience is the best teacher”(Anonymous). Given that direct product experience is generally the optimal method for consumers to learn about new products, one of the marketer’s goals should be to strive for verisimilitude in indirect communications with consumers.¹ This research thus focuses on the ability of media to *emulate* experience. The Web, the prototypical digital medium, has the potential to deliver product information in a form such that the receivers may interpret the information more like information obtained from their own direct experience than they do advertising from traditional media sources. This study expands on the stream of research that

¹ An important stream of research has identified conditions under which direct product experience fails us (see Wright and Lynch 1995; Hoch and Deighton 1989). The current research attempts to show that, even under such conditions, a virtual product experience would be superior to traditional one-way advertising communications.

compares advertising and direct experience as alternative communication methods, re-casting these two alternatives as the ends of a spectrum of mediated communications. The technological capabilities of the medium determine where a given medium falls on this spectrum. In essence, the following quotation may better summarize the premise of this research, “Technology is a way of organizing the universe so that man doesn't have to experience it” (Max Frisch).

While today's Web browsers, programming languages, and limited bandwidth do not yet allow widespread use of the cutting-edge elements of what software engineers label “virtual reality,” a sense of “being there” or presence can still be created in computer-mediated environments. Indeed, it has been found that technology need not be very advanced to compromise human perceptions of reality. For example, as Reeves and Nass (1996, pp.8, 11) discovered in a series of experiments on human responses to computers:

Even the simplest of media are close enough to the real people, places, and things they depict to activate rich social and natural responses. Many of our studies generate these responses with rather pathetic representations of real life: simple textual and pictorial material shown in garden-variety technology . . . Mediated life equals real life . . . [There exists] a critical human tendency to confuse what is real with what only *seems* to be real.

In order to describe the perception of the realism of a computer-mediated experience, this research utilizes the construct of telepresence, which can be simply described as a sense of presence in a mediated environment. Steuer (1992, p.75) explained, “Presence refers to the *natural* perception of an environment and *telepresence* refers to the *mediated* perception of an environment.” Lombard and Snyder-Duch's (2001) definition focuses explicitly on the role of technology in creating telepresence:

Psychological state or subjective perception in which even though part or all of an individual's current experience is generated by and/or filtered through human-made technology, part or all of the individual's perception fails to accurately acknowledge the role of technology in the experience.

The construct has its roots in the field of psychophysics, where research has focused on the impact of telepresence on medical, flight, and other technical simulations (see Schloerb 1995). In the communications field, a number of researchers have explored how telepresence is created through combinations of media capabilities (Kim and Biocca 1997; Sheridan 1992; Steuer 1995). The role of telepresence in consumer response to virtual product experiences in computer-mediated environments has only begun to be explored (Klein 1999; Li et al. 2001a, 2001b).

This research attempts to further our understanding through the exploration of two critical media characteristics that enable telepresence in computer-mediated environments: (1) user control and (2) media richness. The potential for user control is a critical element of interactivity, as will be discussed in detail below. In addition, on the Web, it is controllable by the marketer Web (Ariely 2000). Media richness represents the sensory breadth (number of communication channels) and depth (quality within each channel) of the stimuli (Steuer 1992). As the degree of telepresence increases, the more similar the mediated experience will be to an actual direct product experience. In essence, the experience will seem less mediated. Direct product experiences have been shown to lead to stronger beliefs and attitudes than advertising (Berger and Mitchell 1989; Marks and Kamins 1988; Smith and Swinyard 1988; Wu and Shaffer 1987). Thus, when a state of telepresence is created in a persuasive communication, marketers may expect consumers to develop more intense attitudes and beliefs toward the product and its attributes than they would in a more mediated communication experience, such as that typically engendered by television or print advertisements.²

² Note that this makes no prediction concerning the direction of the attitudes, only the intensity. Telepresence may indeed lead to more negative attitudes and beliefs if the content is interpreted by consumers as negative.

The two main objectives of this research are thus to understand how telepresence is created and how it affects consumer response to computer-mediated communications. The conceptual model of the proposed framework is shown in Figure 1. In the next section, the relevant literature is reviewed and the key constructs are defined. Next, the hypotheses are presented. In the following sections, the two studies are presented and the results discussed. Finally, I conclude with a summary and ideas for future research.

INSERT FIGURE 1 ABOUT HERE

Key Constructs: Literature Review

User Control and Interactivity

This section describes precisely what interactivity is; explores the relationship between user control and interactivity, and; explains why user control is so important in our understanding of consumer responses to different media. As a descriptive characteristic of media, interactivity is not related to technology, despite its growth in popularity as a metaphor for computer-mediated communication. Before the birth of the Web, Blattberg and Deighton (1991) discussed the impact of “addressable” and “interactive” media (which, at that time, included kiosks and interactive television prototypes) on marketers’ relationships with consumers. Most discussions of interactivity since then have revolved around the effect of the new technologies on marketer’s capabilities. That is, we speak about what the new interactive technologies will allow marketers to do with respect to customer acquisition and retention, but we know very little about the specific mechanisms by which interactivity influences an individual consumer’s reactions to marketing communications.

Steuer’s (1992, p.84) definition of interactivity is adopted here: “The extent to which

users can participate in modifying the form and content of a mediated environment in real time” [italics added]. A *mediated communication environment* is an information environment where sender and receiver do not exchange communications directly between each other but through a medium. The phrase *user participation* suggests at least some amount of user input in the modification process. *Modification of the form and content* describe two methods by which users can control a mediated environment. User control has been conceptualized as one key component of interactivity by a number of researchers. Lombard and Snyder-Duch (2001) explain: “Central to the idea of interactivity is the concept of control, either of elements of the physical world or of information.” They propose that interactivity has five critical components: number of inputs acceptable; number and type of characteristics that are modifiable; range of response possible; speed of response; degree of correspondence between input and response. Steuer (1992) construes interactivity as having three components, which he labels: speed, range, and mapping. These correspond to the above-mentioned five components, as the first three of the five can be subsumed under “range.” Here we focus on range, since this is the component where marketers have the most control, while speed and mapping tend to be more a function of the user and receiver technology.

Thus, user control over form and content correspond to the range component of interactivity. Control over content includes control over the amount of information presented and over the actual composition of that information. Control over form includes control over the sequence, organization, pattern and timing of information presentation. Note also that specific Web capabilities, such as customization, can be subsumed under this term of user control, since the essence of both is in the transfer of control to the user.

In a recent experimental study, Ariely (2000) moves away the vague construct of interactivity, focusing instead on the narrower aspects of user control. He also studied some of the same aspects of user control over information flow as this research examines, but focused on the performance effects. Ariely found that control had positive effects due to the importance of “dynamic heterogeneity,” defined as “the changing needs for information during the information acquisition process itself (p.234).” At the same time, control had negative effects due to the additional resources needed to exercise control. This held whether decision performance was measured against others’ preferences through an agent task or against the individual’s own preferences. The studies presented here do not explore decision quality in any normative sense, but focus instead on the *potential for persuasion prior* to decision-making that results from differences in levels of user control.

Media Richness

We will again use Steuer’s (1992, p.75) definition of this media characteristic as:³

Representational richness of a mediated environment as defined by its formal features; that is, the way in which an environment presents information to the senses ... stimulus driven, depending entirely upon technical characteristics of a medium.

The basis for hypothesizing that the richness of a medium will influence user perception of the environment lies in the ability of a media-rich environment to diminish user perception of mediation.

³ Steuer (1992) actually labeled this construct vividness. In this work, the label “media richness” is used instead for two reasons: (1) to use a term that is more descriptive of the phenomenon and (2) to avoid confusion with the different (and unrelated) use of the term “vividness” in marketing (see Kisielius and Sternthal 1986; Pham et al. 2001). This use of richness should also be distinguished from information richness theory (see Daft and Lengel 1984), which categorizes media by their level of richness. However, this conceptualization embodies a number of other elements of media, including feedback and social presence.

Media richness embodies two core characteristics of the communication medium: sensory breadth and depth (Steuer 1992). Sensory breadth describes the number of different sensory channels that a medium utilizes (e.g. aural, olfactory, visual). Thus, multimedia communications have greater breadth than single media communications (e.g., television versus radio). The greater the number of sensory channels, the greater is the likelihood of immersion in the mediated environment (Lombard and Ditton 1997). In the real world, we use all five senses in our experiences. The verisimilitude of a mediated representation will thus be related to the number of our sensory channels that can be engaged.⁴ Depth refers to the resolution or quality of the information transmitted to the senses. A good example is the range of monitor resolutions currently available. A 17" computer monitor with 800 x 600 resolution has greater depth than a 17" monitor with only 600 x 400 resolution. In discussing high-definition television, Reeves, Detenber and Steuer (1995, p.2) explained:

The reason that realistic pictures and sound may be processed as natural experience is that our bodies cannot afford to mistakenly dismiss a picture as inconsequential, even if nothing will jump from the screen.

Together, these two characteristics — breadth and depth — can be envisioned as the *enablers* for the transmission of more realistic messages. This research focuses primarily on the breadth aspect of media richness, holding sensory quality constant.

Attitude Formation via Alternative Media

In a seminal article on attitudes, Fazio and Zanna (1981) argued that the method of acquiring information is a moderator in the attitude-behavior link. In a series of experiments, Fazio and Zanna (1981, 1987) showed that beliefs, and the resulting attitudes, formed from direct

⁴ The use of multiple channels within one sense would, however, present the possibility of sensory overload and would be expected, at some point, to impede information processing and thus have a negative effect on the user experience.

product experience are different in a number of important ways; they will be stronger, more clearly formed, more persistent, more confidently held, more accessible, more stable, and exhibit higher attitude-behavior consistency.⁵ Table 1 contains a summary of the most relevant studies comparing the primary effects of advertising and direct product experience on attitudes. In general, across all measures, it has been found that advertising is an inferior communication method to direct product experience.⁶ The only exception to this generalization was the research by Wright and Lynch (1995) who found that advertising was actually a superior communication vehicle than direct experience for *search* attributes, but inferior for experience attributes.

 INSERT TABLE 1 ABOUT HERE

In sum, this research consistently shows that direct product experience engenders stronger beliefs and attitudes overall than advertising. Thus, experiences which “mimic” real product experiences would be likely to engender the same effects. The next sections discuss how such virtual experiences are created and assessed.

Telepresence

Very little research was found that explored telepresence in a product learning environment in a rigorous manner. Kim and Biocca (1997), who studied both the determinants and effects of telepresence in the context of a television advertisement for a consumer good.

⁵ The Integrated Information Response model (IIRM) is the underlying model of attitude formation on which these propositions rest. The IIRM is derived from the theory set forth by Anderson (1971). Smith and Swinyard (1982, 1988) applied this theory to deepen our understanding of the process by which consumers weight information from alternative sources. It is important to note that this is a non-valenced approach in that the measures focus on intensity rather than direction of attitudes (Raden 1985).

⁶ Another stream of research has explored the interaction between advertising and experience (Deighton 1994; Hoch and Ha 1986), but these will not be discussed in detail here as we are concerned with isolating single experiences rather than multi-exposure integration.

They manipulated the level of “sensory saturation” by increasing the amount of sensory input from the virtual environment and decreasing the amount of input from the physical one. Kim and Biocca found that telepresence was composed of two factors, which they labeled “arrival” (feeling of being in another environment) and “departure” (feeling of leaving the physical one), based on a factor analysis of an 8-item telepresence scale. This interpretation is suspect because the three items loading on the departure factor were the only three negatively worded items. Research has shown a strong tendency for negatively worded items to load separately, to the detriment of the unidimensionality of the scale (Herche and Engelland 1996), an issue that will be explored further below. The authors also found that neither of the sensory manipulations influenced departure or arrival, suggesting that the differences in the media factors were insufficient to create differences in telepresence. Overall, the study offered few conclusive results with regard the impact on memory and persuasion. Kim and Biocca (1997, p.11) explained the failure of the results in the television environment:

Telepresence in the context of non-interactive television viewing can make a viewer only a spectator who is present in the mediated environment . . .So ‘being there’ as a spectator is not the same as ‘being there’ as an actor.

This suggests that the transfer of control to the user — enabling him to become an actor — is a necessary condition for the creation of a sense of telepresence.

Li et al. (2001a, 200b) have explored the impact of two-dimensional versus three-dimensional representations on the creation of virtual product experiences. They manipulate sensory immersion by varying the size of the screen and the dimensionality of the product (2D versus 3D). They found that sensory immersion had a positive impact on telepresence and on brand attitude, self-reported product knowledge and on purchase intention. However, their manipulation of sensory immersion is confounded with differences in interactivity, as subjects in the 3-D environment were able to manipulate (rotate, zoom, and move) the image on the screen.

As such, we still cannot isolate the effects of variations in media richness from the effects of user control.

Novak et al. (2000) studied telepresence through a large-scale survey asking individuals to retrospectively evaluate their experiences on the web in order to investigate the antecedents and consequences of flow.⁷ Using structural equation modeling, the authors identified both telepresence and perceived control as antecedents to flow. However, they did not find the relationship between the two constructs to be significant in their model.

While telepresence is most often measured as a continuous variable, it is important to recognize that there may be some minimum level necessary for telepresence to have a significant effect on consumer response. For example, while television is a rich media environment, it offers little control to consumers and thus the level of telepresence induced in a product advertisement may not be high enough to enable what we would consider a virtual product experience. Kim and Biocca's (1997) findings also support the idea that *both* media richness and user control are necessary to create a sense of experience illusion of direct product experience – strong enough to influence consumer attitudes towards a product.

Hypotheses

Creating Telepresence

While researchers in psychophysics have measured telepresence with various physiological responses such as task performance (Schloerb 1995), reflexive responses (Sheridan 1992), and discriminant ability (Sheridan 1996), researchers in the communications field have

⁷ Hoffman and Novak (1996, p.50) define flow as "the state occurring during network navigation which is: 1) characterized by a seamless sequence of responses facilitated by machine interactivity, 2) intrinsically enjoyable, 3) accompanied by a loss of self-consciousness, and 4) self-reinforcing."

relied on multi-item scales to measure reported feelings of telepresence. This research uses a variation of the 7-item scale employed by Kim and Biocca (1997) and Novak et al. (2000).

As discussed above, earlier research proposes that telepresence is partially driven by the level of “sensory immersion” in the mediated environment (Kim and Biocca 1997). The greater the level of sensory input coming from the mediated environment, the more likely it is that the user will forget the intervention of the medium and perceive the experience as less mediated.

H1: As the level of media richness in a computer-mediated environment increases, the level of telepresence experienced will increase.

As discussed above, user control is recognized as a critical element of interactivity. At the same time, control is a critical aspect of direct product experience; we choose how to interact with the product. Thus, in a mediated experience, the greater the level of control we have, the more we feel the experience is unmediated.

H2: As the level of user control in a computer-mediated environment increases, the level of telepresence experienced will increase.

These first two hypotheses are derived directly from Steuer’s (1992) experiments. In addition, it is likely that if either media richness or user control is low, the level of telepresence experienced will be somewhat diminished from the full potential. While viewing an IMAX movie is very high in richness, we may simply feel like observers. At the same time, while the earliest computer text input games allowed a high degree of control, the lack of sensory stimulation, made this more of an intellectual than sensory immersion. In our direct experience with products, both media richness and user control are at their highest natural levels. Thus, when a mediated environment offers both of these characteristics simultaneously, we would expect that the impact on telepresence would be much greater than an additive effect of having both high richness and high control, suggesting an interaction effect between user control and media richness.

H3: The sense of telepresence created under conditions of both *high user control* and *high media richness* is greater than the sense of telepresence under any conditions with low user control *or* low media richness.

Effects of Telepresence

The predicted effects of telepresence on product beliefs and attitudes are derived directly from the predicted effects of direct product experience *relative* to advertising. The higher the level of telepresence, the more real the experience of the virtual environment will seem. The more real the experience, the higher the intensity of the attitudes and beliefs that will result from the experience. As the level of telepresence increases, the more closely the response will mimic the response of an unmediated (direct product) experience.

H4: As the level of telepresence experienced in a computer-mediated environment increases, beliefs about product attributes communicated via advertising will be more strongly held.

H5: As the level of telepresence experienced in a computer-mediated environment increases, the intensity of attitudes towards the advertised products will increase.

Mediation

It is intuitive that telepresence is not an actual cause of increased belief and attitude strength but the *means by which* changes in the media characteristics influence consumer response. Earlier research has provided little insight into how changes in media characteristics or differences among media affect consumer response. Here, we explore the process through which these effects occur.

H6. In a computer-mediated environment, telepresence will mediate the relationship between user control and media richness and: (a) belief strength about product attributes and (b) attitude intensity toward the product.

In the next section, we discuss the study design and procedures for Studies 1 and 2.

Study 1

Product Selection

Wine was selected as the product category for Study 1 primarily because of the importance of experience attributes for the category (see Nelson 1981). That is, wine is comprised of critical experience attributes that could not be completely digitized – smell, feel and taste (Lal and Sarvary 1999). The rationale was that, if we could create virtual experiences for this type of product, then creating virtual experiences for products dominated by search attributes or digitizable experience attributes would be easier because those attributes could be easily communicated through a visual and aural medium. In order to avoid confronting preconceived product attitudes, an unfamiliar brand was selected.

Attribute Generation

Product attributes were first generated from wine periodicals and academic literature on the topic. For example, Solomon (1996) derived a standardized vocabulary for describing wine in his study of the cognitive organization and vocabulary of wine experts. This attribute list was then pared down through four in-depth tastings with small groups of participants. The participants, graduate students at a large northeastern university, were invited to a wine tasting, where each was instructed to write down the attributes she would use in choosing among wines in general, as well as specific descriptions of the wine tasted. Following the individual response period, participants were asked to discuss their responses with the group. This provided elaboration of the written descriptions and highlighted differences among individuals based on expertise. These studies yielded a list of general attributes, from which 12 specific attribute qualities of the selected wine (e.g. woody aroma, cabernet sauvignon grape), balanced equally

among search and experience attributes, were ultimately selected to incorporate into the advertisement (see Figure 2).

INSERT FIGURE 2 ABOUT HERE

Stimuli

The advertising stimuli were designed using Macromedia's Authorware[®] 3.0 and 4.0. In creating the four different versions (2 media richness x 2 user control) of the stimuli, one of the main goals was to transmit the same core product attribute information across all versions of the stimuli. Pre-testing was conducted with graduate students to ensure informational equivalence across conditions.

The wine selected was Caliterra Cabernet, a little-known Chilean wine that is produced as part of a joint venture by Mondavi and the Chadwick family of Chile, but was not yet widely distributed or advertised in the Northeast at the time of the study. The stimuli were created using advertising and promotional materials provided by Mondavi. The product information in the stimuli was divided into five topical categories (Taste, Aroma, Vineyard, Region, and Reviews), which contained information on the 12 product attributes.

Procedure

Participants were given an introductory sheet explaining that the purpose of the study was to evaluate Internet advertising. In order to disguise the specific nature of the research, the participants were told that this product category was one of a number under study. The guidelines also provided basic instructions about the task and computer operation. At the start of the exercise, participants entered via a main screen. From this screen, the high control (low control) participants selected (were led to) a category of information (e.g. aroma) which they

viewed in its entirety. Each category contained 2-3 screens of information, describing a few of the product attributes. After viewing all of the information, participants then were directed back to this main screen, from which they repeated the process until all categories had been seen. Each participant had to view every screen in the stimuli and no one could return to see any information in previous screens again. Data on response latencies, sequences of movements, and time spent on each screen were collected unobtrusively by the computer.

After viewing the main stimulus, the participants then proceeded to the assessment questions. Their responses were also recorded on the computer. The questions covered the following topics in the order indicated: telepresence measures (Figure 3); open-ended recall measures, belief strength measures; aided recall and recognition measures; attitude intensity measures; manipulation checks, and wine expertise measures.

INSERT FIGURE 3 ABOUT HERE

Design

The study was a 2 (media richness) x 2 (user control) factorial design. Media richness (MR) and user control (UC), were both manipulated between subjects. Each of these operationalizations will be discussed below.

User Control.

Control over form but *not* content was manipulated in order to allow comparison of the conditions. That is, it was essential to keep the content as similar as possible across the conditions in order to compare measures of persuasion. User control was operationalized through the following two manipulations of control over form.

1. Control over sequence. “High user control” (HUC) participants had control over the order in

which they viewed the categories. These participants could view the categories in any order they desired, but were required to see all before exiting. The subjects in the “low user control” (LUC) condition were guided through the topics in a pre-determined order.⁸

2. *Control over timing.* All participants had control over the timing within the exercise; they chose when to proceed to the next page, by pressing a “continue” button. This was essential in order to prevent the secondary effects of time pressure observed in previous studies (Wright 1974). Thus, control over timing was manipulated primarily in terms of perceptions. Participants in the HUC condition were told there were no time constraints. In the LUC condition, participants were given a time limit for the entire exercise and a clock continually showed the time remaining in the lower corner.⁹ However, in order not to create any real time pressure in the LUC condition, this time limit was set to 40 minutes, which was over twice as long as the the maximum amount of time used in pre-tests. Participants were also informed that this was “ample time so [they] should not feel rushed.”

Media Richness.

Media richness was operationalized via the modality of the medium. That is, media breadth was manipulated, while holding depth constant. In the low media richness condition (LMR), participants were exposed to text and still pictures, with no sound. In the high media richness condition (HMR), full-motion video and sound were added. This richness manipulation maps partially to existing media, highlighting the differences between the Web and traditional media, such as television and print. Under the HUC condition, the low richness condition is

⁸ In pre-tests, no order effects were found at all. As such, in the final tests only two alternative orders were used for the LUC participants, which corresponded to the most selected paths by HUC participants. No order effects were found in any of the conditions.

⁹ In order to maintain consistency across conditions, a clock was also shown in the HUC condition, but participants were told its only purpose was to keep track of time spent.

equivalent to the early Web technologies, while the high richness condition is equivalent to the current Web technology. Under the LUC condition, the low richness condition is similar to print (with the constraint of reading the pages in the order given), while the high richness condition is equivalent to television, with the added ability to pause the play.

The audio consisted of voice-overs and music and was entirely consistent with the visual information, but did not provide any additional, factual attribute information in itself. In the low richness condition, identical information was transmitted in text format, rather than through voice-overs. Moreover, all of the voice-over and text information simply reinforced the information displayed visually in order to minimize overload effects (Lang 1995). Lombard and Ditton (1997) also found that the greater the consistency of the message across sensory channels, the greater the likelihood of immersion.

Dependent Variables

In line with previous research comparing the effects of direct product experience and advertising, persuasion is measured in two different ways here: beliefs and attitudes. First, the overall strength (or intensity) of the beliefs in the attribute claims made in the advertising is assessed.¹⁰ Strength of attitudes is assessed with measures of attitude intensity (Raden 1985). A sample of the belief and attitude strength questions, respectively, is shown below:

How strongly do you believe that this wine has an EARTHY aroma?

Not Strongly At All Extremely strongly
 1.....2.....3.....4.....5.....6.....7

Please rate your overall impression of this wine.

Unappealing Appealing
 1.....2.....3.....4.....5.....6.....7

¹⁰ We will label this belief intensity "belief strength" in order to be consistent with the way it is usually labeled, recognizing that it is actually only one category of a broader construct of belief strength.

Participants

One hundred and forty people participated in Study 1. Individuals were recruited through colleges and universities in a northeastern metropolitan area. Given the product category, all subjects were required to be over 21 years of age; most were university staff members (42% female). One hundred and six of the subjects were recruited to participate in an “Internet Wine Advertising Study” whereby they would receive compensation of \$20 for a 45-minute lab exercise and a follow-up survey via e-mail. The ad explicitly stated that wine expertise was not necessary. Subjects signed up for an open time slot and were then randomly assigned to one of the four treatment conditions. The number of subjects participating in a session varied from 2 -8. The physical arrangement of computers within the behavioral lab prevented subjects from viewing others’ screens, thereby assuring independence of subjects’ responses. The remaining 34 participants were recruited from a university alumni club as part of a club event and were not paid. Instead, they received a guest lecture on Internet marketing following the sessions. The responses of these two groups on the measures of interest were not significantly different from one another. As such, all data have been combined.

Manipulation Checks

The maximum amount of time used was 12.3 minutes(mean= 7.11 minutes, s.d.= 1.9) less than half of the allotted time of 20 minutes for the LUC condition. In order to verify that the manipulation of user control was effective, participants were asked how much control they had: over their navigation in the exercise; over the sequence of items they saw; and, in total, using a 7-point Likert scale with endpoints labeled “No control at all” and “Extremely high degree of control.” All of the differences on these three questions between the LUC and HUC conditions were significant (NAVIGATION: $X_{HUC}=4.91$ versus $X_{LUC}=3.29$, $F_{1,138}=21.65$, $p<.001$;

SEQUENCE: $X_{HUC}=4.93$ versus $X_{LUC}=2.06$, $F_{1,138}=77.60$, $p<.001$; TOTAL: $X_{HUC}=5.26$ versus $X_{LUC}=4.27$, $F_{1,138}=9.48$, $p<.001$). Interestingly, participants in the HUC condition also reported having significantly greater control over the information content ($X_{HUC}=4.00$ versus $X_{LUC}=2.21$, $F_{1,138}=31.15$, $p<.001$) and control over customization ($X_{HUC}=3.89$ versus $X_{LUC}=3.04$, $F_{1,138}=8.07$, $p<.01$) although there was no difference in content. One can infer from this that perceptions of control may be broader and easier to influence than they actually are.

For the media richness manipulation checks, subjects were asked to rate the level of media richness and the level of multimedia, using a similar 7-point Likert scale. Both measures yielded significant differences between the high and low richness conditions (RICHNESS: $X_{HMR}=5.72$ versus $X_{LMR}=3.85$, $F_{1,138}=48.82$, $p<.001$; MULTIMEDIA: $X_{HMR}=5.59$ versus $X_{LMR}=3.24$, $F_{1,138}=82.24$, $p<.001$).

Study 1 Results

The 7-items that comprised the telepresence scale yielded a Cronbach alpha of .84. Factor analysis yielded only one factor with an eigenvalue greater than one, suggesting a unidimensional scale. To calculate the telepresence score, the mean of the seven items was calculated ($X=3.84$, $s.d.=1.11$). To test the impact of impact of media richness and user control on telepresence, a 2 (media richness) x 2 (user control) analysis of variance (ANOVA) was conducted with telepresence as the dependent variable (Figure 5). This yielded a significant main effect for both media richness ($TP_{LMR}=3.56$ versus $TP_{HMR}=4.11$, $F_{1,136}=9.87$, $p<.001$) and user control ($TP_{LMR}=3.57$ versus $TP_{HMR}=4.11$, $F_{1,136}=9.53$, $p<.001$), thus supporting H1 and H2 that higher levels of media richness and user control, respectively, would result in higher levels of telepresence. However, the interaction effect between media richness and user control predicted

by H3 finds no support; although directionally correct, the effect was not significant ($F_{1,136}=.48$, $p<.25$).

With respect to the second set of hypotheses regarding the *effects* of telepresence, we find strong support for both H4 and H5, which predict that higher levels of telepresence will result in stronger beliefs and attitudes. To assess belief strength, we averaged the belief strength scores for each of the 12 attributes mentioned in the advertisement. The 12 belief items had a Cronbach alpha of .76. To assess attitude intensity, we used the mean score from four questions regarding attitude toward the product. These responses to these questions yielded a Cronbach alpha of .96. Using regressions with the average belief and attitude scores as dependent variables, we find telepresence to have a positive and significant effect for both beliefs ($B=.39$, $p<.001$, $R^2=.14$) and attitudes ($B=.35$, $p<.001$, $R^2=.12$).¹¹

In order to study mediation parsimoniously, a “realism” index of the four separate conditions was created. Since there are few expectations on the differences between the “mixed” scenarios where either media richness or user control is low, it is useful to think of the four different scenarios as separate states of the world. That is, we can look at the 2x2 table formed by cross-tabulating MR and UC as four separate types of environments, which can be used to create a new variable labeled “realism.” The highest level of “realism” (2) is one with high user control and high media richness (HUC/HMR), while the lowest level (0) is one with low user control and low media richness (LUC/LMR). The middle level (1) incorporates the low control/ high media richness (LUC/HMR) and high control/low richness states (HUC/LMR). This new variable “realism” was used in place of the user control and media richness independent

¹¹ A MANOVA with both dependent variables yielded similar results with telepresence having a significant effect on both beliefs ($F=1.68$, $p<.05$) and attitudes ($F=1.77$, $p<.01$).

variables to test for mediation effects. Using the Baron and Kenny (1986) method, mediation is tested by assessing the effect of realism on the mediator (telepresence) and on the dependent variable (attitudes or behavior), with and without including the mediator. As Table 2 shows, telepresence mediates the relationship between attitudes and realism and beliefs and realism, fully supporting H6. We find perfect mediation by telepresence for beliefs, with realism losing significance completely ($p > .65$) when the telepresence variable is added. For attitudes, perfect mediation is also observed, although realism has only marginal significance alone in the regression ($p < .10$).

INSERT TABLE 2 ABOUT HERE

Overall, the results from Study 1 suggest that media richness and user control are significant enabling factors for the creation of telepresence. However, it does not seem necessary for *both* factors to be at high levels to create this sense of telepresence; no significant interaction effect is observed. In addition, in contrast to Kim and Biocca's findings, the media richness manipulation alone had a significant influence on telepresence. Moreover, as predicted, higher levels of telepresence lead to stronger beliefs in advertised product claims and more intense attitudes toward the advertised product. Finally, the results support the proposition that telepresence works as a mediating factor between the media characteristics and the consumer response. In order to strengthen the external validity of these findings, I sought to replicate this study in another "experiential" product category in Study 2.

In addition, order to test further the robustness of the telepresence scale, a minor modification was made for Study 2. Recall that Kim and Biocca (1997) had observed a two-dimensional telepresence scale in their study, whereas the scale in Study 1 proved to be unidimensional. In Study 2, two of the items (numbers 2 and 6, as shown in Figure 3) were

negatively worded. In addition, one of the two items reversed in Study 2 was a different one than any of the three reversed in the Kim and Biocca study.¹² Comparing the results of these three scales would allow us to assess whether the dimensionality differences were a result of the negative coding itself or of true underlying multidimensionality.

Study 2

Product Selection and Attribute Generation

This product category, face cream, is dominated by a different set of sensory attributes — feel and smell. However, like wine, these sensory attributes were not digitizable. In order to generate the product attributes for the face cream, a similar procedure was used to that described above for wine. A general attribute list was generated and then pared down through three in-depth product trials with small groups of female graduate students at the Harvard University. Only women were used in this study due to the nature of the product category. These pre-studies yielded a list of 12 specific attributes to be communicated in the advertisement, again equally balanced among search and experience attributes (Figure 4).

INSERT FIGURE 4 ABOUT HERE

Stimuli, Design, and Procedures

The advertising stimuli were designed using Macromedia's Authorware[®] 4.0. Again, in creating the four different versions (2 media richness x 2 user control) of each of the stimuli, we strove for informational equivalence across conditions; this was confirmed through pre-tests. For the face cream, the product used was the *Exuviance* line of facial creams, created by a

¹² Item 6 was never reversed in the Kim and Biocca study.

NeoStrata. The products are relatively expensive and sold exclusively through dermatologists so there was not widespread awareness.¹³ All of the materials for the stimuli were created using advertising and promotional materials provided by the company. The product information was divided into six topical categories (How it feels, How to use it, Aromas, Ingredients, Company, and Product line), which contained the information on all 12 product attributes. The experimental design and procedures were identical to those described for Study 1, except as noted.

Participants

In this study, only women were used and no age restrictions were set. One hundred people participated in Study 2. Staff and students were recruited through colleges and universities in a northeast metropolitan area. Once again, subjects were recruited to participate in an “Internet Advertising Study” whereby they would receive compensation of \$15 for a 45-minute lab exercise and for completing a follow-up survey via e-mail.¹⁴ Subjects signed up for an open time slot and were then randomly assigned to one of the four treatment conditions. Session participation ranged from 12 –20 people per session, using the same lab set-up as described in Study 1. In Study 2, assessment of expertise consisted of one question asking for a self-assessment of skin care category expertise.

Manipulation Checks

The maximum amount of time taken by participants was 19.2 minutes (mean =10.3, s.d.=2.9), which was less than half of the maximum of 40 allotted for LUC participants in this

¹³ No one in the study recognized the brand name or company.

¹⁴ The amount offered was lower for this sample because we were able to recruit from a younger population. The \$15 payment was closer to the market rate for such studies.

simulation.¹⁵ Participants were asked the same questions about the perceived level of control as in Study 1. We find the expected differences in perceived control resulting from the manipulation (NAVIGATION: $X_{HUC}=5.88$ versus $X_{LUC}=3.72$, $F_{1,98}=32.72$, $p<.001$); SEQUENCE: $X_{HUC}=5.96$ versus $X_{LUC}=2.04$, $F_{1,98}=133.58$, $p<.001$; TOTAL: $X_{HUC}=5.60$ versus $X_{LUC}=4.84$, $F_{1,98}=5.19$, $p<.05$). We also observe a significant difference in perceptions of control over content ($X_{HUC}=4.78$ versus $X_{LUC}=2.00$, $F_{1,98}=52.80$, $p<.001$) and a marginally significant difference for customization ($X_{HUC}=3.98$ versus $X_{LUC}=3.52$, $F_{1,98}=2.20$, $p<.10$). This further supports the potential for expanded perceptions of control that are achieved merely by giving the subjects the control over sequence.

For the media richness manipulation checks, subjects were asked to rate the level of media richness and the level of multimedia on 7-point Likert scales. Again, both measures yielded significant differences (RICHNESS: $X_{HMR}=4.87$ versus $X_{LMR}=3.83$, $F_{1,98}=14.24$, $p<.001$; MULTIMEDIA: $X_{HMR}=4.94$ versus $X_{LMR}=3.60$, $F_{1,98}=26.68$, $p<.001$).

Results

Hypothesis Tests.

The negative scoring of two items, as described above, had a small negative influence on the reliability of the telepresence scale, which will be discussed below. However, the Cronbach alpha was still an acceptable .78. To test the determinants of telepresence (H1 –H3), the same two-way ANOVA as was conducted in Study 1 (Figure 6). Partially supporting H1, media richness had a marginally significant and positive effect on telepresence ($X_{HMR}=6.62$ versus $X_{LMR}=3.35$, $F_{1,96}=2.21$, $p<.10$). User control had a positive and significant effect ($X_{HMR}=3.67$

¹⁵ This simulation contained one more category of information and thus took more time to complete than the wine simulation in Study 1.

versus $X_{LMR} = 3.31$ $F_{1,96} = 3.40$, $p < .05$) on telepresence, providing support for H2. Here, the interaction effect between user control and media richness (H3) was also significant ($F_{1,96} = 6.05$, $p < .01$). In this study, under the low control condition, there was no significant difference in reported telepresence between the high and low media richness conditions ($X_{HMR} = 3.30$ versus $X_{LMR} = 3.41$, $F_{1,45} = .15$, $p > .50$). However, under the high richness condition, participants with high user control reported significantly higher telepresence than those with low user control ($X_{HMR} = 3.23$ versus $X_{LMR} = 4.02$, $F_{1,51} = 12.25$, $p < .001$).

With respect to the effects of telepresence, we find a significant and positive effect of telepresence on belief strength ($B = .37$, $p < .001$, $R^2 = .14$) and attitude strength ($B = .35$, $p < .001$, $R^2 = .12$). Again, using Baron and Kenny's method (1986), we find significant mediation effects between realism and attitudes and beliefs, as shown in Table 3. The results suggest perfect mediation for attitudes, but only partial mediation for beliefs, whereby realism remains significant ($p < .05$), although its coefficient falls from .24 to .17, when telepresence is added as a predictor.

 INSERT TABLE 3 ABOUT HERE

Telepresence Scale.

The results of the modified telepresence scale merit further discussion. A factor analysis of this second scale (with items 2 and 6 negatively worded) reveals that the reversed factors load separately. This second factor explains 23% of the total variance, while both factors explain 62% (versus 51% for the 1 factor Study 1). Interestingly, as briefly mentioned above, Kim and Biocca's (1997) scale also yielded two factors; the second factor was composed solely of the three items that were reverse scaled. However, in our scale, a *different* set of items was reversed, and we find similar results. In fact, we find that the average score for items 2 and 6 (after reverse

coding) was significantly lower ($p < .001$) in Study 2 than in Study 1. However, without the two negatively worded items there is no significant difference between the telepresence scores for the two studies ($TP_{\text{study1}}=3.74$ versus $TP_{\text{study2}}=3.59$, $F_{1,238}=1.20$, $p < .30$).

These findings suggest that the two factors observed in Study 2 and in Kim and Biocca's study may not represent two elements of the construct telepresence but simply reflects the effects of negative wording. Such effects have been well documented (Friedman 1998; Herche and Engelland 1996). Herche and Engelland's studies have shown a significant tendency for reversed-polarity items to load independently, compromising the unidimensionality of the scale. In addition, Friedman (1998) found that positively worded or "favorable" scales yielded significantly different mean results from "mixed" positive and negatively worded scales and negatively worded or "unfavorable" scales. Specifically, means for scales with mixed or only negative items were significantly lower than means for all positively worded scale, which may explain the difference in overall mean telepresence scores between Study 1 (3.84) and Study 2 (3.49, $F_{1,238}=6.54$, $p < .05$). Overall, however, lower means for mixed scales is not a fundamental problem; in fact, one could argue that this works against the inflation of all positively worded scales that might be a result of response bias (Churchill 1979). If we combine the data from our two studies and do a composite factor analysis of the telepresence scale, we find only one factor which explains 48% of the total variance, suggesting that the effects of the negative wording are relatively weak in a larger sample.

General Discussion

Thus, overall we again find strong support for our hypotheses relating to both the influences on and effects of telepresence. We also find support for the role of telepresence as a mediating variable. Moreover, in Study 2, we are able to isolate some specific problems with

variations of the telepresence scale, which should help in the future refinement of the measurement scale. Below, some overall comparisons and contrasts between the two studies will be discussed.

One important point to explore is why the interaction effect of media richness and user control is significant in Study 2 but not in Study 1. Further exploration and qualitative testing of the two operationalizations suggests a stronger media richness manipulation in Study 1 versus Study 2. That is, the media richness manipulations were operationalized slightly differently in the two studies. In Study 1, the stimuli featured one individual, Oz Clarke, an animated wine critic with an Australian accent, who “narrated” throughout.¹⁶ In addition, the stimuli featured two other pictures (LMR) or videos (HMR) of interactions among people. In contrast, in Study 2, the stimuli did not feature a narrator. The only real people were still pictures of faces with different hair and make-up styles. The videos were of scenery, flowers and herbs, and sketched faces applying cream. In Study 1, it is possible that the animation with voice-overs of one lively character was a more powerful manipulation of media richness than the animation of other types of pictures.¹⁷ The inclusion of people enjoying and discussing the product in the videos could be also be responsible for the greater impact of the media richness manipulation overall in the wine category. Exploring the data from the manipulation checks, we find in the low richness condition, there is no difference across samples in perceived “level of media richness” (3.85 for Study 1 versus 3.83 for Study 2, $p > .90$) or in perceived “level of multimedia” (3.24 for Study 1 versus 3.60 for Study 2, $p > .30$). However, for the high richness conditions, participants in Study

¹⁶ A question in the post-exposure questionnaire asked if anyone recognized the man, but not one subject reported knowing him.

¹⁷ This may have created some type of “parasocial interaction” through a mediated personality, wherein the user perceives a social relationship with an actor within a medium. See Hoerner (1999) for a review of this phenomenon.

1 report significantly higher levels of media richness (5.72 versus 4.87, $p < .001$) and multimedia (5.59 versus 4.94, $p < .001$).

It may be possible to explain the differences by presuming that the wine LMR scenario was not actually as “low” as the LMR for the face cream. In essence, in Study 2, the presence of Oz Clarke as narrator through the still photos may have been enough to raise the level of media richness a small, but significant, amount above that of the LMR for Study 1. The studies may thus be taking measurements along different points on the realism spectrum, due to the differences in the operationalizations of media richness. Future research needs to explore the role of such characters and social interaction in the creation of rich media environments.

Although we have noted some small differences in the impact of user control and media richness on telepresence, it is important to note that telepresence differences were found in all manipulations of media richness and user control. This suggests the creation of telepresence may be easier than imagined; no complicated combination of factors is necessary to create a sense of telepresence — a finding which should be reassuring to marketers striving to create virtual experiences without incurring burdensome costs or requiring significant technological expertise.

Before drawing any conclusions, we must attempt to rule out alternative explanations for these findings. One might argue that the manipulations merely encouraged subjects to spend more time with the stimuli, resulting in greater persuasion. We do find a positive correlation between the telepresence scores and total time spent on the exercise for both Study 1 ($r = .32$, $p < .01$) and for Study 2 ($r = .16$, $p < .10$), but the direction of causality is unknown. We find no difference in the actual time spent by user control in Study 1 ($X_{HUC} = 436.6$ seconds versus $X_{LUC} = 414.3$ seconds, $F_{1,136} = 1.36$, $p > .25$) or Study 2 ($X_{HUC} = 626.5$ versus $X_{LUC} = 613.7$ seconds, $F_{1,98} = .14$, $p > .50$). We also find no difference in the time spent by media richness condition in

Study 2 ($X_{\text{HMR}} = 597.2$ versus $X_{\text{LMR}} = 645.0$ seconds, $F_{1,98} = 1.98$, $p < .20$). However, in Study 1, we find that those in the high richness condition spent significantly more time than those in the low richness condition ($X_{\text{HMR}} = 387.5$ versus $X_{\text{LUC}} = 463.8$, $F_{1,136} = 17.93$, $p < .001$).¹⁸

The critical issue is whether the effects found can be explained solely by time. Using time as a covariate in the ANOVA used to test H1-H3, we find that time spent is indeed a significant predictor of telepresence in Study 1 ($F_{1,133} = 7.83$, $p < .01$) and a marginal predictor in Study 2 ($F_{1,133} = 2.72$, $p < .10$). However, most importantly, we find that even controlling for time spent, user control (STUDY 1: $F_{1,133} = 7.39$, $p < .01$; STUDY 2: $F_{1,95} = 3.78$, $p < .05$) and media richness (STUDY 1: $F_{1,133} = 3.83$, $p < .05$; STUDY 2: $F_{1,95} = 2.41$, $p < .05$) remain significant antecedents of telepresence. There are no changes to the significance levels for the interactions either.

It is important to note that we did not measure involvement here. Indeed, a component of the process through which telepresence influences consumer response may be increased involvement. Li et al. (2001a), using verbal protocol analysis, identified involvement as one characteristic of virtual experiences.” However, differences in time spent may be an indicator of differences in involvement; the underlying assumption is that the higher the involvement level, the more time will be spent, all else being equal. In terms of differentiating media according to levels of user control, the differences in the manipulations can be related to Krugman’s (1965) characterization of low and high involvement media and McLuhan’s (1965) hot/cold distinction. Stewart and Ward (1994, p.333) summarized this work as follows:

Television, in particular, is a low-involvement medium because the rate of viewing and understanding is not controlled by the viewer. In contrast, exposure to print media is under the control of readers, who may pause and make connections between what is being read and personal experiences and attitudes.

¹⁸ This may be the result of the more engaging nature of this simulation due to the presence of the narrator or materials or the result of the fact that the videos in this simulation took longer to play than reading the text and observing the still pictures.

Thus, involvement may indeed be a component or byproduct of telepresence, but we are unable to isolate the relationship between the constructs in this study. Further research is necessary to explore the precise ways in which involvement and telepresence are related in these computer-mediated environments.

Summary and Future Research Directions

Summary

In summary, we find that user control and media richness had significant positive influences on the creation of telepresence. In turn, telepresence was found to have a significant and positive impact on persuasion, measured at the attribute level and at the product level. Moreover, these studies have been able to isolate the underlying processes by showing that telepresence mediates the relationship between user control and media richness (reclassified in terms of the level of realism of the environment) and persuasion at both levels. Using the construct of realism enabled us to classify the different scenarios as alternative media along a continuum of mediated communications. Our telepresence scale shows strong reliability. In addition, analysis and comparison of the results of the two scale variations identified some problems with prior scales and identified further lines of research necessary to improve the scale.

While it appears that the creation of telepresence is sensitive to the operationalizations of media richness, it is also apparent that creating a level of telepresence sufficient to have a meaningful effect on beliefs and attitudes is not difficult. Note that the stimuli used in these two studies were quite simple renditions created with off-the-shelf programming tools, not cutting edge, 3D simulations. The media richness and user control manipulations were minimal, relative to the potential applications observed on the Web. For practitioners, this should be welcome

news. Providing basic virtual experiences may indeed be a lot less expensive than other methods of providing real trial, such as sampling. Although this research does not measure the proximity of these virtual experiences to ones engendered from actual trials, we have shown that these virtual experiences, created by increasing levels of user control and media richness, lead to stronger consumer responses, as measured by beliefs and attitudes, than *less* realistic experiences.

Moreover, in these two studies, virtual experiences were provided for products whose dominant attributes were true (nondigitizable) experience attributes, such that these attributes were in essence transformed into search attributes (Klein 1998). For products dominated by search attributes or digitizable experience attributes (e.g. sound), these virtual experiences should be even easier to provide and should be interpreted as even more similar to direct product experiences.

Limitations and Future Research Directions

This study suffers from several shortcomings. First, only attribute beliefs and product attitudes were measured. In order to fully evaluate the media impact, we would need to study a broader range of persuasion measures, such as: a weighted-attribute belief strength, based on individual attribute importance weights; longer term impacts of single and multiple virtual experience exposures; and product choice in a decision-making environment.

With a limit of five or six categories and only 12 pieces of attribute information to keep track of, the cognitive load created by this transfer of control was minimal. Ariely (2000) and Lepper and Malone (1987) showed that, under certain conditions, the incremental demand on cognitive resources created by increased control could be detrimental to performance. At some point, this depression of performance may also effect individual's satisfaction with and

confidence in the information search process itself, thus negatively impacting the communication's persuasive ability. Heeter (2000, p.12) explains that, "More interactivity is not necessarily good. A poorly designed interface is likely to require more separate interactions and take longer to achieve a sought affordance than a well-designed interface."

In this research, we have examined only one element of user control — control over information acquisition order. We have not yet explored the impact of other types of control over format, such as methods of visual representation or attribute/alternative. Moreover, while we have given subjects control over order of information access, in the real world environment (including the Internet and direct product experience) individuals also have control over the content or amount of information. This type of control may have an even greater impact on both learning and persuasion but has not yet been explored due to the difficulties of maintaining "experimental control" while turning over such "user control" to participants.

As discussed above, these studies have not fully explored the role of involvement. Further research needs disentangle the roles of telepresence and involvement and explore directly the relationship of these constructs to one another through direct manipulation of both of these variables simultaneously.

We cannot make conclusive managerial recommendations without first mentioning the importance of fit between individual information processing styles and aptitudes and the media environment. First, individuals have been shown to differ according to whether they are verbal or visual processors (Childers and Houston 1984). Clearly, video representations will affect individuals differently depending on their preference for visual processing. Secondly, the amount of control that is optimal, or even beneficial, is likely to depend upon the individual's level of expertise. The greater the level of category expertise, the more capable the individual is in

managing the information gathering and assimilation tasks. That is, they know what to do with control when it is given to them. For example, Carlson and Klein (2001) found that individuals with greater expertise were better able to structure their virtual experience to mimic a direct product experience. Finally, we might expect that certain personality traits, such as the locus of control (Hoffman et al. 2000) or desire for control (Burger 1992), would be positively correlated with an individual's choice of whether to actively exercise control when options are available.

The 7-item telepresence scale successfully measured both the causes and effects of telepresence. However, we can improve its construct validity by improving construct convergence and discrimination. For convergence, it would be necessary to remove mono-method bias by assessing telepresence in additional ways. One possible method would be to record physiological responses to the stimuli (Schloerb 1995). In our advertising stimuli, measures such as hunger, heart rate, or body language might be appropriate ways to measure the "sense of being there." Divergent validity can be more easily improved by collecting measures of related constructs such as involvement and flow, which have been claimed to be related to telepresence (Hoffman and Novak 1996), but have not been precisely measured in relationship to it.

Recently, researchers have begun to explore the potential for virtual product experiences to surpass real product experiences in terms of the quantity and quality of information provided to consumers. Johnson, Lohse, and Mandel (1999) discuss the potential for the unbundling of product information from product display. Li et al. (2001a, 2001b) have explored the construct of "affordances" which are defined as the potential interactions between a consumer and a product during product inspection (Norman 1998). In their studies, they identify situations where virtual affordances may be superior to actual or perceived affordances. Thus, future research needs to

look beyond direct product experience as the model which virtual product experiences try to emulate. We must try to understand the effects of such superior virtual experiences on consumer behavior over the short and long term. This study answers a number of key questions about consumer response to advertising in the digital media. This research has demonstrated a novel way of operationalizing control and media richness in a computer-mediated environment, and of measuring the role of telepresence in the process. A systematic program of research exploring the impact of the many facets of control and combinations of modalities on different types of individuals is necessary before we can be confident in our understanding of the impact of these new media on consumer behavior.

References

- Anderson, Norman H. (1971), "Integration Theory and Attitude Change," *Psychological Review*, 78 (3), 171-206.
- Ariely, Dan (2000), "Controlling the Information Flow: Effects on Consumers' Decision Making and Preferences," *Journal of Consumer Research*, 26 (September), 233-48.
- Baron, Reuben M. and David A. Kenny (1986), "The Moderator-Mediator Variable Distinction in Social Psychological Research," *Journal of Personality and Social Psychology*, 51 (6), 1173-82.
- Berger, Ida and Andrew A. Mitchell (1989), "The Effect of Advertising on Attitude Accessibility, Attitude Confidence, and the Attitude-Behavior Relationship," *Journal of Consumer Research*, 15(4), 269-79.
- Burger, Jerry M. (1992), *Desire for Control: Personality, Social, and Clinical Perspectives*. New York: Plenum Press.
- Calfee, John E. and Debra Jones Ringold (1994), "The 70% Majority: Enduring Consumer Beliefs About Advertising," *Journal of Public Policy and Marketing*, 13 (2), 228-41.
- Carlson, Kurt A. and Lisa R. Klein (2001) "Predecisional Distortion in Real Choice," Cornell University, working paper.
- Childers, Terry L., and Michael J. Houston (1984). Conditions for a Picture-Superiority Effect on Consumer Memory. *Journal of Consumer Research*, 11, 643-654.
- Blattberg, Robert C. and John Deighton (1991), "Interactive Marketing: Exploiting the Age of Addressability," *Sloan Management Review*, 33 (1), 5-14.
- Daft, Richard L. and Robert H. Lengel (1986), "Organizational Information Requirements, Media Richness and Structural Design," *Management Science*, 32 (May), 554-71.
- Deighton, John (1984), "The Interaction of Advertising and Evidence," *Journal of Consumer Research*, 11, 763-70.
- Fazio, Russell H. and Mark P. Zanna (1987), "On the Predictive Validity of Attitudes: The Roles of Direct Experience and Confidence," *Journal of Personality*, 46, 228-43.
- and ---- (1981), "Direct Experience and Attitude-Behavior Consistency," in *Advances in Experimental Social Psychology*, L. Berkowitz, Ed. Vol. 14. New York: Academic Press.
- Ford, Gary, Darlene B. Smith, and John L. Swasy (1990), "Consumer Skepticism of Advertising Claims," *Journal of Consumer Research*, 16, 433-41.

- Friedman, Hershey H. (1998), "The Effects of Positive and Negative Wording on Responses to a Likert Scale," *Applied Marketing Research*, 28 (2).
- Heeter, Carrie (2000), "Interactivity in the Context of Designed Experiences," *Journal of Interactive Advertising*, 1 (1), 1-16.
- Herche, Joel and Brian Engelland (1996), "Reversed-Polarity Items and Scale Unidimensionality," *Journal of the Academy of Marketing Science*, 24 (4), 366-374.
- Hoch, Stephen J. and John Deighton (1989), "Managing What Consumers Learn from Experience," *Journal of Marketing*, 53 (April), 1-20.
- and Young-Won Ha (1986), "Consumer Learning: Advertising and the Ambiguity of Product Experience," *Journal of Consumer Research*, 13, 221-34.
- Hoerner, John (1999), "Scaling the Web: A Parasocial Interaction Scale for World Wide Web Sites," in *Advertising and the World Wide Web*, Schumann, David W. and Esther Thorson, eds. New Jersey: Lawrence Erlbaum Associates, 135-147.
- Hoffman, Donna L., Thomas P. Novak, and Ann Schlosser, "Consumer Control in Online Environments, working paper, available: <http://www2000.ogsm.vanderbilt.edu/papers.html>.
- and Thomas P. Novak (1996), "Marketing in Hypermedia Computer-Mediated Environments: Conceptual Foundations," *Journal of Marketing*, 60 (3), 50-69.
- Kim, Taeyong and Frank Biocca (1997), "Telepresence Via Television: Two Dimensions of Telepresence May Have Different Connections to Memory and Persuasion," *Journal of Computer-Mediated Communication*, 3 (2).
- Kisielius, Jolita and Brian Sternthal (1986), "Examining the Vividness Controversy," *Journal of Consumer Research*, 12, 418-31.
- Klein, Lisa R. (1999), "Creating Virtual Experiences in the New Media," unpublished doctoral dissertation, Marketing Department, Harvard Graduate School of Business Administration.
- (1998), "Evaluating the Potential of Interactive Media Through a New Lens: Search versus Experience Goods." *Journal of Business Research*. 41(3), 195-203.
- Krugman, Harold E. (1965), "The Impact of TV Advertising: Learning without Involvement," *Public Opinion Quarterly*, 29 (Fall), 349-56.
- Lal, Rajiv, and Sarvary, Miklos. (1999), "When and How is the Internet Likely to Decrease Price Competition?" *Marketing Science*, 18(4), 485-503.
- Lang, Annie (1995), "Defining Audio/Video Redundancy from a Limited-Capacity Information Processing Model Perspective.," *Communication Research*, 22 (1), 86-115.

- Lepper, Mark R. and Thomas W. Malone (1987), "Intrinsic Motivation and Instructional Effectiveness in Computer-Based Education," in *Aptitude, Learning and Instruction*, R.E. Snow and M.J. Farr, eds. Hillsdale: NJ: Erlbaum.
- Li, Hairong, Terry Daugherty, and Frank Biocca (2001a), "Characteristics of Virtual Experience in Electronic Commerce: A Protocol Analysis," *Journal of Interactive Marketing*, Vol. 15(3), pp.13-30.
- , ----, and ---- (2001b), "Consumer Learning and 3D E-commerce: The Effects of Sequential Exposure of A Virtual Experience Relative to Indirect and Direct Product Experience on Product Knowledge, Brand Attitude and Purchase Intention," in Frank Biocca, Hairong Li, P. David, S. Edwards, and T. Daugherty (Eds.), *Proceedings of the Experiential E-commerce Conference (CD-ROM)*. East Lansing: M.I.N.D. Lab, Michigan State University.
- Lombard, Matthew and Snyder-Duch (2001), "Interactive Advertising and Presence: A Framework," *Journal of Interactive Advertising*, 1 (2).
- and Teresa Ditton (1997), "At the Heart of It All: The Concept of Telepresence," *Journal of Computer-Mediated Communication*, 3 (2).
- McLuhan, Marshall (1965), *Understanding Media: The Extensions of Man*. New York: McGraw Hill.
- Marks, Lawrence and Michael Kamins (1988), "The Use of Product Sampling and Advertising: Effects of Sequence of Exposure," *Journal of Marketing Research*, 25, 266-82.
- Nelson, Philip J. (1981), "Consumer Information and Advertising," in *Economics of Information*, eds. Malcom Galatin and Robert D. Leiter, Boston: M. Nijhoff Publishers.
- Norman, D. (1998). *The Invisible Computer: Why Good Products Can Fail, the Personal Computer Is So Complex and Information Appliances Are the Solution*. Cambridge, MA: MIT Press.
- Novak, Thomas P., Donna L. Hoffman, and Y.F. Yung (2000), " Measuring the Flow Construct in Online Environments: A Structural Modeling Approach," *Marketing Science*, 19(1), 22-42.
- Pham, Michel Tuan, Tom Meyvis; and Rongrong Zhou (2001), "Beyond the Obvious: Chronic Vividness of Imagery and the Use of Information in Decision Making," *Organizational Behavior and Human Decision Processes*; New York; 84(2), 226-253.
- Raden, David (1985), "Strength Related Attitude Dimensions," *Social Psychology Quarterly*, 48 (4), 312-30.
- Reeves, Byron and Clifford Nass (1996), *The Media Equation*. Palo Alto, CA: CSLI Publications.

- , Ben Detenber, and Jonathan Steuer (1993), "New Televisions: The Effects of Big Pictures and Big Sound on Viewer Responses the Screen," paper presented at the annual meeting of the International Communication Association, May.
- Schloerb, David W. (1995), "A Quantitative Measure of Telepresence," *Presence*, 4 (1), 64-80.
- Sheridan, Thomas B. (1996), "Further Musings on the Psychophysics of Presence," *Presence*, 5 (2), 241-46.
- (1992), "Musings on Telepresence and Virtual Presence," *Presence*, 1 (1), 120-26.
- Smith, Robert E. and William R. Swinyard (1988), "Cognitive Response to Advertising and Trial: Belief Strength, Belief Confidence and Product Curiosity," *Journal of Advertising*, 17 (3), 3-14.
- and ----- (1983), "Attitude-Behavior Consistency: The Impact of Product Trial Versus Advertising," *Journal of Marketing Research*, 20, 257-67.
- and ----- (1982), "Information Response Models: An Integrated Approach," *Journal of Marketing*, 46, 81-93.
- Solomon, Gregg Eric Arn (1996), "Psychology of Novice and Expert Wine Talk," *American Journal of Psychology*, 103 (4), 495-517.
- Stern, Barbara (1994), "A Revised Communication Model for Advertising: Multiple Dimensions of the Source, the Message, and the Recipient," *Journal of Advertising*, 23 (2), 5-14.
- Steuer, Jonathan (1995), "Vividness and Source of Evaluation as Determinants of Social Responses toward Mediated Representations of Agency," doctoral dissertation, Stanford University.
- (1992), "Defining Virtual Reality: Dimensions of Determining Telepresence," *Journal of Communication*, 42 (4), 73-93.
- Stewart, David W. and Scott Ward (1994), "Media Effects on Advertising," in *Media Effects: Advances in Theory and Research*, J. Bryant and D.Zillman, eds. Hillsdale: NJ: Erlbaum.
- Wright, Alice A. and John Lynch (1995), "Communication Effects of Advertising versus Direct Experience when Both Search and Experience Attributes are Present," *Journal of Consumer Research*, 21, 708-18.
- Wright, Peter.L. (1974), "The Harassed Decision Maker: Time Pressures, Distractions, and the Use of Evidence," *Journal of Applied Psychology*, 59, 555-61.
- Wu, Chenghuan and David Shaffer (1987), "Susceptibility to Persuasive Appeals as a Function of Source Credibility and Prior Experience with the Attitude Object," *Journal of Personality and Social Psychology*, 52 (4), 677-88.

Table 1

Review of Studies on Advertising and Experience: Main Effects and Interactions

Factors Studied	Distinguishing Factors of Advertising versus Direct Product Experience		Source
	Advertising	Direct Product Experience	
Claim and Source Credibility		Higher	Ford, Smith and Swasy (1990) Hoch and Deighton (1989) Smith and Swinyard (1983, 1988)
Belief Confidence		Higher	Smith & Swinyard (1988)
Attitude accessibility	Higher for single exposure, but declines with repeated exposures		Berger and Mitchell (1989)
Attitude Confidence	Increases with number of repetitions	Higher	Berger and Mitchell (1989)
Attitude-Behavior Consistency	Increases with number of repetitions	Higher	Smith and Swinyard (1983) Berger and Mitchell (1989)
Resistant to Change	Influenced by source credibility	More resistant to counterattack More influenced	Wu and Shaffer (1987)
Interaction Effects/Order of Exposure	Influences experience when encountered first Can lessen effects of negative trial Influences experience when experience is ambiguous		Deighton (1984) Marks and Kamins (1988) Smith & Swinyard (1993) Hoch and Ha (1989) Smith & Swinyard (1993)

Table 2
Mediation Results for Wine

Dependent Variables	Independent Variables	
	Telepresence	Realism
Telepresence		.55 (.13)***
Belief Strength	.28 (.06)***	.19 (.09)**
	.27 (.06)***	.04 (.09)
Attitude Strength	.29 (.07)***	.17 (.11)*
	.28 (.07)***	.02 (.11)

*p<.10

**p<.05

***p<.01

Table 3

Mediation Results for Face Cream

Dependent Variables	Independent Variables	
	Telepresence	Realism
Telepresence		.32 (.13)**
Belief Strength	.36 (.09)***	
		.32 (.13)**
	.32 (.09)***	.22 (.13)**
Attitude Strength	.43 (.12)***	
		.28 (.17)**
	.41 (.12)***	.15 (.17)

*p<.10

**p<.05

***p<.01

Figure 1
Conceptual Model

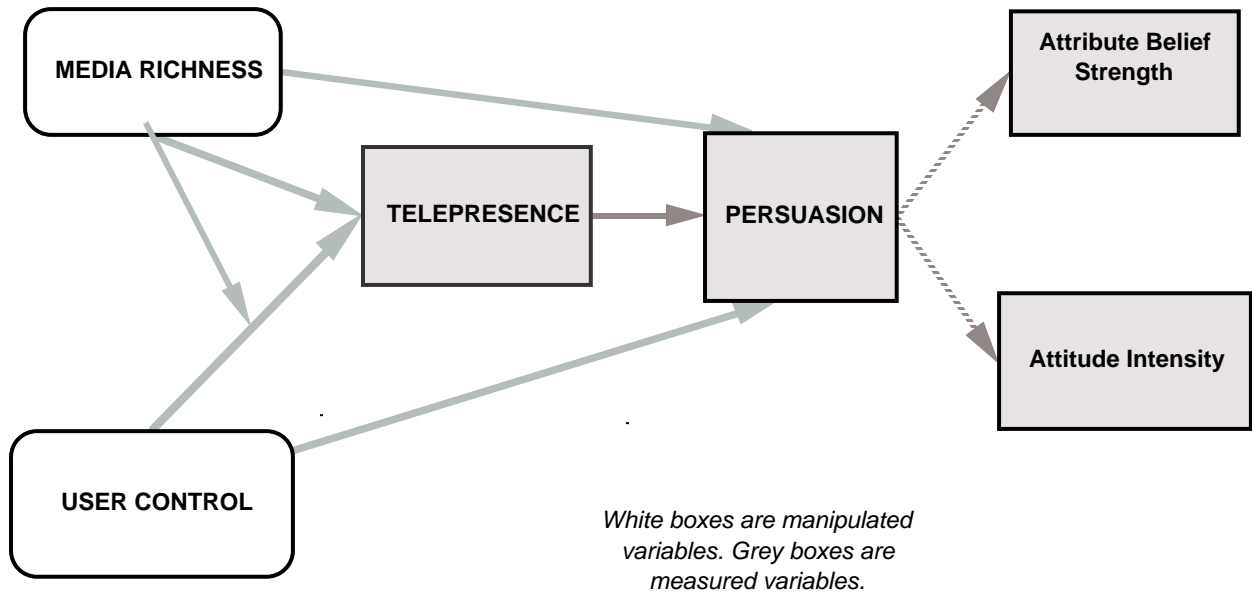


Figure 2**List of Selected Wine Attributes for Study 1**

1. Strong winery heritage
2. Cabernet Sauvignon grape
3. Impressive expert reviews
4. Informative label
5. Meaningful name (Caliterra)
6. Chilean wine-making abilities
7. Fruity aroma
8. Woody aroma
9. Fruity flavor
10. Well-balanced
11. High in tannin
12. Fit with Latin American food

Figure 3**Telepresence Scale for Study 1**

- 1.** During the exercise, I felt I was in the world the computer created.
Strongly Disagree Strongly agree
1.....2.....3.....4.....5.....6.....7
- 2.** During the exercise, I forgot that I was in the middle of an experiment.
Strongly Disagree Strongly agree *
1.....2.....3.....4.....5.....6.....7
- 3.** During the exercise, my body was in the room, but my mind was inside the world created by the computer.
Strongly Disagree Strongly agree
1.....2.....3.....4.....5.....6.....7
- 4.** The computer-generated world seemed to me "somewhere I visited" rather than "something I saw."
Strongly Disagree Strongly Agree
1.....2.....3.....4.....5.....6.....7
- 5.** I felt I was more in the "computer world" than the "real world" around me when was going through the exercise.
Strongly Disagree Strongly Agree
1.....2.....3.....4.....5.....6.....7
- 6.** I forgot about my immediate surroundings when I was navigating through the exercise.*
Strongly Disagree Strongly Agree
1.....2.....3.....4.....5.....6.....7
- 7.** When the computer exercise ended, I felt like I came back to the "real world" after a journey.
Strongly Disagree Strongly Agree
1.....2.....3.....4.....5.....6.....7

*The items were modified in Study 2 by negatively wording them, as follows:

2. During the exercise, I DID NOT forgot that I was in the middle of an experiment.
6. I DID NOT forgot about my immediate surroundings when I was navigating through the exercise

Figure 4**List of Selected Face Cream Attributes for Study 2**

1. Benefits of lavender
2. Benefits of aromatherapy
3. Chamomile aroma
4. Rosemary aroma
5. Hydrating
6. Leave face feeling smooth
7. Importance of SPF with AHA's
8. Contains powerful antioxidants
9. Unique formula
10. Prestigious manufacturer
11. Reputable brand name
12. Suitability for all skin types

Figure 5

Effect of User Control and Media Richness on Telepresence: Study 1

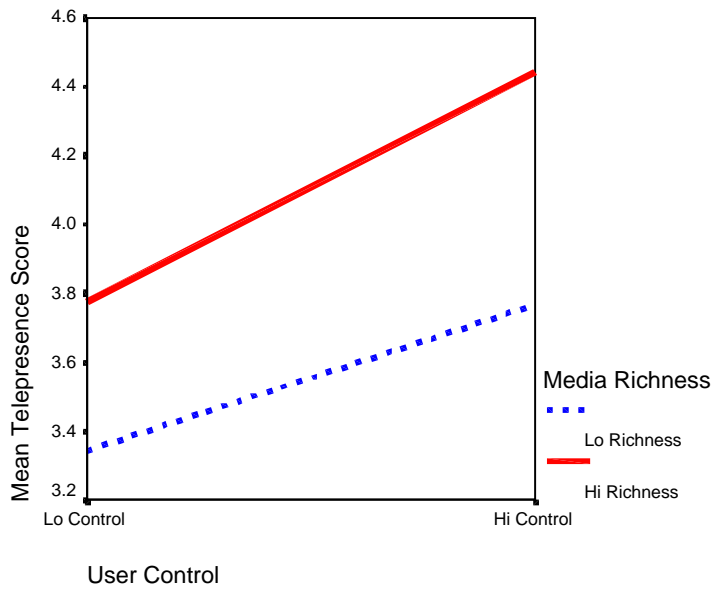


Figure 6

Effect of User Control and Media Richness on Telepresence: Study 2

