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EFFECTS OF PRESENCE ON THE EFFECTIVENESS OF WEB SITE ADVERTISING

By

Yung Kyun Choi

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ABSTRACT

EFFECTS OF PRESENCE ON THE EFFECTIVENESS OF WEB SITE ADVERTISING

By

Yung Kyun Choi

The purposes of this research were to contribute to advertising theory and practice. The theoretical contributions are to understanding and predicting the relationships between presence and advertising effectiveness. Knowledge of these relationships can also guide advertising practice, especially to prepare messages that communicate effectively. There is no known study that has empirically tested the effects of presence on consumers' responses to advertising messages. Considering the multimedia capacity of the World Wide Web, creating a compelling online environment for Web consumers will have numerous positive consequences for commercial Web providers.

This dissertation research was designed to determine if there are relationships between presence and the effectiveness of Web site advertising. An experiment was conducted to compare the effectiveness of Web advertisements without an agent and Web advertisements with an agent. Presence is an illusion that a mediated experience is not mediated. The research was focused primarily on the effects of telepresence and social presence because the literature identifies them as major components of presence. In accordance with the traditional literature, advertising effectiveness was measured by attitude toward the advertisement (Aad), attitude toward the brand (Ab), and purchase

intention (PI). Intention to revisit the Web site (VI) was added because recent literature indicates that it is an important measure of Web advertising effectiveness.

The study employed a 2 by 3 between subjects factorial design to test the hypotheses. The first independent variable was the size of the monitor and the second one was the existence of an anthropomorphic agent. The agent conditions were divided into sales-agent and customer-agent conditions to see if there are any effects of the role of different agents on users' perception of source credibility. The hypotheses were summarized in a hypothetical path model and the data were analyzed by means of ANOVA, t-tests, and path analysis to determine the patterns among presence and the advertising effectiveness measures.

Results indicate that an anthropomorphic agent in the Web site can increase a sense of social presence and telepresence to influence some of the advertising effectiveness measures to be more favorable. However, simple manipulation of the size of the monitor did not result in any significant mean differences between treatment conditions. Using a path model, a strong and direct positive relationship was found between social presence and telepresence, and between social presence and attitude toward the advertisement. Also direct and positive relationships were found between social presence and intention to revisit the Web site, between telepresence and attitude toward the advertisement, and between telepresence and intention to revisit the Web site. It was found that Aad and VI were major components that mediate the effects of presence on Ab and PI, and that VI was another important variable in the Web site advertising environment. Finally, the study concludes with specific managerial implications, limitations, and suggestions for future research.

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CHAPTER 1

INTRODUCTION

From virtual reality to the information highway, the new media technologies are radically transforming almost every aspect of how we communicate and with whom. The computer is one of the major technical foundations of this current development of the information society. The Internet, or World Wide Web, has brought us closer to a global village and has provided another conduit for advertisers and marketers to sell products and services. The Web is a distinctive advertising medium with such characteristics as multimedia capacity, 24-hour-a-day delivery of messages, directly measurable effects, audience selectivity, direct marketing opportunities, global reach potential, ad exposure controlled by the audience, and interactivity (Ju-Pak, 1999). Specifically, Web sites can be regarded as a form of advertising (Ducoffe, 1996; Raman. 1996; Berthon, Pitt, & Watson, 1996). Schlosser et al. (1999) broadly defined the Internet advertising as any form of commercial content (e.g., video clip, print or audio) available on the Internet that is designed by businesses to inform consumers about a product or service. Multimedia content on the Web site is delivered by interactive access to both static (e.g., text, image, and graphics) and dynamic (e.g., audio, full-motion video, and animation) content across the network with hypertext links (Hoffman & Novak, 1996). Therefore, opening up a Web site is equivalent to creating an advertisement in formats that are different from traditional advertisements.

The development of virtual reality technology is adding another media dimension on the Web. Virtual reality can create a communication environment that transcends the limitations of all other media by bringing the immediate and sensually rich domain of the face-to-face encounter into the imaginative, artificial, and control-oriented domain of the computer (Palmer, 1995). Recently, the prospect of commercially viable virtual reality is becoming a reality. With the ability to portray three-dimensional subjects interacting on the two-dimensional plane of the monitor, computers can offer heightened realism and navigation. A low to mid level of virtual environments can be developed on the Web by presenting virtual humans, such as avatars or agents. An avatar or agent is an animated two- or three-dimensional figure representing an individual in an online environment. Avatars and agents can possess personal characteristics as well as physical likeness based on graphical polygons and texture maps. Online computer users can interact with avatars on an individual or group basis.

Considering the multimedia capacity of the World Wide Web and the advent of virtual reality technologies, numerous marketing applications will be possible by using virtual humans on the Web. However, it is unknown if and how the presence of avatars and agents on the Web will shape or change consumers' perceptions of the Web site and their responses to a specific message conveyed by the site. Currently, there is no known study that has empirically tested the effect of avatars or agents on consumers' responses to advertising messages. Therefore, the purpose of this study is to investigate the relationship between the presence of a virtual agent and Web advertising effectiveness.

As the number of commercial Web sites continues to explode, the marketing problems of attracting target consumers to a particular Web site, engaging them

interactively within the site, and then securing repeat visits, have become acute (Hoffman & Novak, 2000). Previous research (Hoffman & Novak, 1996) suggests that creating a compelling online environment for Web consumers will have numerous positive results for commercial Web providers (Novak, Hoffman, & Young, 1999). In this regard, the researcher will test the effect of an agent's presence in making the Web a more compelling experience for its users. The researcher will also test the effect of an agent's presence on advertising effectiveness, including consumers' attitudes and behavioral intentions. This study is expected to contribute to theory regarding presence, nonverbal communication, and persuasion. The research is also expected to have implications for commercial Web site design, online advertising, and Internet marketing strategies.

Virtual Human, Avatar, and Anthropomorphic Agent

Virtual (or digital) humans are computer-generated, graphically displayed entities that represent either imaginary characters or real humans (Miller, 1998). The growth in the interest and development of virtual humans can be traced to at least two factors. First, the advances in computer graphics technology have delivered the speed and performance necessary to efficiently duplicate and display human motion. Second, the importance of "human-centered design" is achieving formal recognition by many design engineers and major manufacturers (Miller, 1998). Therefore, there is increased interest in creating sociable virtual environments and in making the Internet a more social space.

Virtual humans are commonly referred to as "avatars," and are used primarily in video games and the entertainment industry. Originally referring to the incarnation of Hindu deities, *Avatars* in the computing realm have come to mean any of various graphic representations of human or visual agents in a multi-user computer generated

environment (Lonehood, 1997). Avatars are controlled by human intelligence. In contrast, "agents" are controlled by artificial intelligence. Specifically, an agent that is incarnated with human form is referred to as "anthropomorphic agent." If artificial intelligence is combined with convincing morphology, users may be fooled into believing that the artificially intelligent agent is really a humanly directed avatar (Biocca, 1997).

Avatars or agents are given properties: shape, color, sound, motion, and so forth (Biocca & Delaney, 1995). These properties are important for the design of social virtual environments because they facilitate the real time transmission of some of the body's communication cues (Biocca, 1997). Building a more sociable interface is important because of human beings' social nature. Human beings are social creatures, and each likes to feel that he or she is not alone. People are curious and like to know what other people are doing. Studies have found that not only are people much more expressive when they are in the company of others than when alone, they are as expressive when they imagine themselves to be with others as when the others are actually present (Hauser, 1996). In this regard, anthropomorphic agents, by displaying the presence of artificial others, can play a key role in making a successful public social space.

Avatars were recently selected as a technology that will evolve over the next five to ten years (Anonymous, 1999). This assessment is based on the notion that this technology could bring some sense of community to the Internet by allowing online computer users to interact with other avatars on an individual or group basis. Currently, the technology is primarily used in the entertainment industry, for high-end video games, for example, and as high-tech novelties for realistic Internet chat rooms such as "Active World."

The commercial application of agents is also very feasible in online sales and other areas where business interaction can be enhanced by human interface. Anthropomorphic agents, semi-intelligent computer programs with a human face, can assist in handling repetitive and time-consuming tasks. For example, they can act as "salespeople" for users in a cyber shopping mall by providing products or service sales advice. They can help troubleshoot customer problems and, ultimately, shape consumers' purchase decisions. Through interaction with the agent, customers can build a human-like relationship with the agent because they may perceive the agent as a social actor with intelligence, thus minimizing resistance from the customers.

Agent: Mediating Interpersonal Relationships

A face-to-face (FTF) conversation is an activity in which we participate in a relatively effortless manner, and where synchronization between participants seems to occur naturally. FTF conversations are facilitated by the various channels we have at our disposal to convey information to our partners. These channels include the words spoken, intonation of speech, hand gestures, facial expressions, body posture, orientation and eye gaze (Vilhjalmsson, 1997). Interpersonal communication is communication involving relationships between human beings. Often the actual transaction of a relationship occurs through behavioral exchanges that are not observable in a verbal transcript, but must be attended to in other channels. Subtle, nonverbal behaviors (e.g., eye gaze, smiles) are the channels by which a large share of affectively changed relational information is conveyed (Palmer, 1995). Thus, individuals gain a sense of directly encountering others and their relational "minds" in FTF encounters through an affective, emotional and involving relational transaction.

Conventional media may become intrusive and distract individuals from the smooth and transparent processing of relational information due to restrictions in delivering verbal and nonverbal communication cues interactively. To the extent that media reflect or match the defining characteristics of interpersonal communication, media intrusiveness is reduced and the human communicators are more likely to express interpersonal behaviors and to make interpersonal inferences (Palmer, 1995). Unlike conventional media, an agent in a virtual environment can realistically simulate the elements of face-to-face interactions by providing sensual stimuli (e.g., voice, facial displays) that are virtually equivalent to those in verbal and nonverbal channels. The VR environment has the potential to provide these multiple communication channels in real time and in an interactive mode. Thus, users who encounter an anthropomorphic agent in virtual space are more likely to carry on a FTF interaction that is similar to an interpersonal interaction because of the illusion that the user's correspondent is a social actor, not a computer generated graphical image.

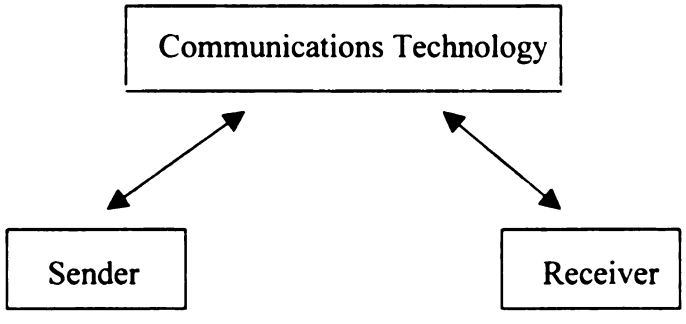
CHAPTER 2

LITERATURE REVIEW

Presence in Mediated Environment

Traditionally, the process of communication is described in terms of the transmission of information, as a process linking sender and receiver. Therefore, media are important as a means of connecting sender and receiver, and are only interesting to the extent that they contribute to or otherwise interfere with the transmission of a message from sender to receiver (Steuer, 1992). In contrast, the mediated communication model, represented in Figure 1, suggests that the primary relationship is not between the sender and the receiver, but rather with the mediated environment with which they interact (Steuer, 1992; Hoffman & Novak, 1996). Information is not transmitted from sender to receiver; rather, mediated environments are created and then experienced (Steuer, 1992).

Figure 1. Mediated Communication



Source: Hoffman & Novak (1996).

When perception is mediated by a communication technology, one is forced to perceive two separate environments simultaneously: the physical environment in which one is actually present, and the environment presented via the medium (Steuer, 1992). The experience of presence in a mediated environment is created by means of a communication medium. Presence refers to the strong perceptual illusion in which the user of a medium experiences sensations of being present in an environment, and perceives objects found there as equally present (Biocca and Delaney, 1995). In other words, presence is the perception that a mediated experience is real rather than mediated (Lombard & Ditton, 1997). Presence as transportation is telepresence. In telepresence, the immediate environment and the source of sensation is transported, using technology, to a location that differs from that of the physical body (Biocca, 1997). That is, telepresence is the extent to which one feels present in the mediated environment, rather than in one's immediate physical environment (Steuer, 1992). It is a sense of "being there" or the experience of presence in an environment by means of a communication medium (Reeves, 1991; Steuer 1992). Therefore, telepresence can be generalized as a sense of transportation to any "space" created by media.

Another type of presence is social presence. Social presence is defined as the feeling that communication exchanges are sociable, warm, personal, sensitive, and active or the degree to which a medium is perceived as conveying the presence of the communicating participants (Short et al., 1976). Biocca (1997) defined perception of social presence as the degree to which a user feels access to the intelligence, intentions, and sensory impressions of another. According to his definition, the minimum level of social presence occurs when users feel that a form, behavior, or sensory experience

indicates the presence of another intelligence. The perception of the other is the empathetic simulation of internal states of another "if we were there in the space" over there (Biocca, 1997). The simulation is run in the body and mind of the perceiver, and models the internal experience of some other moving, expressive body. Therefore, the perception of the other is based on bodily motions and cues.

Social presence is influenced by channel attributes. That is, channels that convey nonverbal information, such as facial expressions, gazes, and postures, are usually rated higher in social presence (Acker & Levitt, 1987; Short et al., 1976). Social presence theory states that communication media differ in their capacity to transmit information about facial expressions, gazes, postures, dress and nonverbal vocal cues. Accordingly, communication media that can convey nonverbal cues and social-context cues (e.g., face-to-face and video conferencing) rate high in social presence. In contrast, media that lack nonverbal elements and feedback cues (e.g., computer-based communication technologies and written documents) are considered to rate low in social presence (King and Xia, 1997).

Variables that Influence Presence

Structural variables

Generally, presence can be influenced by the structure of the mediated presentation, content in the medium, and media user characteristics. Vividness and interactivity are the main types of structural variables in the communication system. The sense of presence is a function of vividness of an experience, that is, the representational richness of a mediated environment, and the level of interactivity, or degree to which a

participant can modify the form and content of a mediated environment in real time (Steuer, 1992).

Vividness is composed of sensory breadth (the number of sensory dimensions) and sensory depth (the resolution within each of these perceptual channels). According to the theory, it is expected that the higher the number of sensory outputs, the greater the chance that the medium will produce a higher sense of presence. Actually, Short et al. (1976) proved this assumption by showing that media that provide both audio and visual stimuli produce greater social presence than audio-only. Regarding sensory depth, visual display characteristics can play an important role for presence. For example, high resolution quality and large image size can elicit more reality or a higher perception of presence (e.g., Reeves, Detenber, & Steuer, 1993; Bocker & Muhlbach, 1993; Lombard, 1995). Therefore, it is likely that the higher the number of sensory channels (or breadth) or the higher the quality of sensory fidelity (or depth), the higher the degree to which the senses are engaged, and the higher the level of presence.

Another component of structural variable is interactivity. Interactivity is a critical concept in computer-mediated communications because it is seen as the key advantage of the medium (Morris & Ogan, 1996; Rafeli & Sudweeks, 1997). However, the concept is not uniformly defined. Technologists have suggested that human-computer activities exemplify the human impulse to create interactive representation. The outcomes of interactivity are engagement in communication and relationship building between a company and its target consumers (Ha & James, 1998). From a mechanical point of view, interactivity has been defined as the extent to which users can participate in modifying the form and content of a mediated environment in real time (Steuer, 1992).

Steuer suggests that interactivity depends on speed, range, and mapping. Speed refers to the rate at which input can be assimilated into the mediated environment. Real-time interaction clearly represents the highest possible value for this variable. Range refers to the amount of change that can be effected on the mediated environment by modification of temporal ordering (order of events within a presentation), spatial organization (placement of objects), intensity (of volume, brightness, color, etc.), and frequency characteristics (timbre, color). Mapping refers to the degree of correspondence between the type of user input and the type of medium response. From an interpersonal communication perspective, many communication researchers (e.g., Rafaeli & Sudweeks, 1997) use face-to-face communication as the standard of interactivity and evaluate the interactivity of mediated communication by how closely it simulates face-to-face communication (Walther & Burgoon, 1992). If presence is influenced by interactivity, it seems that the level of presence may depend on the number of choices available in modifying the form and content of a medium or how closely the medium simulates face-to-face communication.

Other structural variables include ease of interaction and social factors. For example, Weghorst and Bellinghurst (1993) reported that designs that eased the interaction were most predictive of the sense of presence in the virtual environment. Numerous researchers suggest that sense of presence may increase with the existence of other individuals or virtual actors (Heeter, 1992; Steuer, 1992; Welch et al., 1996). Because humans are well accustomed to interacting with other humans in the real world, the apparent presence of others in virtual worlds should enhance the experience of telepresence (Steuer, 1992).

Content variables

The content factor includes objects, human and non-human characters, and the nature of tasks or activities. Media users often respond to social cues presented by persons they encounter within a medium (on television) even though it is illogical and even inappropriate to do so (Lombard, 1995). The mediated nature of the interaction is ignored, and the media personality is incorrectly perceived as a social actor. The same thing can happen on the computer. That is, virtual actors (or agents) with human gestures, facial movements, and voice can lead users to interact with them, making the interaction more like interacting with another human. For example, facial expressions play a major role in interpersonal communication. In a telecommunication application, a greater sense of "being there" (telepresence) might be achieved if virtual reality systems could display representations of facial expressions (Biocca & Delaney, 1995).

The nature of tasks can also influence presence. Short et al. (1976) hypothesized that social presence depends upon not only the visual non-verbal cues transmitted, but also upon more subtle aspects, such as the apparent distance of the other (e.g., voice volume) and the 'realness' of the other (e.g., fidelity of speech reproduction). Short et al. hypothesized that the suitability of any given communications medium for a specified type of interaction depends on two things: the degree of social presence of the medium, and the degree of social presence required by the task. For example, high social presence media (e.g., video conferencing) were judged more appropriate for personal tasks and low social presence media (e.g., telephone, business letter, etc.) were judged more appropriate for simple tasks (Perse & Courtright, 1993; Rice, 1992).

In generating the sense of "being with others," social presence is related to two important concepts originally applied to non-mediated interpersonal communication: intimacy and immediacy (Lombard & Ditton, 1997). Intimacy refers to the process of reciprocal self-confirmation and the affective tone of the relationship. In large part, the experience of intimacy is closely tied to the expression of nonverbal involvement. Immediacy, dominance, and arousal are the three primary dimensions of nonverbal behavior (Mehrabian, 1981). The immediacy dimension indicates a sense of psychological closeness. The dominance dimension (e.g., facial and gestural animation) encompasses behaviors that signal the degree to which the actor is powerful or powerless. The arousal dimension refers to the amount of physiological and physical activation experienced by the actor. Immediacy cues (e.g., physical proximity, body orientation, eye contact, nodding, or facial pleasantness) are approach behaviors that signal availability, increase sensory stimulation, and decrease both the physical and psychological distance between the interactors (Andersen, 1985; Burgoon, Buller, & Woodall, 1989; Patterson, 1983). Positive affect cues, such as smiling and vocal pleasantness, are also important because they signal availability and communication warmth and intimacy (Andersen, 1985; Burgoon, 1994). A medium high rating in social presence is achieved when the interactors can adjust more of these variables and therefore more precisely adjust the overall level of intimacy (Lombard & Ditton, 1997). Therefore, it seems logical to expect that the capacity to deliver nonverbal cues may increase the sense of "being with others," and the sense of "being there" on the Web.

Media user characteristics can also interact with media structure and content variables to influence presence. Although almost no research has been conducted to

examine the relationship between user characteristics and presence, some variables were suggested as determinants of presence: knowledge of and prior experience with the medium, age, gender, and personality type (Lombard & Ditton, 1997). The current study focuses on structural and content variables of a medium mainly because these are fundamental in establishing and maintaining an experience of presence in a mediated environment. The user's characteristics, such as personality type, personal traits, and temporal mood, can also be very important. However, those characteristics are beyond the scope of this research.

CHAPTER 3

THEORETICAL FRAMEWORK

The Effects of Presence

The focus of much of the interest in presence concerns a wide range of psychological effects. Though research concerning those effects has only just begun, it is expected that presence may enhance a Web user's enjoyment, involvement, task performance, persuasion, and memory, depending on the media content and the user's characteristics (Lombard & Ditton, 1997). Heeter (1995) found that the feeling of entering another world was strongly related to enjoyment of the virtual experience. Media experiences that evoke presence tend to be highly involving (Lombard & Ditton, 1997). For example, virtual reality experiences are active and involving, unlike television viewing (Heeter, 1995). In one study (Kubey & Larson, 1990), children reported significantly higher attention, arousal, and motivation levels while playing video games than they reported while watching television. In an analysis of BattleTech, a virtual reality game, involvement was the highest gratification factor (Heeter, 1995). Therefore, presence implies a direct and natural experience, rather than just the processing of symbolic data, and is therefore likely to be more compelling (Lombard & Ditton, 1997). There is not much research regarding the effect of presence on advertising effectiveness. In one study (Kim and Biocca, 1997), it was found that the sense of being present in a mediated environment had a positive effect on attitude change (e.g., buying intention and confidence in product decision).

Effects of Nonverbal Communication Cues

When we think about the way people interact with each other, it is clear that our body displays structured signals that are an integral part of communication with other people. For example, Mehrabian (1972) found that only 7 percent of our feelings and attitudes are communicated with words, 38 percent via tone of voice and 55 percent through nonverbal expressions (Gschwandtner & Garnett, 1985).

> *During an average 30-minute sales call, buyer and seller exchange approximately 800 different nonverbal messages. Think about your last meeting with a client. Can you recall his or her basic sitting position? Did he lean forward or backward in his chair? You may have seen her smile, but did you notice whether her arms and legs were crossed at the same time?*
>
> *Most salespeople focus on the verbal part of the sale. Some of them listen to the tone of voice—how the words are said. And the salespeople who pay attention to body language focus almost exclusively on facial expressions. Obviously, these are all necessary areas of interest. Words, the way they're spoken, and a person's face all give the seller information about how the call is going.*
>
> (Gschwandtner & Garnett, 1985, p3)

Therefore, when examining the effects of an agent, it is important to consider the relationship between nonverbal cues and persuasion.

The literature linking nonverbal behaviors directly to persuasion is focused on kinesic and vocal cues. Mehrabian and Williams (1969) found that speakers attempting to be persuasive and speakers who are actually persuasive (a) used more eye contact with their audience, leaned back less or adopted closer distances, and used more affirmative head nods; (b) gestured more and were more facially expressive; and (c) were moderately relaxed. A few other studies also found increased persuasiveness with more frequent and longer eye contact (LaCrosse, 1975; McGinley, LeFevre, & McGinley, 1975; Timney & London, 1973), more gestural and facial activity (Edinger & Patterson, 1983; Forbes & Jackson, 1980; Maslow et al., 1971), and less postural rigidity (Maslow et al., 1971) but

more random movement (Young & Beier, 1977). Bettinghaus and Cody (1987) identified eye contact, smiles, nodding, gestures, and moderate relaxation as behaviors that enhance performance ratings, which should translate into greater persuasiveness.

Research linking vocal cues to persuasion is concentrated on fluency. Fluent speech is usually free of lengthy pauses, hesitations, repetitions, sentence changes, interruptive vocalizations, and the like. Several studies have shown that nonfluencies undermine persuasiveness and attitude change (Erickson et al, 1978; Hollandsworth, Kazelskis, Stevens, & Dressel, 1979; McCroskey & Mehrley, 1969; Mehrabian & Williams, 1969). Other studies found that persuasiveness can be enhanced by quickened speaking rate (Apple et al., 1979; Mehrabian & Williams, 1969; Miller et al., 1976) or by increased vocal intensity in the form of louder amplitude, greater intonation, greater fluency, and faster tempo (Edinger & Patterson, 1983; Erickson et al., 1978; Mehrabian & Williams, 1969).

Vocal, facial (including gaze, eyebrow action, and mouth movement), and gestural animation also indicate a high degree of expressiveness (Burgoon & Newton, 1991). Coker and Burgoon (1987) suggested that kinesic, proximic, and vocal patterns combine to create perceptions of alertness, attention, focus, and interest. For example, such perceptions can be created by raising the eyebrows and slightly nodding head on a stressed or an accented word, raising the eyebrows during an offer or a suggestion, blinking on a pause, lowering the eyebrows and wrinkling the nose when saying "not," and dropping the jaw when showing surprise (Vilhjalmsson, 1997). Facial movements such as nodding and brow raising are also used as listener feedback, sometimes accompanying a low verbalization like "mhm" or "yeah."

With high physical expressiveness accompanied by positive affect cues (e.g., smiling and/or a warm voice), intimacy (psychological and/or physical closeness) and affiliation are likely conveyed (Burgoon, 1994). Similarly, it is expected that an agent with positive nonverbal cues can develop intimacy and affiliation with users during the interaction. For example, an agent with a sustained gaze and a smile may indicate its intention to greet users visiting the Web site. Therefore, the Web advertisement with an agent is likely to generate a more favorable response from consumers.

Vividness Effects and Communication Modality

Perhaps the most fundamental decision facing advertisers is the decision about how best to present their product information. Nisbett and Ross (1980) state that vividly presented information has more impact on judgment than does pallid and abstract information. Nisbett and Ross note that information is vivid to the extent that it attracts or holds attention and excites the imagination by being "(a) emotionally interesting, (b) concrete and imagery-provoking, and (c) proximate in a sensory, temporal or spatial way" (p. 45). Considerable support for this belief is found in literature that judges message effectiveness in terms of stimulus recall (Kisielius & Sternthal, 1986).

However, previous research pertaining to the effects of vividness on persuasion seems controversial (McGill & Anand, 1989). The presentation of a persuasive message is characteristic of vividness studies. In these studies, vividness is manipulated via the concreteness of the verbal information presented, the presentation format (or modality) (e.g., audio-visual, audio, print), or the presence and absence of instructions to create a mental image (Kisielius & Sternthal, 1986). Regarding the message modality, several

studies report that vividness did not have a significant attitudinal effect (e.g., Borgida, 1979; Edell & Staelin, 1983; Gottlieb, Taylor, and Ruderman, 1977; Keating & Latane, 1976; Manis et al., 1980; Nisbett & Borgida, 1975). However, other studies show that communication modality has an effect on attitude change (e.g., Andreoli & Worchel, 1978; Chaiken & Eagly, 1983; Worchel, Andreoli, & Eason, 1975).

The availability-valence hypothesis is one way to explain this controversy. The hypothesis posits that judgements (or attitudes) depend on the favorableness of the information that is available in memory. Availablity refers to the ease with which an association can be accessed from memory. One factor that is important in accounting for vividness effects is *cognitive elaboration*, which refers to the number of associative pathways in memory (Nisbett & Ross, 1980). Subject to the limited capacity of human memory, the greater the cognitive elaboration of information, the greater is its availability for rendering attitudinal judgements. Judgments depend on the favorableness, or *valence*, of the available information (Kisielius & Sternthal, 1986). Valence is defined in relative terms in that information is viewed as being more or less favorable toward an object.

According to this view, vividness of message can affect attitudes by influencing the extent to which people will engage in cognitive elaboration. To the extent that information is rich in modality, messages using these devices are likely to enhance the number of message-relevant associations in memory. Mousavi et al. (1995) suggest that dual-presentation modalities may increase working memory resources by activating both auditory and the visual working memory rather than just one or the other. In a similar fashion, Mayer and Moreno (1998) found that the superiority of simultaneous narrations and animations over simultaneous text and animations is consistent with separate

channels for visual and auditory processing. Whether vivid information evokes cognitive elaboration that may either enhance, undermine, or have no effect on the persuasiveness of a message depends on the relative favorableness of the information in response to vivid and pallid presentations.

Regarding the enhancement of message persuasiveness, Chaiken and Eagly (1983) found that a video presentation presented by a likable source was more effective than the same message presented in audio or written format. Conversely, for an unlikable source, audio and written message presentations were more persuasive than video message presentations. Andreoli and Worchel (1978) reported that when the source was highly credible, the audio-visual presentation induced more favorable judgments of the position advocated than did the audio or written presentations. By contrast, when the source was less credible, the written presentation yielded more favorable judgments. The results can be interpreted in terms of the availability-valence perspective. It is likely that the audio-visual presentation enhanced cognitive elaboration of information about the communication source. When the sources were highly credible, the elaboration of favorable information in the audio-visual presentation enhanced acceptance of the advocacy, whereas when the sources lacked credibility, unfavorable information was elaborated, and persuasion declined. In the same way, it is expected that the advertising Web site presenting an anthropomorphic agent will induce greater cognitive elaboration than the Web without an agent because of the agent's audio-visual message presentation. Simultaneously, an agent's favorable nonverbal cues may influence the valence of relevant information to enhance the persuasiveness of advertising messages. In sum, the

Web advertisement with an agent will generate more favorable response from consumers than the Web advertisement without an agent.

Advertising Effectiveness: Antecedents of Attitude toward the Ad

When advertising content is exposed to consumers in a specific manner, the first "communication effect" likely to result from advertising processing responses is the consumer's overall evaluation of the advertising itself, their attitude toward the ad (Rossiter & Bellman, 1999). Researchers investigating advertising persuasion have focused on advertising attitudes and brand attitudes (Brown & Stayman, 1992). Consumers' attitudes toward advertising have been considered important to track because they likely influence consumers' exposure, attention, and reaction to individual ads through a variety of cognitive and affective processes (Schlosser et al., 1999). Attitude toward the ad (Aad) has been defined as a "predisposition to respond in a favorable or unfavorable manner to a particular advertising stimulus during a particular exposure situation (MacKenzie, Lutz, & Belch, 1986). Percy and Rossiter (1992) noted that Aad has been conceptually defined in terms of "overall liking" of the advertisement, liking of specific aspects of an advertisement, and in terms of a single (global/affective) component as well as separate (cognitive and affective) dimensions. Thus, no universal definition of Aad has emerged.

Research shows that Aad is affected by ad credibility and ad perceptions (Lutz, MacKenzie, & Belch, 1983; Lutz, 1985), ad cognitions (Chattopadhyay & Basu , 1990; Homer, 1990; Muehling & Laczniak, 1992), ad-induced feelings (Burke & Edell, 1989; Stayman & Aaker, 1988), prior brand attitudes (Edell & Burke, 1987; Messmer, 1979), and involvement in the advertisement (Kardes, 1988). More specifically, advertising

related factors include humorous appeals (Belch & Belch, 1984; Chattopadhyay & Basu, 1990; Madden, Allen, & Twible, 1988), the use of celebrities and endorsers (Atkin & Block, 1983; Kamins, 1990; Freiden, 1984; Lutz, MacKenzie, & Belch, 1983), the visual/verbal nature of the ad (Mitchell, 1986), sexual appeals (Severn, Belch, & Belch, 1990), warm ads (Aaker, Stayman, & Hagerty, 1986), highly emotional ads (Thorson & Page, 1988), and ads evoking a pleasant feeling (Villarreal, 1985).

The Effects of an Anthropomorphic Agent on Advertising Effectiveness

Anthropomorphic agents can simulate face-to-face interaction in their speech with appropriate facial expressions, such as raising their eyebrows while asking a question or nodding and raising their eyebrows on an emphasized word, giving feedback while listening in the form of nods, low "mhm"s and eyebrow action, and finally, "giving the floor" or selecting the next speaker using gazes (Vilhjalmsson, 1997). In face-to-face conversation, people rely on various kinds of gestural information given by their partners, and therefore, they have to glance at each other, at least from time to time. Listeners spend more than half of the time looking at the speaker, supplementing the auditory information (Argyle and Cook, 1976).

The same phenomenon can occur in a mediated environment when users are faced with an agent capable of multi-modal interaction that integrates speech, gestures, and facial expressions. In order to read visual and auditory signals from an agent, users may have to direct their attention and, thus, their gaze toward the source (the agent, in this case). The audio-visual presentation of messages by the agent will facilitate the cognitive elaboration, thereby making information more accessible from the memory.

Simultaneously, an agent's favorable nonverbal cues may influence the valence of relevant information to enhance the persuasiveness of advertising messages. This process will evoke ad-induced feelings to have direct effects on Aad. Thus, the following hypothesis is proposed:

> H1a: People who are exposed to the Web advertisement with an agent will have more favorable attitudes toward the advertisement (Aad) than people who are exposed to the advertisement without an agent.

Advertising Effectiveness: Consequences of Attitude toward the Ad

The effects of attitude toward the advertising logically fall within one of three categories: cognitive, affective, or behavioral. The Aad's influences on cognitive processes include its impact on brand attribute beliefs (Hastak & Olson, 1989), cognitive responses directed toward the brand or product (Homer, 1990; MacKenzie & Lutz, 1989; MacKenzie, Lutz, & Belch, 1986), brand recall, and brand recognition (Zinkhan, Locander, & Leigh, 1986).

Investigations of the effect of Aad on affective processes have focused mostly on brand attitude. Much research has supported the notion that individuals' Aad has a direct influence on brand attitudes (e.g., Lutz, MacKenzie, & Belch, 1983; Laczniak & Carlson, 1989; Laczniak & Muehling, 1990; Park & Young, 1986; Miniard, Bhatla, & Rose, 1990).

Regarding the effects of Aad on behavioral processes, MacKenzie, Lutz, & Belch (1986) identified four processes of how Aad could mediate advertising effectiveness. One view is expressed in the indirect effects model, where Aad has an impact on Ab

through affect transfer, and Ab in turn affects intentions. Ab includes beliefs formed from advertising brand attribute information and inferences based on advertising picture content (Gardner, 1985; Mitchell & Olson, 1981). In this view, Ab mediates the impact of Aad on purchase intentions and there is no direct Aad-intention link (dual mediation model). One version of this model is the reciprocal mediation model in which a bidirectional relationship is proposed between Aad and Ab, with the latter determining intention. Another view is expressed in the independent influence model. This model proposes that both Aad and Ab have direct but separate influences on intentions (MacKenzie, Lutz, & Belch, 1986).

So far, most research supports the mediated effects of Aad on intentions. For example, MacKenzie et al. (1986) found strong support for the dual mediation (indirect effect) model. Further, Brown and Stayman (1992) meta-analyzed 43 articles in advertising and marketing research journals and found support for the dual mediation model, which posits a direct effect of ad attitude on brand attitude as well as an indirect effect via brand cognitions. This model has been previously supported by a number of studies (e.g., Homer, 1990; Miniard et al., 1990), and thus, appears fairly robust. In sum, Aad will mediate ad-related feelings to Ab and Ab, in turn, will influence intentions. Thus, the following hypotheses are proposed:

> H1b: People who are exposed to the Web advertisement with an agent will have more favorable attitudes toward the brand (Ab) than people who are exposed to the advertisement without an agent.

H1c: People who are exposed to the Web advertisement with an agent will have a higher intention to purchase the brand (PI) than people who are exposed to the advertisement without an agent.

H1d: Aad will mediate ad-related responses to Ab and, in turn, Ab will influence purchase intention.

In measuring behavioral intentions, specifically for Web advertisements, the type of advertising exposure needs to be considered. Advertising exposure in the Internet is more voluntary or sought-out than traditional advertising because it requires more commitment with voluntary action (e.g., visiting the Web site) (Cho, 1999). In traditional media (e.g., magazines), communication is a one-way passive process that requires no extra voluntary action (e.g., visiting Web sites, clicking banner ads) other than purchase. In contrast, voluntary action (e.g., visiting Web sites) is a precondition for consumers' active information processing. This means that if the Web site is not visited, the information in the Web site will be totally ignored. However, consumers with a specific interest in the Web site can bookmark advertising sites for future reference or voluntary repeated exposure (Cho, 1999). Attracting visitors to Web sites is important as a positive behavioral consequence for commercial Web providers (Novak, Hoffman, & Young, 1999). Therefore, "intention to revisit (VI)" the Web site has been added to the list of dependent variables. Consequently, the following hypothesis is also proposed:

H1e: People who are exposed to the Web advertisement with an agent will have a higher intention to revisit the Web site (VI) than people who are exposed to the advertisement without an agent.

Since there is no literature to suggest the probable relationships between media content and the mediating effects of Aad and Ab on VI, the same pattern will be hypothesized as in H1d, as follows:

H1f: Aad will mediate ad-related responses to Ab and, in turn, Ab will influence intention to revisit the Web site.

The Effect of Presence on Advertising Effectiveness

A human-like virtual agent with facial expressions and a voice may develop a higher sense of presence in the Web site by simulating some elements of face-to-face interactions. Even though there is a dearth of advertising literature addressing the issue of presence, nonverbal communication literature and vividness theory imply a positive relationship between presence and advertising effectiveness. In the presence literature, the sense of presence is affected both by the communication modality as a sensory breadth and by nonverbal cues as content variables (e.g., Lombard & Ditton, 1997). The modality of message presentation will influence the vividness of the message and an agent's nonverbal cues will influence the users perceived interactivity in the mediated environment. Thus, when a user interacts with an agent in a vividly simulated audio-visual environment, more sensory cues will be involved and perceived by the users. Such an interaction will lead to a higher degree of telepresence than if no agents were present. Also, it is expected that a higher degree of social presence will be conveyed as the user interacts with an agent capable of both verbal and nonverbal cues. Therefore, the following hypotheses are proposed:

H2: A Web advertisement with an agent will generate higher telepresence than an advertisement without an agent.

H3: A Web advertisement with an agent will generate higher social presence than an advertisement without an agent.

Nonverbal communication literature and vividness theory imply a positive relationship between presence and advertising effectiveness. Therefore it is expected that the effect of an agent delivering dual modality (audio-visual) and nonverbal cues will be mediated by presence to affect the attitude toward the advertising. This means that, in the Web environment, the more the consumer feels that he or she is really present and interacting with an agent, who looks and sounds favorable, the more favorable will be the consumer's attitudes or behavioral intentions. Thus, the following hypotheses are proposed:

H4: The effect of an agent will be mediated by telepresence to influence attitude toward the advertisement.

H5: The effect of an agent will be mediated by social presence to influence attitude toward the advertisement.

The Agent and Source Credibility

Marketing and advertising practitioners believe that a communicator's character has a significant effect on the persuasiveness of the message (Ohanian, 1990). Given the impact a source can have on a communicator's persuasiveness, researchers have been interested in understanding which characteristics of a source will influence persuasion. A

number of empirical investigations have examined the effectiveness of using credible spokespersons to enhance the persuasiveness of messages. The research on source credibility has shown that in most situations a highly credible source is more effective than a less credible source (Sternthal et al., 1978). Highly credible sources also have been found to produce more positive attitude changes toward the position advocated and to induce more behavioral changes than have less credible sources (Craig & McCann, 1978). Source credibility had considerably stronger effects when the elaboration likelihood was low (Petty et al., 1987).

Studies have measured the process by which a communicator's perceived attractiveness, trustworthiness, and expertise mediate immediate and delayed attitude change and persuasion (e.g., Anderson & Clevenger, 1963; Hovland & Weiss, 1951; Patzer, 1983; Whittaker & Meade, 1968). The attractiveness model contends that the effectiveness of a message depends on the source's familiarity, likability, similarity, and attractiveness to the respondent. Research has shown that physically attractive communicators are more successful in changing beliefs than are unattractive communicators (Chaiken, 1979; Dion & Berscheid, 1972). In an exhaustive review, Joseph (1982) concluded that attractive communicators are consistently liked more and have a positive impact on products with which they are associated. This result is consistent with other studies reporting that increasing the communicator's attractiveness enhances positive attitude change (Simon, Berkowitz, & Moyer, 1970; Kahle & Homer, 1985).

Another influential characteristic is the communicator's perceived expertise, which is the extent to which a communicator is perceived to be a source of valid

assertions (Hovland, Janis, & Kelley, 1953). Research investigating source expertise in persuasive communication generally indicates that the source's perceived expertise has a positive impact on attitude change (Horai, Naccari, & Fatoullah, 1974; Maddux & Rogers, 1980; Mills & Harvey, 1972). In a selling context, an expert salesperson induced a significantly higher number of customers to purchase a product than did the nonexpert salesperson (Woodside and Davenport, 1974). Similarly, Crano (1970) experimentally manipulated the dimensions of expertise and found that subjects exposed to an expert source exhibited more agreement with the advocated position than did those exposed to a low-expertise source.

Finally, numerous studies support the positive effect of trustworthiness on attitude change. Trustworthiness refers to the consumer's confidence in the source for providing information in an objective and honest manner. Studies show that when the communicator was perceived to be highly trustworthy, an opinionated message was more effective than a non-opinionated communication in producing attitude change (Miller & Baseheart (1969). It was also found that a source who was perceived to be both an expert and trustworthy generated the most opinion change (McGinnies & Ward, 1980).

Recent research suggests that the three dimensions (e.g., attractiveness, trustworthiness, expertise) of source credibility can make independent contributions to source effectiveness (Weiner & Mowen, 1985). For example, a spokesperson can be perceived as an expert and still be untrustworthy (e.g., a salesperson), or a spokesperson lacking expertise can be perceived as highly trustworthy (e.g., a consumer in a peer group). While sales personnel often have more knowledge on a particular subject than does an inexpert friend, many consumers doubt salespeople's trustworthiness because of

the potential conflict of interest (Ohanian, 1991). Comparatively, in testimonial advertising, consumers traditionally have been chosen as product endorsers because of their similarity to target audiences (Ohanian, 1990).

Regarding the role of the agent as a communicator, previous animation literature suggests that animated characters have been granted a special kind of credibility born of animation's unique ability to create the "illusion of life" (e.g., Cholodenko, 1991, p.20). The use of animation in advertising is not a new technique. But advanced technology, especially in computer animation, has made animation a more flexible and artistic tool (Callcott & Lee, 1994). Animation historians and advertising experts alike have associated viewer propensity to "suspend disbelief" with animation's ability to produce believable characters (Baldwin, 1982; Crafton, 1982). Gales (1987) adds that the animated character's ability to imitate live action helps adults, as well as younger audiences, to accept the character as real. Therefore, it is likely that an agent endowed with a specific character (e.g., salesperson, consumer) may act as a spokesperson simulating an interaction with users in advertising Web sites. In such case, the agent's level of attractiveness, expertise, and trustworthiness will affect the persuasiveness of the agent's message. For example, an agent acting as a salesperson and an agent acting as a consumer may not have the same level of source credibility. Even if the agents are presented with the same physical appearance and voice, the agent's role as a salesperson and as a consumer may affect the persuasiveness of the message. In this case, the agent's trustworthiness and expertise will influence attitudes and behavioral intentions due to the role imposed on the agent. Given the risks associated with the selection of an

inappropriate communicator, it is important for the advertising manager to select the right spokesperson. To this end, the following hypothesis is proposed:

H6a: Consumers' perception of attractiveness, trustworthiness, and expertise in the Web advertisements with a sales agent will be different from those in the advertisements with a consumer agent.

H6b: Consumers' attitudes (Aad, Ab) and behavioral intentions (PI, VI) in the Web advertisement with a sales agent will be different from those in the Web advertisement with a consumer agent.

Screen Size, Presence, and Advertising Effectiveness

The content of the Web site is not the only characteristic that influences presence. Also important are the forms of media such as size, shape, fidelity, etc. Many forms of visual displays encourage a sense of presence. Among them, the size of a visual image is one of the most primitive cues that has received the greatest attention from researchers concerned with presence (Lombard & Ditton, 1997). Larger images have been shown to evoke more intense presence-related responses such as higher arousal, greater agreement with a statement, greater sensation of reality, or higher involvement (e.g., Reeves & Nass, 1996; Reeves, Detenber, and Steuer, 1993; Yuyama, 1982; Ditton, 1997). The size of an image is significantly a function of the size of the screen. Reeves and Nass (1996) assumed that a larger image fills a greater percentage of the viewer's visual field and is, therefore, more immersive and so more likely to evoke presence. A handful of studies have examined the effect of screen size on presence in the context of television viewing. In most cases, they support the assumption that a larger screen can be more immersive

and more likely to generate an illusion of nonmediation than a small display (e.g., Lombard 1995; Lombard et al., 1997; Lombard et al., 2000). Kim (1996) showed participants an informercial on either a 9-, 20-, or 32-inch television screen and found no differences in presence. However, for his study, the large screen size of 32 inches was relatively smaller than the screen used in other studies and may not have been large enough to see a difference in the presence effect among screens.

Additionally, the types of display may affect sense of presence. In a comparison of Head Mounted Displays (HMDs), monitors, and screen-based projections, the screen-based projections were found to produce the greatest immersion in inexperienced users. The screen-based projection was most preferred because it was perceived as the most natural display medium. The computer monitor was perceived as the least immersive display. The HMD was criticized for its low resolution and blurred images (Deisinger et al., 1997). It is expected that a larger screen used in screen-based projection will create higher presence than a small monitor. Therefore, the following hypotheses are proposed:

H7: A Web advertisement on a large screen will generate a higher telepresence than on a small monitor.

H8: A Web advertisement on a large screen will generate a higher social presence than on a small monitor.

The presence from the larger screen may also influence consumers' responses in terms of attitudes and behavioral intentions. According to Reeves and Nass (1996), larger screens create more arousal, stronger memories, and more positive evaluations of the content displayed. In their experiment, participants viewed segments from entertainment movies. Each segment lasted between two and three minutes. The result

was that the viewers liked the movie scenes on the large displays considerably more. The scenes were more exciting, the action faster, the pictures more realistic, and viewers reported feeling more a part of the action. Lombard (1995) also confirms this finding by reporting that when subjects watched attractive and professional news anchors deliver stories on a large (42 inch) screen, the subjects reported more positive emotional responses to the anchors and to the viewing environment, than when the anchors appeared on small (26 or 10 inch) screens. Recently, Lombard et al. (2000) reported that participants who watched a large screen television thought the movement in the scenes was faster, experienced a greater sense of physical movement, enjoyed the movement to a greater extent, found the viewing experience more exciting, and were more physiologically aroused. Therefore, it is expected that the larger screen used with screen-based projection will develop more favorable responses to the Web site from the consumers than the small size computer monitor. Therefore, the following hypotheses are proposed:

H9a: People who are exposed to a Web advertisement on a large screen will have a more favorable attitude toward the advertisement than people who are exposed to the same advertisement on a small monitor.

H9b: People who are exposed to a Web advertisement on a large screen will have a more favorable attitude toward the brand than people who are exposed to the same advertisement on a small monitor.

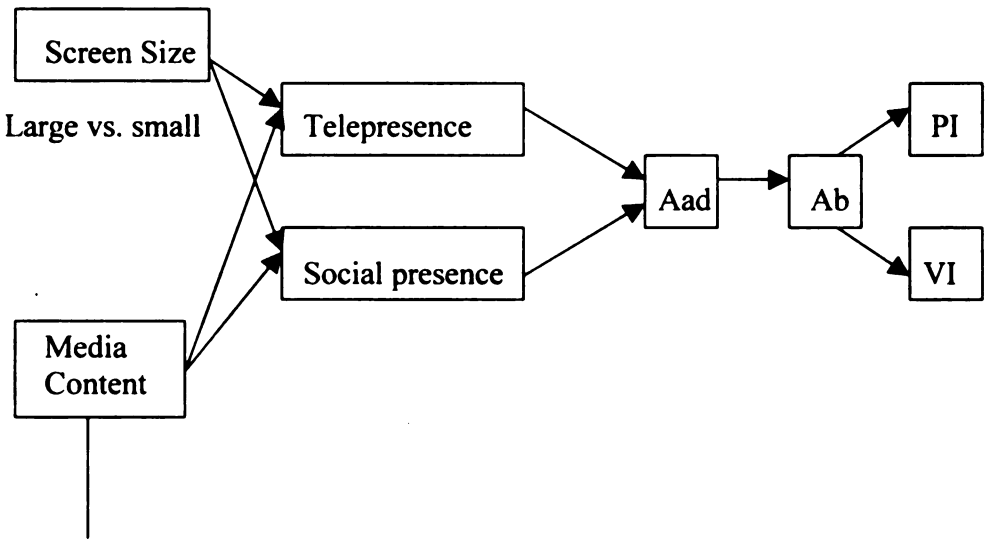
H9c: People who are exposed to a Web advertisement on a large screen will have a higher intention to purchase the brand than people who are exposed to the same advertisement on a small monitor.

H9d: People who are exposed to a Web advertisement on a large screen will have a higher intention to revisit the Web site than people who are exposed to the same advertisement on a small monitor.

The Hypothetical Model

The possible theoretical links that are examined by the above-stated hypotheses are summarized in the model shown in Figure 2. In sum, it is expected that telepresence and social presence will mediate the effects of screen size and that an anthropomorphic agent will have a positive effect on consumers' responses to the Web advertisement.

Figure 2. The Proposed Hypothetical Model



Web advertisement without an agent

Web advertisement with an agent

Aad: Attitudes toward the Ad
Ab: Attitudes toward the brand
PI: Intention to Purchase a product
VI: Intention to revisit the advertising Web site

CHAPTER 4

METHODOLOGY

Research Design

To test the hypotheses, a 2 × 3 between-subject factorial design was employed. The independent variables are screen size (small and large) and the media content (Web site without an agent, Web site with a sales agent, and Web site with a consumer agent). There are four dependent variables to measure advertising effectiveness: attitude toward the Web advertisement (Aad), attitude toward the brand (Ab), intention to purchase the brand (PI), and intention to revisit the Web site (VI). Telepresence and social presence were proposed as mediating variables between the independent variables and the dependent variables.

Figure 3. Experimental Design

	Advertising without an agent	Advertising with a sales agent	Advertising with a consumer agent
Large screen			
Small screen			

Sample for the Experiment

A total of 210 undergraduate students were drawn as a sample to be assigned in each treatment condition. The subjects were recruited from introductory advertising classes at a large midwestern university in the United States. Subjects were randomly assigned to each treatment condition, and the number of males and females were arranged to be similar across treatment conditions to control the possible effects of gender. For example, studies have found that women had significantly stronger responses (indicating presence) to a large screen, whereas men showed relatively little change (Lombard, 1995; Lombard et al., 2000). In Reeves et al's (1993) study, female participants were more likely to agree that they felt they were "part of the action" when they viewed the large rather than the small screen. Therefore, the percentages of males and females in the present study were carefully controlled.

Design of Stimulus Materials

The product categories for the advertising Web site were t-shirts and socks. These products were selected for two reasons. First, t-shirts and socks are very relevant products to college student subjects. In a survey before the experiment, clothing was found to be one of the most likely product categories that students want to see in a Web site. Second, it was assumed that subjects might respond similarly to t-shirts or socks regardless of gender. The fictitious brand name (Tees & Toes) was developed and used for the following reasons: first, Moore and Hutchinson (1983) have shown that prior attitudes toward a brand can affect advertising attitudes and related constructs. Thus, for

familiar brands, prior brand attitudes may account for variations in relationships involving advertising attitudes. Second, established brand attitudes toward familiar brands are unlikely to be as strongly affected by advertising attitudes as are brand attitudes toward novel brands about which consumers have little other information (Johnson & Eagly, 1989).

The Web advertisement without an agent contained information regarding the Tees & Toes brand: a welcoming message, user options for information search (e.g., t-shirts and socks for men and women: the size, and colors), purchase instructions, and a farewell message. The front page of the Tees & Toes Web site used a 3-dimensional background and displayed the brand name and pictures of t-shirts and socks in all the treatment conditions (see appendices 2 and 3). "Images in this thesis/dissertation are presented in color."

In the Web advertising with a sales agent, the agent introduced himself as a sales agent when the user accessed the Tees & Toes Web site. The agent was endowed with a voice and a limited level of bodily motions (e.g., head nodding, waving hands, and moving arms) to simulate a face-to-face interaction with users by delivering nonverbal cues. The agent was designed as a man with a male voice for favorable valence because both men and women are more favorably influenced by praise from a male-voiced computer than they are by identical praise from a female-voiced computer (Reeves & Nass, 1996). The voice was designed to be consistent with the behaviors, characteristics, and script of the agent because voice is an important source that activates stereotypes associated with gender, age, or personality of the agent.

At the beginning of the Tees & Toes Web site, an anthropomorphic agent appeared and introduced himself and the product, and welcomed visitors. The agent remained on the screen to simulate an interaction with users while users searched for product information. After the user finished the search, the agent announced a farewell message and the Web viewing was finished.

In the Web advertising with a consumer agent condition, the agent introduced himself as a customer of Tees & Toes products. To detect the pure effects of the agent's role on the advertisement's effectiveness, the appearance (attractiveness) and the voice of the sales agent and the consumer agent were developed to be identical to each other. The script and behaviors of the consumer agent were almost the same as those of the sales agent, except that the consumer agent introduced himself as a customer (see appendices 2 and 3).

The textual message in the Web site without an agent was substantially similar to what the agents said. Every effort was made to hold the visual and verbal message components constant across treatment conditions (other than the independent variables, e.g., screen size and existence of the sales agent and consumer agent). Subjects navigated the Web site in a linear fashion in all treatment conditions, moving sequentially from the greeting message, to product search from t-shirts to socks, to the farewell message. See the scripts in *appendix 2* for more details.

The user interface (Tees & Toes Web site) and the agent was developed in the Media Interface & Network Design (M.I.N.D.) Lab at Michigan State University. To develop the 3-dimensional background and user interface, the 3 D Studio Max program

was used. Character Studio software was used to create a virtual agent. For the execution of the program and its functionality, Macromedia Director 7 was used.

Procedure

Each participant was met by the experimenter and escorted into the MIND Lab that contained computer monitors and a large projection screen. The experiments were conducted separately for large screen and small monitor conditions. In the small monitor condition, 17-inch monitors were used and were a distance of approximately 15 inches from the subject. In the large screen condition, the computer monitor was projected onto a 54-inch screen, which was 50 inches from the subject to provide a fine view. In both conditions, the physical surroundings (e.g., strength of light, noise level) were controlled to be equivalent, and resolution of the display was set at 800 × 600 pixels. Exploring the Web site took a similar amount of time (1 min. 30 sec.~ 2 min.) with an agent and without an agent. After the subjects finished navigating the Web site, a questionnaire was administered to collect their responses to the experience. After the subjects completed the questionnaire, they were told that they would be debriefed after the experiment was finished. They were then thanked and dismissed.

The experiment was started after the researcher received approval from the Michigan State University Committee for Research Involving Human Subjects (UCRIHS). All materials for the entire process were pre-tested on a group of 20 subjects to make sure that all the questions in the instrument were easy to understand and that the research process was well organized.

Measurement

Measure of Presence

Social presence (SP) experienced from the media was measured by 7-point semantic differential scales previously developed and used by Short et al. (1976) and Lombard (1999). The scales included the following anchor points: impersonal/personal, unsociable/sociable, insensitive/sensitive, cold/warm, dead/lively, dull/vivid, unresponsive/responsive, informal/formal, unfriendly/friendly, unemotional/emotional, inaccessible/accessible, and remote/immediate.

Telepresence (TP) was measured by multi-item semantic differential scales. Ten items were selected from the presence measures from Lombard (1999), who modified the scales of Kim & Biocca (1997). See *appendices 1* and *4* for details.

Measure of Advertising Effectiveness

Of the many studies incorporating measures of attitude toward advertisements, most have used bipolar adjective (semantic differential) item-pairs. Numerous studies have used more than one semantic-differential pair of items (Muehling and McCann, 1993). Typical endpoints used in the research include: "good-bad," "like-dislike," "favorable-unfavorable," "informative-uninformative," "appealing-unappealing," enjoyable-unenjoyable," "interesting-uninteresting," "irritating-not irritating," "pleasant-unpleasant," "nice-awful," "entertaining-unentertaining," and "offensive-nonoffensive" (e.g., Kirmani, 1990; Lutz, MacKenzie, & Belch, 1983; Stout & Burda, 1989; Machleit & Kent, 1989; Machleit & Wilson, 1988; Madden, Allen, & Twible, 1988; Shimp & Yokum, 1981).

For this research, attitude toward the advertisement (Aad) was measured by 7-point semantic differential scales: good/bad, like/dislike, favorable/unfavorable, enjoyable/unenjoyable, pleasant/unpleasant, appealing/unappealing, interesting/uninteresting, and nice/awful.

Attitude toward the brand (Ab) was measured by 7-point semantic differential scales: positive/negative, satisfactory/unsatisfactory, favorable/unfavorable, good/bad, and likable/dislikable (Lutz & Belch, 1983; Messmer, 1979; Mitchell & Olson, 1981; Osgood, Suci, & Tanneunbaum, 1957).

The intention to purchase the brand (PI) and the intention to revisit the Web site (VI) were measured by 7-point semantic differential scales: likely/unlikely, probable/improbable, and possible/impossible (Bearden, Lichtenstein, & Teel, 1984).

Measure of the Agent's Credibility

To test if subjects' responses to the sales agent and the consumer agent were different, the agent's perceived attractiveness, trustworthiness, and expertise was measured. Even though the experiment used the identical agent with the same voice, same face, and same gestures, it was expected that subjects' perception of attractiveness, trustworthiness, or expertise would be different due to the different role of the agents.

Source attractiveness was measured by 7-point semantic differential scales: attractive/unattractive, classy/not classy, handsome/ugly, elegant/plain, and sexy/not sexy (Ohanian, 1990).

Trustworthiness was also measured by 7-point semantic differential scales: dependable/undependable, honest/dishonest, reliable/unreliable, sincere/insincere, and trustworthy/untrustworthy (Ohanian, 1990).

Finally, expertise was also measured by 7-point semantic differential scales: expert/not an expert, experienced/inexperienced, knowledgeable/unknowledgeable, qualified /unqualified, and skilled/unskilled (Ohanian, 1990).

Demographics and Media Usage Patterns

The following information was recorded for each subject: age, gender, race, years of Web experience, hours spent daily on the Internet, monthly play of video games, and the number of experiences on an interactive virtual reality system.

Manipulation Check for the Agent's Role

To see if the subjects perceived the role of the agent (sales agent vs. customer) correctly, the following questions were asked: Did you see a person (animated human character) in the Tees & Toes Web site? (Response: Yes vs. No) If your answer is "yes," who is the person (animated human character)? (Response: Customer vs. Sales agent)

CHAPTER 5

RESULTS

Sample Size and Composition

A total of 207 usable questionnaires were collected for data analysis. The final sample consisted of 123 women (59.5%) and 84 men (40.6%). The average age of the entire sample was 20.3 years and 77.2% of the subjects were white American. More than half of them (55.6%) used the Internet for an hour or less in a typical day, and 52.7% of the subjects had begin using the World Wide Web more than 4 years ago. 53.1% of the subjects played video game less than once in a typical month. There were 92 people (44.4%) who had never used an interactive virtual reality system, and 22.7% of the subjects who answered had used such a system only once. See *appendix 5* for more details.

For the media content variable, 69 subjects (33.3%) each were assigned to the Web advertisement without agent, the Web advertisement with a sales agent, and the Web advertisement with a consumer agent. For the screen size, 46.9% of the subjects were assigned to a large screen condition, and 53.1% to a small monitor condition.

Factor Structure and Scale Reliability

For the items designed to measure each construct to be meaningful, the items should represent alternative measures of the same underlying factor (Hunter & Gerbing, 1982). Therefore, all scales used in the research, including the dependent measures and the intermediary variables, were tested and optimized for face validity, internal consistency, and parallelism using confirmatory factory analysis and tested for reliability

using coefficient alpha. The determination of face validity was made on the basis of existing theory and logical judgment and internal consistency. Parallelism tests were conducted by comparing the obtained value with the predicted value of the correlation coefficients of each item. The items with relatively large error sizes (obtained value subtracted by predicted value) were dropped from each scale. Finally, the items that passed internal consistency and parallelism tests were combined and the average score of each variable was used as a single composite measure. Summated scales were created to provide a means of overcoming to some extent the measurement error inherent in all measured variables that ranges from actual errors (e.g., data entry errors) to the inability of individuals to accurately provide information. Using the "average" response to a set of related variables will reduce the measurement error that might occur in a single question (Hair et al., 1998).

A confirmatory factory analysis performed on nineteen items designed to measure the subjects' attitude toward the ad (Aad), attitude toward the brand (Ab), intention to purchase the brand (PI), and intention to revisit the Web site (VI) revealed that the data were consistent with the posited four-factor model. The items with large error sizes were deleted from each of the four scales. The items retained for inclusion in the analysis are identified in table 2 and in *appendix 4*.

Lombard's 31 item presence measures (1999) underwent two procedures. First, principal component analysis with VARIMAX rotation was conducted to extract social presence (SP) and telepresence (TP) components. The presence scales were found to be composed of seven factors (see the appendix 4). Based on the literature (e.g., Reeves, 1991; Steuer, 1992; Biocca, 1997; Short et al., 1976), the first and the second factor were

defined to be telepresence and social presence measures. Those two factors explained 41% of the total variance. Second, a confirmatory factor analysis was conducted using the nineteen items indicating social presence and telepresence to test internal consistency and parallelism. The results of the analysis revealed that the data were consistent with the posited two-factor model. Two items from the social presence measure and one item from the telepresence measure were deleted due to large error sizes. The items retained for inclusion in the analysis are identified in table 2 and in *appendix 4*.

Finally, a confirmatory factory analysis performed on the fifteen items designed to measure subjects' perceived credibility of the agent (attractiveness, trustworthiness, and expertise) revealed that the data were consistent with the posited three-factor model. The items with large error sizes between obtained correlations and predicted correlations were deleted from each of the three scales. Also, the items mitigating the scale reliability were dropped from the scales. The items retained for inclusion in the analysis are identified in table 2 and in *appendix* 4. Summated scales were calculated as a composite measure for each variable, and scale reliability was assessed by coefficient alpha using the retained items. Table 1 displays descriptive statistics and Table 2 shows the result of the validity and the reliability check after optimization of the scales. The coefficient alpha for variables ranged from .73 to .97, and most scales stayed above the .90 level.

Table 1. Descriptive Statistics for Scales Used in the Experiment

Variables	M	SD	Number of items included in the final analysis	Coefficient alpha
Social presence	4.60	1.14	6	.86
Telepresence	3.43	1.43	10	.95
Aad	5.07	1.24	6	.95
Ab	4.59	1.29	4	.95
PI	3.28	1.75	2	.97
VI	4.13	1.91	3	.96
Attractiveness	3.58	1.13	3	.73
Trustworthiness	4.59	1.47	4	.90
Expertise	4.58	1.49	3	.94

Table 2. Summary of Measures used for Data Analysis

Variables	Selected Items
Social presence (SP)	Cold/Warm Unsociable/Sociable Impersonal/Personal Unfriendly/Friendly Unemotional/Emotional Unresponsive/Responsive
Telepresence (TP)	To what extent ddi you feel like you were inside Tees & Toes Web site you saw/heard? To what extent did you feel surrounded by the environment you saw/heard in Tees & Toes Web site? To what extent did you feel immersed in Tees & Toes Web site you saw/heard? To what extent did you experience a sense of being "really there" inside Tees & Toes Web site you saw/heard?

	How often did Tees & Toes Web site you saw/heard seem more like 'somewhere that you visited' rather than 'something that you saw/heard? How often did you feel "My body was in this room, but my mind was inside Tees & Toes Web site I saw/heard"? How often did it feel as if you visited another place? How often did you feel you were inside Tees & Toes Web site you saw/heard? How much did it feel as if you were inside Tees & Toes Web site you saw/heard observing the products? How addictive was the experience?
Aad	Bad/Good Dislike/Like Unfavorable/Favorable Unenjoyable/Enjoyable Unpleasant/Pleasant Awful/Nice
Ab	Negative/Positive Unsatisfactory/Satisfactory Bad/Good Dislikable/Likable
PI	Unlikely/Likely Improbable/Probable
VI	Unlikely/Likely Improbable/Probable Impossible/Possible
Attractiveness	Unattractive/Attractive Ugly/Handsome Not sexy/Sexy
Trustworthiness	Dishonest/Honest Unreliable/Reliable Insincere/Sincere Untrustworthy/Trustworthy
Expertise	Not an expert/Expert Inexperienced/Experienced Unknowledgeable/Knowledgeable

The Effects of Anthropomorphic Agents on Attitude toward the Ad

To test the mean difference in Aad across treatment conditions, univariate analysis of variance was conducted as shown in Tables 3, 4, and 5. Before running the analysis, the assumption of homogeneity of variance were checked using Levene's test of equality of error variances for all dependent measures. The results of tests indicated insignificant F-values, which means that the error variances of dependent variables are equal across conditions.

Overall, there was a significant main effect of the media content (without an agent, sales agent vs. consumer agent) but screen size was not an influencing factor for Aad. There was no significant interaction effect between screen sizes and media content either. Hypothesis 1a posited that people who are exposed to the Web advertisement with an agent would have more favorable attitudes toward the advertisement than those exposed to the advertisements without an agent. To directly test the hypothesis, the mean of the "without-an-agent" condition was compared to the mean of the "with-an-agent" conditions (combined sales agent and consumer agent conditions) using the Helmert contrast method. Helmert compares the mean of each level of the factor (except the last) to the mean of subsequent levels. There was a significant mean difference on Aad between "with-an-agent" and "without-an-agent" condition (difference= -.519, SE= .182, p= .005). However, there was no significant difference between sales agent and consumer agent conditions (difference= -.342E-02, SE= .209, p= .869). Subjects' attitudes toward the Web advertisement were more favorable with an agent (M= 5.24, which is an average of the sales agent and consumer agent conditions) than without an agent (M= 4.73) (see table 5). Therefore, hypothesis 1a was supported. However,

hypothesis 9a, which stated that people who are exposed to a Web advertisement on a large screen will have a more favorable attitude toward the Web advertisement than people who are exposed to the same Web advertisement on a small monitor, was rejected (see table 4).

Table 3. Descriptive Statistics on Attitude toward the Ad (Aad)

Variable	M	SD	n
Large Screen			
Web ad without agent	4.60	1.30	31
Web ad with a sales agent	5.03	1.32	33
Web ad with a consumer agent	5.26	1.15	32
Small Monitor			
Web ad without agent	4.83	1.38	37
Web ad with a sales agent	5.41	1.09	35
Web ad with a consumer agent	5.24	1.06	37
Total (Large screen + Small monitor):	5.07	1.24	205
Web ad without agent	4.73	1.34	68
Web ad with a sales agent	5.22	1.21	68
Web ad with a consumer agent	5.25	1.09	69

Table 4. Tests of Between-Subjects Effects on Aad

Source	Type III SS	df	MS	F	p
Screen size (S)	1.960	1	1.960	1.314	.253
Agent (A)	12.230	2	6.115	4.100	.018*
S × A	1.409	2	.705	.473	.624

Table 5. Contrast Results (K Matrix) on Advertising Effectiveness

Helmert Contrast	Aad	Ab	PI	VI
Without-an-agent vs. With-an-agent (Sales agent + Consumer agent)				
Difference (estimate-hypothesized)	-.519	-.148	.115	-.738
SE	.182	.191	.262	.280
p	.005*	.440	.662	.009*
Sales agent vs. Consumer agent				
Difference (estimate-hypothesized)	-3.452E-02	-.259	-.192	6.909E-02
SE	.209	.221	.303	.324
p	.869	.244	.527	.831

The Effects of Anthropomorphic Agents on Attitude toward the Brand

A univariate analysis of variance resulted in an insignificant mean difference on brand attitude as shown in Tables 5, 6, and 7. Neither screen size nor media content showed significant main effect. There was no significant interaction between those variables. A Helmert contrast test, conducted on "without-an-agent" and "with-an-agent" conditions, also showed insignificant mean differences (see table 5). Therefore, both hypothesis 1b and 9b are rejected.

Table 6. Descriptive Statistics on Brand Attitude (Ab)

Variable	M	SD	n
Large Screen			
Web ad without agent	4.33	1.34	32
Web ad with a sales agent	4.37	1.35	33
Web ad with a consumer agent	4.63	1.20	32
Small Monitor			
Web ad without agent	4.65	1.31	37
Web ad with a sales agent	4.64	1.24	35
Web ad with a consumer agent	4.90	1.30	37
Total (Large screen + Small monitor):	4.59	1.29	206
Web ad without agent	4.50	1.32	69
Web ad with a sales agent	4.51	1.29	68
Web ad with a consumer agent	4.77	1.25	69

Table 7. Tests of Between-Subjects Effects on Ab

Source	Type III SS	df	MS	F	p
Screen size (S)	4.196	1	4.196	2.510	.115
Agent (A)	3.295	2	1.647	.985	.375
S × A	3.093E-02	2	1.546E-02	.009	.991

The Effects of Anthropomorphic Agents on Purchase Intention

A univariate analysis of variance performed on the data produced an insignificant mean difference on brand attitude as shown in Tables 5,8, and 9. Neither screen size nor media content showed significant main effects. The interaction effect between those variables was not significant. A Helmert contrast test also indicated that purchase intentions between "without-an-agent" and "with-an-agent" conditions were not significantly different (see table 5). Therefore, hypotheses 1c and 9c were rejected.

Table 8. Descriptive Statistics on Purchase Intention (PI)

Variable	M	SD	n
Large Screen			
Web ad without agent	3.20	1.86	32
Web ad with a sales agent	2.94	1.49	33
Web ad with a consumer agent	3.33	1.58	32
Small Monitor			
Web ad without agent	3.50	1.69	37
Web ad with a sales agent	3.34	1.99	35
Web ad with a consumer agent	3.34	1.90	37
Total (Large screen + Small monitor):	3.28	1.75	206
Web ad without agent	3.36	1.77	69
Web ad with a sales agent	3.15	1.77	68
Web ad with a consumer agent	3.33	1.75	69

Table 9. Tests of Between-Subjects Effects on PI

Source	Type III SS	df	MS	F	p
Screen size (S)	2.874	1	2.874	.919	.339
Agent (A)	1.851	2	.925	.296	.744
S × A	1.419	2	.709	.227	.797

The Effects of Anthropomorphic Agents on Intention to Revisit the Web site

A univariate analysis of variance on intention to revisit the Web site (VI) found a significant effect of media content (without-an-agent, sales agent vs. consumer agent). Using the Helmert contrast test, there was a significant mean difference on VI between "without-an-agent" and "with-an-agent" conditions (difference= -.738, SE= .280, p= .009) (see table 5). However, VI was not significantly different between the sales agent and consumer agent conditions. Subjects' intentions to revisit the Web site were higher with an agent (M= 4.37, which is an average of the sales agent and consumer agent conditions) than without an agent (M= 3.65) (see table 10). Therefore, hypothesis 1e, which stated that people who are exposed to the Web advertisement with an agent will have a higher intention to revisit the Web site than people who are exposed to the advertisement without an agent, was supported.

The main effect of screen size was not significant on VI without any significant interaction effect with the media content as shown in Table 11. Therefore, hypothesis 9d, which stated that people who are exposed to a Web advertisement on a large screen will have a higher intention to revisit the Web site than people who are exposed to the same advertisement on a small monitor, was rejected.

Table 10. Descriptive Statistics on Intention to Revisit the Web site (VI)

Variable	M	SD	n
Large Screen			
Web ad without agent	3.62	1.87	32
Web ad with a sales agent	4.47	1.79	33
Web ad with a consumer agent	4.63	1.76	32
Small Monitor			
Web ad without agent	3.67	1.90	37
Web ad with a sales agent	4.36	2.09	35
Web ad with a consumer agent	4.06	1.89	37
Total (Large screen + Small monitor):	4.13	1.91	206
Web ad without agent	3.65	1.88	69
Web ad with a sales agent	4.42	1.94	68
Web ad with a consumer agent	4.33	1.84	69

Table 11. Tests of Between-Subjects Effects on VI

Source	Type III SS	df	MS	F	p
Screen size (S)	2.361	1	2.361	.659	.418
Agent (A)	25.027	2	12.514	3.494	.032*
S × A	3.499	2	1.749	.488	.614

The Effects of Anthropomorphic Agents on Telepresence

Hypothesis 2 posited that a Web advertisement with an agent would generate higher telepresence than an advertisement without an agent. An initial univariate analysis of variance performed on these data produced statistically insignificant main effects of screen size, media content, and interaction effect (Table 13). However, the effect of media content was only slightly short of the significance level ($p = .051$). As a result of further analysis using Helmert contrast, there was a significant mean difference

(difference= -.513, SE= .209, p= .015) between "without-an-agent" (M= 3.10) and "with-an-agent" conditions (M= 3.59, which is an average of the sales agent and consumer agent conditions) (see tables 12 and 14). Therefore, hypothesis 2 was supported but hypothesis 7 (on the main effect of screen size) was rejected.

Table 12. Descriptive Statistics on Telepresence

Variable	M	SD	n
Large Screen			
Web ad without agent	2.78	1.18	32
Web ad with a sales agent	3.46	1.57	33
Web ad with a consumer agent	3.72	1.35	31
Small Monitor			
Web ad without agent	3.38	1.42	37
Web ad with a sales agent	3.71	1.34	36
Web ad with a consumer agent	3.49	1.54	37
Total (Large screen + Small monitor):	3.43	1.43	206
Web ad without agent	3.10	1.34	69
Web ad with a sales agent	3.59	1.45	69
Web ad with a consumer agent	3.59	1.45	68

Table 13. Tests of Between-Subjects Effects on Telepresence

Source	Type III SS	df	MS	F	p
Screen size (S)	2.210	1	2.210	1.107	.294
Agent (A)	12.049	2	6.024	3.017	.051
S × A	6.031	2	3.015	1.510	.223

Table 14. Contrast Results (K Matrix) on Presence

Helmert Contrast	Telepresence	Social Presence
Without-an-agent vs. With-an-agent (Sales agent + Consumer agent)		
Difference (estimate-hypothesized)	-.513	-.639
SE	.209	.166
p	.015*	.000*
Sales agent vs. Consumer agent		
Difference (estimate-hypothesized)	-2.293E-02	-.110
SE	.242	.190
p	.925	.564

The Effects of Anthropomorphic Agents on Social Presence

Hypothesis 3 posited that a Web advertisement with an agent will generate higher social presence than an advertisement without an agent. A univariate analysis of variance performed on these data produced statistically significant main effects of media content (without agent, with a sales agent vs. with a consumer agent) (see table 16). The Helmert contrast test indicated a consistent result (difference= -.639, SE= .166, p= .000) between "without-an-agent" and "with-an-agent" conditions (see table 14). Social presence in the Web advertisement was significantly higher with agent (M= 4.80, which is an average of the sales agent and consumer agent conditions) than without agent (M= 4.18) (see table 14 and 15). Therefore, hypothesis 3 was supported.

The effect of screen size, however, and its interaction effect with media content were not significant (see Table 16). Therefore, hypothesis 8 was rejected.

Table 15. Descriptive Statistics on Social Presence

Variable	M	SD	n
Large Screen			
Web ad without agent	4.01	1.03	30
Web ad with a sales agent	4.65	1.24	33
Web ad with a consumer agent	4.99	1.08	32
Small Monitor			
Web ad without agent	4.32	1.14	36
Web ad with a sales agent	4.86	1.08	34
Web ad with a consumer agent	4.73	1.03	37
Total (Large screen + Small monitor):	4.60	1.14	202
Web ad without agent	4.18	1.10	66
Web ad with a sales agent	4.75	1.16	67
Web ad with a consumer agent	4.85	1.05	69

Table 16. Tests of Between-Subjects Effects on Social Presence

Source	Type III SS	df	MS	F	p
Screen size (S)	.404	1	.404	.331	.566
Agent (A)	18.497	2	9.249	7.569	.001*
S × A	3.106	2	1.553	1.271	.283

The Effects of the Agent's Role on Source Credibility

Hypotheses 6a and 6b predicted that subjects will evaluate the role of the sales agent and consumer agent differently in terms of attractiveness, trustworthiness, and expertise (H6a), resulting in differences on Aad, Ab, PI, and VI between the Web advertisement with a sales agent and that with a consumer agent (H6b).

Before analyzing the data, the questionnaires were examined to determine if the subjects answered correctly the question regarding the role of the agent in a given

treatment condition. Out of 69 subjects in the sales agent treatment, 55 (79.7%) correctly identified the role of the agent as a salesperson. In the consumer agent treatment, only 45 subjects (65.2%) correctly identified the role of the agent as a customer. The consumer agent treatment shows a lower valid response rate to the question probably because the script of the agent in both conditions was very similar and because the consumer agent was introduced as a customer only once at the beginning of the Web viewing. Therefore, even if the agent was identified as a customer, subjects still could have assumed that the agent was a salesperson.

To test hypotheses 6a and 6b, the t-test analysis (Table 17) included the data only from the subjects who identified the agent's role correctly. Subjects who misidentified the agent were not included. The result was that no statistically significant mean difference was found either in source credibility or in advertising effectiveness due to the role of the agent (customer vs. salesperson) (see table 18). Therefore, hypotheses 6a and 6b were rejected.

Table 17. Descriptive Statistics on the Agent's Role (Sales agent vs. Consumer agent)

Variable	Web advertisement with a Sales agent		Web advertisement with a Consumer agent	
	M	SD	M	SD
Credibility:				
Attractiveness	3.47	1.17	3.72	1.08
Trustworthiness	4.49	1.55	4.70	1.38
Expertise	4.58	1.59	4.57	1.38
Ad effectiveness:				
Aad	5.30	1.24	5.10	1.12
Ab	4.53	1.38	4.59	1.27
PI	3.26	1.78	3.22	1.71
VI	4.48	2.03	4.27	1.89
n	55		45	

Table. 18. T-test of Equality of Means between Sales agent and Consumer agent

Measures	t	df	p (2-tailed)	Mean Difference
Attractiveness	-1.163	98	.247	-.2455
Trustworthiness	-1.021	97	.310	-.2733
Expertise	.038	98	.970	1.145E-02
Aad	1.130	125	.261	.2375
Ab	.412	125	.681	9.812E-02
PI	.445	125	.657	.1435
VI	.493	125	.623	.1709

Effects of Demographic Variables and Media Consumption Patterns

To test if any demographic variables had any effects on the outcome variables, a multivariate analysis was conducted, as shown in Table 19. The analysis shows that subjects' demographic characteristics and their media usage patterns had no significant effect on advertising effectiveness measures. This result confirms that the mean difference in effectiveness between the Web advertisements with an agent and without agent was caused by the effects of presence, not by the effects of the subjects' individual characteristics assigned in each treatment condition. However, it is interesting to look at the effect of gender on Aad, which is only a little short of significance level ($p = .079$).

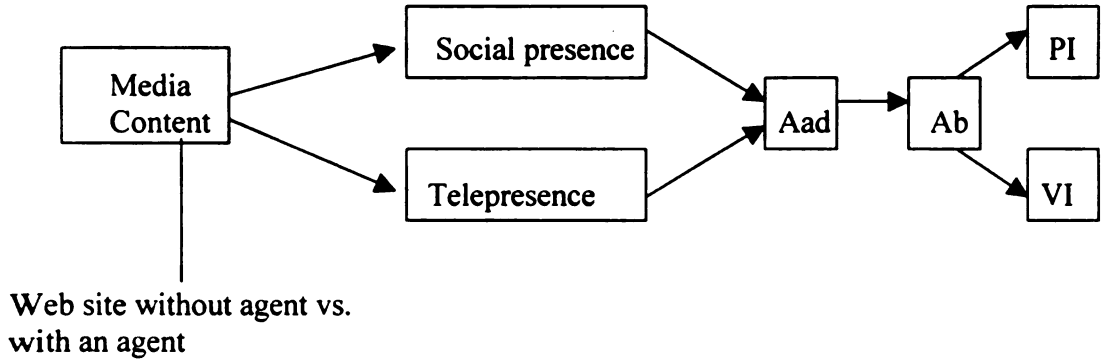
Table 19. Test of Between-Subjects Effects by Demographic Variables

Source & Dependent variables	Type III SS	df	Mean Square	F	p
Age:					
Aad	.454	1	.454	.311	.578
Ab	4.039E-02	1	4.039E-02	.024	.876
PI	.749	1	.749	.237	.627
VI	2.378E-02	1	2.378E-02	.007	.935
Gender:					
Aad	4.559	1	4.559	3.122	.079
Ab	3.080	1	3.080	1.854	.175
PI	1.603	1	1.603	.506	.478
VI	1.993	1	1.993	.557	.456
Race:					
Aad	3.346	1	3.346	2.292	.132
Ab	.952	1	.952	.573	.450
PI	.166	1	.166	.052	.819
VI	.804	1	.804	.225	.636
Years of Web Experience:					
Aad	.234	1	.234	.160	.689
Ab	.264	1	.264	.159	.691
PI	7.146E-02	1	7.146-02	.023	.881
VI	6.883	1	6.883	1.922	.167
Hours on the Internet:					
Aad	.699	1	.699	.479	.490
Ab	4.108	1	4.108	2.472	.117
PI	2.134	1	2.134	.674	.413
VI	5.882	1	5.882	1.643	.201
Use of Video Games:					
Aad	1.859	1	1.859	1.274	.260
Ab	.742	1	.742	.447	.505
PI	.535	1	.535	.169	.682
VI	2.739	1	2.739	.765	.383
Experience with VR:					
Aad	1.945	1	1.945	1.332	.250
Ab	1.196	1	1.196	.720	.397
PI	5.919	1	5.919	1.869	.173
VI	4.049E-03	1	4.049E-03	.001	.973

Test of the Hypothetical Model and Structural Relations

It was found (H2, H3) that the presence of an agent can generate: (1) higher social presence and telepresence and (2) a more favorable Aad and VI (H1a, H1e). To investigate the patterns of relationships between constructs underlying the effects of an anthropomorphic agent and the effects of presence, a structural equation model was tested based on theory and inspection of the data. The proposed model suggested that telepresence (H4) and social presence (H5) will mediate the effect that an agent has on Aad, and that this effect will be shown in PI (H1d), and VI (H1f) by way of Ab. The screen size was dropped from the original model in Figure 2 because it was found that screen size has no effect on presence and advertising effectiveness. Therefore, the hypothetical model was changed as in Figure 4 to examine the structural relationship between the variables.

Figure 4. Hypothetical Model Tested



To explore the nature of the process, shown in Figure 4, the correlation matrix among seven variables was used as input data, as shown in Table 20. Formal path analysis was conducted using these seven variables.

Table 20. Correlations between the exogenous and endogenous variables. The lower triangle includes the uncorrected correlations. The top triangle includes the correlations corrected for attenuation due to measurement error.

	Mcont	SP	TP	Aad	Ab	PI	VI
Mcont	**1.00**	.28	.16	.19	.05	-.03	.18
SP	.26**	**1.00**	.66	.78	.64	.52	.62
TP	.16*	.59**	**1.00**	.59	.52	.54	.54
Aad	.19**	.70**	.55**	**1.00**	.73	.56	.65
Ab	.05	.58**	.49**	.69**	**1.00**	.59	.58
PI	-.03	.47**	.52**	.54**	.56**	**1.00**	.69
VI	.18**	.56**	.51**	.62**	.55**	.66**	**1.00**

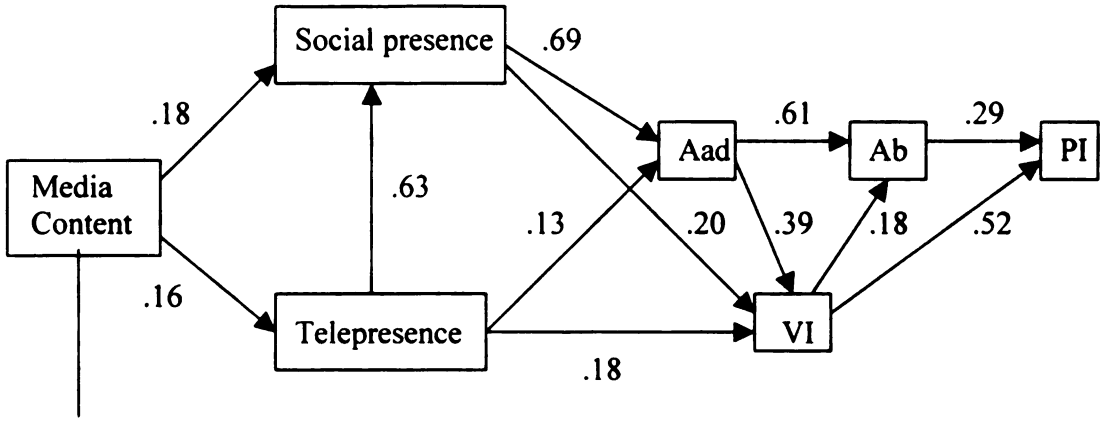
*p < .05. **p < .01.

Mcont: the Media Content; Web advertisement without agent (0) vs. with an agent (1)
SP: Social presence
TP: Telepresence
Aad: Attitude toward the advertisement
Ab: Attitude toward the brand
PI: Intention to purchase the brand
VI: Intention to revisit the Web site

The media content of the Web site was entered as an exogenous variable with dichotomous values ("0" for the advertisement without an agent vs. "1" for the advertisement with an agent). Social presence and telepresence were entered as first-rank endogenous variables. Finally, four sets of advertising effectiveness measures were entered as dependent variables in the order of Aad, Ab, PI, and VI. Thus, the path model was tested as in Figure 4. However, it was found that the fit of the model was not consistent with the data. The overall chi-square goodness of fit test yielded a statistically significant chi-square value (chi-square = 132.66, df = 14, p = .000), which indicates that the error generated by the model was substantial.

Through an individual link analysis, some of the missing links were added so that the modified model would be consistent with the data, as shown in Figure 5. The overall chi-square goodness of fit test yielded a non-significant chi-square value for the modified model (chi-square = 7.33, df = 9, p = .602), which suggested the fit of the model to the data. Additionally, individual link analysis showed that none of the errors due to the missing links was statistically significant. These results indicate that the error generated by the modified model was not substantial.

Figure 5. Modified Path Model



The analysis for the model as a whole:
The overall chisquare = 7.33
the degree of freedom = 9
p= .602

From the above it is concluded that the presence of an agent on the Web site with a dual modality (audio-visual) and nonverbal behaviors was the major source that created the perception of social presence and telepresence to influence advertising effectiveness. The modified model presented in Figure 5 shows a strong relationship between social presence and telepresence (r= .63). Further, a very strong and positive causal link was found between social presence and Aad (r= .69). There was a somewhat weaker direct link between telepresence and Aad (r= .13). Another path between telepresence and Aad was mediated by social presence to have an indirect effect on Aad. In sum, it appears as

if both telepresence and social presence were mediating the effects of an agent to Aad. Therefore, hypotheses 4 and 5 were supported.

The relationship between social presence and VI was moderately strong (r= .20). A similar pattern was also found between telepresence and VI (r= .18). However, as in the theory, no direct link was found between presence and Ab or between presence and PI; Aad was the major variable that directly mediates the effects antecedents (e.g., telepresence and social presence) to Ab (r= .61) and to VI (r= .39). Therefore, the path between Aad, Ab, and PI was consistent with the advertising literature; the effect of Aad was delivered to PI by way of Ab. Therefore, hypothesis 1d was supported.

The role of VI in the model appeared much more interesting. Rather than being affected by Ab, VI was directly related with Aad. Not only was VI influenced by Aad, but it was directly linked with telepresence and social presence. Thus, VI mediated the effect of presence on Ab and PI. Therefore, hypothesis 1f was rejected.

From this result a revised theory can be proposed for the role of VI and PI in the model. PI was directly influenced by both Ab (r= .29) and VI (r= .52), but the effect of VI on PI was much higher. Therefore, VI can be said to be another important variable that mediates the effect of social presence, telepresence, and Aad on Ab (r= .18) and PI (r= .52). Overall, it can be said that both social presence and telepresence were important variables that influence advertising effectiveness. However, social presence, had a more direct impact on Aad than telepresence.

CHAPTER 6

DISCUSSION AND CONCLUSIONS

Anthropomorphic Agents as a Source of Presence

The purpose of this research was to investigate the effects of presence on advertising effectiveness by employing an anthropomorphic agent in Web advertisements. Social presence and telepresence were found to be major components, explaining 40.95% of the total variance (23.85% for telepresence and 17.09% for social presence) in the presence measures (see appendix 4). There has been relatively little research conducted to investigate the causes and effects of presence (Lombard & Ditton, 1997). This research showed that an anthropomorphic agent in Web advertising can contribute to a sense of social presence and telepresence in viewers. Steuer (1992) argued that presence is based in large part on a medium's vividness, which includes sensory breadth and sensory depth. In this regard, communication modality (e.g., audio-visual, audio, print) is the major influence on the vividness of a message or communication interface. Further, the presence level will be affected by this communication modality. Consequently, in this research, the voice of the anthropomorphic agent may have caused the subjects' experiences in the Web site to be more vivid and may have contributed to the increase in social presence and telepresence when compared to the Web advertisement that presented messages in the text without an agent and without a voice. Another important factor was the presence of a virtual agent. The level of interactivity was controlled by providing exactly the same user options in the product search stage (e.g., gender, size, colors for t-shirts and socks) in both the treatment

with and without agents. However, the existence of an agent may have caused an additional sense of user interaction in the Web site, simulating face-to-face communication (e.g., voice and gestures). This implies that the use of nonverbal cues can be an important component for the development of presence.

Although vividness and interactivity from the agent are thought to affect the perceived level of telepresence and social presence, precisely how these factors combine and interact is unclear. Thus, of potential importance to designers of virtual environment systems is an understanding of the relative weighting of these variables. For example, it would be useful to know if changes in vividness have less of an impact on social presence than interactivity or if vividness of a virtual environment is more important for the perception of telepresence than for that of social presence. With regard to interactivity, more research is needed to determine which nonverbal cues are more important than others and how to manipulate these variables to efficiently develop a sense of presence in a mediated environment.

The Relationship between Social presence and Telepresence

It was found that the anthropomorphic agent contributed to an increase in the perceived level of social presence and telepresence in the Web site. In turn, both telepresence and social presence played a vital role in generating more favorable attitudes toward the advertisement in the Web site and stronger intention to revisit the Web site. It seems that an agent with a voice and some gestures can play a pivotal role as a focal point to attract a viewer's attention and can succeed in building a positive relationship between the consumer and the advertisement and the products in the Web site.

This research found a strong positive relationship between telepresence and social presence (r= .63). This relationship indicates that the higher the sense of "being there" in the Web site, the higher the degree of salience of the communication participant in the mediated environment. However, this result should be carefully interpreted because the causal relationship between telepresence and social presence is disputable.

Previous literature tried to define different dimensions of presence but did not specify the relationship between those dimensions. In fact, this research showed telepresence and social presence as distinctively different dimensions of presence measures, but they strongly related with each other to influence consumers' responses to the Web advertisement. This result is consistent with the recent findings by Thie and Wijk (1998), who reported that there is a significant correlation (.458) between social virtual presence and virtual presence. However, correlation does not indicate the direction in the relationship. Then, which one comes first, social presence or telepresence?

There are many variables that influence presence: ease of interaction, user-initiated control over their actions, pictorial realism, length of exposure, social factors such as social presence, system factors such as sensory modality and field of view (Weghorst & Bellinghurst, 1993; Witmer & Singer, 1994; Welch et al., 1996; Heeter, 1992; Steuer, 1992; Prothero & Hoffman, 1995). Social presesence may be one of the many elements that influence the sense of being there but may not be a sufficient factor to generate telepresence. According to Loomis (1992), people's perception of a space is more fundamental for human cognition than the perception of a specific object in that space. Therefore, it is expected that the telepresence generated by the vividness and

interactivity of an environment will precede the social presence caused by the agent's nonverbal cues abiding in the virtual environment. Therefore, it was concluded that telepresence comes earlier than social presence.

The Relationship between Presence and Advertising Effectiveness

A more important finding is that there is a positive relationship between presence and advertising effectiveness. Specifically, both social presence and telepresence had direct positive relationships with attitudes toward the advertisement and intentions to revisit the Web site. The relationship between social presence and attitude toward the advertisement implies that as consumers perceive their experience in the Web site to be more personal, sociable, warm, responsive, friendly, or emotional, they are more likely to build a favorable attitude toward the advertisement in the Web site. How, then, can this perceived experience in the mediated environment shape people's attitude toward the advertisement?

Previous advertising research (e.g., Batra & Ray,1986; Holbrook & Batra, 1987; Leigh, Rethans, & Whitney, 1987; MacInnis & Park, 1991; Miniard, Bhatla, & Rose, 1990; Muehling, Stoltman, & Mishra, 1989) has determinded that the attitude toward the advertisement will be influenced by the individual affective, emotional, and non-ad-related responses evoked at the time of ad exposure. Burke and Edell (1989) found that ad-induced feelings (e.g., upbeat feelings and negative feelings) had a significant direct effect on Aad. Stayman and Aaker (1988) also found feelings (e.g., informed, warm, irritated, amused, and bored) directly influenced Aad. Therefore, social presence, that is consumers' perception of their Web experience to be personal, warm, sociable, friendly,

can be regarded as a parallel to ad-induced feelings, and these feelings may have evoked affective responses to influence Aad.

In addition to the effect of affective components on Aad, other researchers (e.g., Chattopadhyay & Basu, 1990; Hastak & Olson, 1989; Homer, 1990; Muehling & Laczniak, 1992; Muehling, Laczniak, & Stoltman, 1991; Rethans, Swasy, & Marks, 1986) have established that cognitive responses toward particular aspects of an advertisement may directly influence Aad. According to the availability-valence hypothesis, consumers' attitudes depend on the favorableness of the information that is available in memory. Vivid information will increase the number of associative pathways in memory. This effect is termed cognitive elaboration (Nisbett & Ross, 1980). To the extent that advertising messages are rich in modality, messages using this device are likely to enhance cognitive elaboration. That in turn will influence consumers' attitudes toward the advertisement. In this regard, the telepresence, instigated by multi-modal presentation of messages from the agent, may have enhanced cognitive elaboration of information so that it is more accessible from memory in the Web advertisement with an agent condition. This means that as consumers feel that they are really transported into the mediated environment rather than remaining in their own physical environment, the information in the Web site will be more easily accessible from the consumers' memory. Therefore, telepresence seems more likely to influence cognitive responses to influence Aad.

This research found that the Web advertisement with an agent (3-dimensional animation + audio) could create more favorable attitudes toward the advertisement and greater intention to revisit the Web site than the Web advertisement without an agent (3-

dimensional static pictures + text). This is consistent with previous studies dealing with communication modality (e.g., Chaiken & Eagly, 1983; Andreoli & Worchel, 1978). The audio-visual presentation induced more favorable attitudes toward the Web site than the textual version when the message was presented by a likable source. It is likely that the audio-visual presentation of messages by an anthropomorphic agent, by way of telepresence, enhanced cognitive elaboration of information about the Web advertisement compared to the messages that were primarily presented in a text format. The agent's favorable nonverbal cues (e.g., voice, gestures) may have influenced the valence of relevant information, probably and mostly by way of social presence, to enhance the persuasiveness of the advertising messages. Therefore, the availability-valence hypothesis seems to be a useful tool to explain how the increased sense of presence leads to a more favorable consumer judgment of the Web advertisement.

The Relationship among Advertising Effectiveness Measures

Regarding behavioral intentions in the Web site, it was found that as consumers feel a higher degree of social presence and/or telepresence, they feel the experience in the Web site to be more compelling and are more likely to revisit the Web site. Attitude toward the advertisement (Aad) was a summary construct that can influence consumers' brand attitude (Ab) and intention to purchase a product (PI) as the indirect effects model (e.g., affect transfer, dual mediation model) has predicted. Ab mediated the impact of Aad on purchase intentions, and there was no direct relationship between Aad and PI. However, the same model was not applicable in the case of the intention to revisit the Web site (VI). VI was directly influenced by Aad rather than mediated by Ab or PI. VI

was highly related with Aad (r= .39), and it positively delivered its effect to Ab and PI. Therefore, the mediating role of VI in addition to Aad seems important to develop a more favorable Ab and stronger purchase intention on the Web site. This means that when consumers feel good and intend to revisit the Web site, consumers may have more favorable attitudes toward the brand and greater intention to purchase.

Web advertisements with an agent did not show significantly higher Ab (tables 5, 6, and 7) or PI (tables 5, 8, and 9) than the Web advertisements without an agent. Regarding consumers' intention to purchase on the Web site, one possible explanation could be that consumers have yet to shop online in large numbers, or even to provide information to Web providers in exchange for access to information offered onsite because of the fundamental lack of faith between most businesses and consumers on the Web (Hoffman, Novak, & Peralta, 1998). For example, consumers may fear transmitting their credit card information to any commercial Web provider, or they may be concerned that Web providers are selling their personal information to third parties without their knowledge or permission. These concerns about online purchasing could confound the result of insignificant mean differences in purchase intentions.

Role of Agent and Source Credibility

The role of the sales agent and the consumer agent did not result in a significant mean difference in terms of attractiveness, trustworthiness, expertise, and other advertising effectiveness measures. There could be two reasons. One could be that the roles of salesperson and consumer were not clearly customized in the audio scripts. The effects of the agent's role could not be detected because the manipulation of the scripts

was not strong enough to obtain a measurable effect. The other possibility is that the role of the agent in the experiment did not influence the consumers' perception of their credibility because the research employed exactly the same voice and facial appearance in both agents. However, when creating an agent, the possible variations in characteristics (e.g., attractiveness, facial expressions and its expressiveness, age, gender) are unlimited. Where characters are used in Web interfaces, the casting and creation of agent characters can obviously affect the success of a Web advertisement. Almost always, there will be some characters that are better than no characters, and some characters that are worse (Reeves & Nass, 1996). More research is suggested to delve into the relationship among different characteristics of agents, consumers' perception of source credibility, and Web advertising effectiveness.

Screen Size, Visual Angle, and Presence

It was hypothesized that a large screen size will generate a higher level of presence than a small monitor. However, screen size did not cause any significant effect on presence. This was probably because only the screen size was considered for the manipulation of the visual field. Even though the screen size will be a key variable influencing the size of the visual image, the viewing distance simultaneously affects the user's visual field. In other words, the same screen size will look larger when people are physically closer. A large image viewed from a great distance can occupy the same proportion of the view's visual field as a small image viewed at a short distance (Lombard & Ditton, 1997). In this regard, visual angle is a more precise term that describes and quantifies a user's field of view. Visual angle ($Tan\ \theta/2 = (x/2)/d$) is

calculated as a function of screen size measured on the diagonal (x) and screen distance (d) (see Kim & Biocca, 1997; Whitaker, 1997). When the visual angle was calculated, a large screen (x = *54inch, d= 50inch*) and a small monitor (x = *17inch, d= 15inch*) commanded similar fields of view. The visual angle of the small monitor (59.08 degree)[1] was even slightly wider than that of the large screen (56.74 degree)[2]. This indicates that the manipulation of the screen size was not successful, and that fact resulted in non-significant differences of presence and advertising effectiveness between the treatment conditions. Therefore, screen size and viewing distance should be considered simultaneously for the manipulation of the viewer's visual field in future research.

Implications for Advertisers and Marketers

The World Wide Web has grown at a spectacular rate as a medium for promoting and marketing products and services. At the same time, commercial sites must compete intensely for even a small share of consumer visits because consumer Web traffic is fragmented across millions of Web sites (Meeker, 1997). Considering that the initial goal of Web site advertising was to attract consumers to the advertiser's Web site, the main task of commercial Web providers will be to figure out how to attract and retain customers.

The research findings provide a clue for online marketers who are challenged to attract and retain online consumers to their Web sites. First, it was found that social presence and telepresence are capable of positively influencing consumers' attitudes and their behavioral intentions. This result offers a potentially powerful insight for marketers

[1] Tan $\theta/2 = (17/2)/15$, $\theta = 59.08$
[2] Tan $\theta/2 = (54/2)/50$, $\theta = 56.74$

and advertisers. It implies that the Web site needs to be developed to help consumers feel a higher sense of presence while they explore the site. The research has shown that the employment of anthropomorphic agents can increase both social presence and telepresence. The concept of presence should be actively applied to increase traffic to a Web site by creating a more intimate relationship with customers, and ultimately to draw more favorable responses from consumers. Advertising practitioners should begin to think about various types of structural variables (e.g., communication modality, speed, range, mapping) and content variables (e.g., virtual agent's gestures, voice, or facial expressiveness) in promoting products on the Web site to make consumers' experiences more compelling and to make the message more persuasive. Creating a sense of presence will be one of the important strategies in online marketing to attract consumers and to establish more favorable relationships with visitors.

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

The research had several limitations. It was a single laboratory experiment, and replications are needed so that advertisers can base their strategies on a solid foundation of empirical evidence. Specifically, the research should be extended to replicate its findings with consumers other than college students. Even though college students may be one of the most active groups of Web surfers, more generalizable results will be achieved by including subjects who have more diverse ages or ethnic backgrounds. To see the effect of different demographic variables, equivalent numbers of subjects with certain characteristics may be needed for each treatment condition.

In this research, none of the demographic and media usage variables showed any significant effects on advertising effectiveness measures, probably because some variables did not have an equivalently comparable number of subjects in a specified category. For example, it is possible that the effect of gender on Aad ($p = .079$) may become significant with increased sample size. The effect of race on Aad ($p = .132$) and the effect of hours on the Internet on Ab ($p = .117$) can be also significant with more equivalent distribution of categories in the sample.

Therefore, more research is needed to specify how media user characteristics interact with media structure and content variables to influence presence. For example, it is expected that people living in other-oriented collectivistic cultures, like Korea, will be more sensitive to social presence than people in self-oriented individualistic cultures, like America. Social presence may be more important than telepresence to those in collectivistic cultures. If this is true, those consumers could feel a higher level of social presence with an anthropomorphic agent and might build a more favorable relationship with the Web site than would individualistic consumers.

The research used only t-shirts as the product in the Web site to test hypotheses. However, different product can have a different effect on advertising effectiveness. For example, advertisements featuring novel rather than familiar products had more positive Aad (Cox & Locander, 1987) and advertisements with high involvement products produced more favorable Aad than low involvement ones (Thorson & Page, 1990). Therefore, the research findings need to be verified using different product categories.

Another drawback is about measurement issues. This study was specifically focused on the effect of social presence and telepresence. However, these two constructs

accounted for only 41% of the total variance of presence measures. More research is needed to better define the various dimensions of presence and to identify their relationships with advertising effectiveness.

As was shown in the results, the message to define the roles of sales agent and consumer agent were not very well customized, resulting in the weak manipulation of the roles. Because the experiment used an identical face and voice for both the sales agent and consumer agent, the effects of agents with different personalities could not be investigated. Moreover, the agent was deficient in facial expressions. Therefore, the effect of various types of facial cues could not be studied. Finally, the effects of screen size were not detected because the manipulation of the viewing angle was not appropriate. That is, the field of view did not take account of the viewers' distance from the screen.

Future research needs to consider these issues so that the interactive role of presence in different agents and viewing angles can be explained with a full model. Certainly, more work needs to be done before we have a complete understanding of the operation of presence in Web advertisements.

CONCLUSIONS

The research indicated that there is a positive relationship between presence and advertising effectiveness. The research findings indicate that both telepresence and social presence are important constructs for the persuasion of messages and for a more compelling experience in the Web site. Interestingly, a sense of "being there" had a strong positive relationship with a sense of "being with a communication participant." This relationship means that once a user feels transported into a mediated environment, he or she may feel social presence more easily. In addition to the attitude toward the advertisement, intention to revisit the Web site (VI) was found to play a primary role in the persuasion process, influencing brand attitude and intention to purchase on the Web site. These findings provide a new direction for marketers and advertisers who are striving to attract and retain online consumers.

The answer was 'Yes' for the question of whether the anthropomorphic agent makes the experience with the Web site advertising better than the same experience without an agent. However, this answer warrants a great deal of further research to investigate the interrelationship among presence, different design characteristics of agents, and advertising effectiveness. Despite its limitations, this research suggests that the concept of presence is a useful tool for studying the effectiveness of Web advertising content.

APPENDIX 1

Instruction and Questionnaire for Main Experiment

ID #:_____.

Dear Participants,

Thank you very much to agreeing to complete this questionnaire.

You will see an advertising Web site for t-shirts and socks.
I would like you to answer a few questions regarding the Web site and products in it. You will be videotaped while you view the web site for research purposes and each participant will get extra credit from the participation. Additional information will be provided after whole experiment is completed.

You indicate your voluntary agreement to participate in this research by completing and returning this questionnaire. It will take about 15 to 20 minutes to complete the questionnaire and there is no penalty for choosing not to participate or discontinuing the experiment. Please note that there is no reasonably foreseeable risks or discomforts for you to give your opinions about the Web site and the products in it. Individual participation in this study is anonymous, therefore you do not have to identify yourself by signing the questionnaire. Data gathered from you will be treated with strict confidence and your privacy will be protected to the maximum extent allowable by law.

There are no right or wrong answers. Please respond as you feel in the Web site, simply giving your first impressions. Your honest answers will be the most valuable input for this research. Remember that even though you have never tried this product before, you can base your answers on what you have been exposed and what you have felt in the Web site. Take your time and try to reflect carefully on each question so that you can give us complete responses.

Thank you for your time. Your opinions count and will be used for research purposes only.

Cordially,

Yung Kyun Choi

Contact:
Phone: 517-353-5937
Fax: 517-432-2589
Email: choiyung@pilot.msu.edu

For questions about participants' right as human subjects of research:
Contact UCRIHS Chair (David E. Wright 355-2180).

START HERE

Below are sets of word pairs. For each pair, please place a checkmark next to the word that best represents your answer.

Overall, how do you feel about **the WEB SITE** for Tees & Toes?

Bad	____	____	____	____	____	____	____	Good
Dislike	____	____	____	____	____	____	____	Like
Unfavorable	____	____	____	____	____	____	____	Favorable
Unenjoyable	____	____	____	____	____	____	____	Enjoyable
Unpleasant	____	____	____	____	____	____	____	Pleasant
Entertaining	____	____	____	____	____	____	____	Not entertaining
Interesting	____	____	____	____	____	____	____	Uninteresting
Awful	____	____	____	____	____	____	____	Nice

Overall, how do you feel about the **Tees & Toes PRODUCTS**?

Negative	____	____	____	____	____	____	____	Positive
Unsatisfactory	____	____	____	____	____	____	____	Satisfactory
Favorable	____	____	____	____	____	____	____	Unfavorable
Bad	____	____	____	____	____	____	____	Good
Dislikable	____	____	____	____	____	____	____	Likable

How likely or unlikly is it that you **WOULD PURCHASE** the Tees & Toes products if you need a t-shirt in the near future?

Unlikely	____	____	____	____	____	____	____	Likely
Improbable	____	____	____	____	____	____	____	Probable
Impossible	____	____	____	____	____	____	____	Possible

How likely or unlikely it is that you **WOULD REVISIT** the Tees & Toes Web site later?

Unlikely	____	____	____	____	____	____	____	Likely
Improbable	____	____	____	____	____	____	____	Probable
Impossible	____	____	____	____	____	____	____	Possible

The following questions ask about your* EXPERIENCE *you just had, watching Tees & Toes Web site. Please place a checkmark next to the word that best represents your experience.

Impersonal	____	____	____	____	____	____	____	Personal
Unsociable	____	____	____	____	____	____	____	Sociable
Insensitive	____	____	____	____	____	____	____	Sensitive
Cold	____	____	____	____	____	____	____	Warm
Lively	____	____	____	____	____	____	____	Dead
Dull	____	____	____	____	____	____	____	Vivid
Unresponsive	____	____	____	____	____	____	____	Responsive
Formal	____	____	____	____	____	____	____	Informal
Unfriendly	____	____	____	____	____	____	____	Friendly
Unemotional	____	____	____	____	____	____	____	Emotional
Inaccessible	____	____	____	____	____	____	____	Accessible
Remote	____	____	____	____	____	____	____	Immediate

For each of the pairs of words below, please circle the number that best represents the degree of the experience you just had. In the first example, for instance, if the things in the Web site did Not look at all like they would if you had experienced them directly, circle "1". If things in the site did look Very much like they would if you had experienced them directly, circle "7". If you felt something in between, circle "2", "3", "4", "5", or "6".

Overall, how much did the things in Tees & Toes Web site you saw/heard LOOK LIKE they would if you had experienced them directly?

Not at all 1 2 3 4 5 6 7 Very much

Overall, how much did the things in Tees & Toes Web site you saw/heard FEEL LIKE they would if you had experienced them directly?

Not at all 1 2 3 4 5 6 7 Very much

How often did you feel you were inside Tees & Toes Web site you saw/heard?

Never 1 2 3 4 5 6 7 Always

How often did Tees & Toes Web site you saw/heard seem more like 'somewhere that you visited' rather than 'something that you saw/heard'?

Never 1 2 3 4 5 6 7 Always

How often did you feel "My body was in this room, but my mind was inside Tees & Toes Web site I saw/heard"?

Never	1	2	3	4	5	6	7	Always

How much of a sense of participation in Tees & Toes Web site you saw/heard did you feel?

Not at all	1	2	3	4	5	6	7	Very much

How much of a sense of involvement in Tees & Toes Web site you saw/heard did you feel?

Not at all	1	2	3	4	5	6	7	Very much

To what extent did you experience a sense of being 'really there' inside Tees & Toes Web site you saw/heard?

Not at all	1	2	3	4	5	6	7	Very much

How much did it feel as if you visited another place?

Not at all	1	2	3	4	5	6	7	Very much

How much did it feel as if you were inside Tees & Toes Web site you saw/heard observing the products?

Not at all	1	2	3	4	5	6	7	Very much

Did Tees & Toes Web site you saw/heard seem more like a picture or more like a scene looked at through a window?

Like a picture	1	2	3	4	5	6	7	Like a scene looked at through a window

How involving was the experience, viewing Tees & Toes Web site?

Not at all	1	2	3	4	5	6	7	Very much

How intense was the experience, viewing Tees & Toes Web site?

Not at all	1	2	3	4	5	6	7	Very much

How addictive was the experience, viewing Tees & Toes Web site?

Not at all 1 2 3 4 5 6 7 Very much

To what extent did you feel like you were inside Tees & Toes Web site you saw/heard?

Not at all 1 2 3 4 5 6 7 Very much

To what extent did you feel immersed in Tees & Toes Web site you saw/heard?

Not at all 1 2 3 4 5 6 7 Very much

To what extent did you feel surrounded by the environment you saw/heard in Tees & Toes Web site?

Not at all 1 2 3 4 5 6 7 Very much

How often did you want to touch something you saw/heard in Tees & Toes Web site?

Never 1 2 3 4 5 6 7 Always

How often did you try to touch something you saw/heard in Tees & Toes Web site?

Never 1 2 3 4 5 6 7 Always

These next questions are specifically about the person (animated human character) you saw/heard in the Tees & Toes Web site.

How do you feel about the **ANIMATED HUMAN CHARACTER** that you have seen/heard in the Web site?

Unattractive	____	____	____	____	____	____	____	Attractive
Not classy	____	____	____	____	____	____	____	Classy
Ugly	____	____	____	____	____	____	____	Handsome
Elegant	____	____	____	____	____	____	____	Plain
Not Sexy	____	____	____	____	____	____	____	Sexy
Dependable	____	____	____	____	____	____	____	Undependable
Dishonest	____	____	____	____	____	____	____	Honest
Unreliable	____	____	____	____	____	____	____	Reliable
Insincere	____	____	____	____	____	____	____	Sincere
Untrustworthy	____	____	____	____	____	____	____	Trustworthy
Not an expert	____	____	____	____	____	____	____	Expert
Inexperienced	____	____	____	____	____	____	____	Experienced
Unknowledgeable	____	____	____	____	____	____	____	Knowledgeable
Qualified	____	____	____	____	____	____	____	Unqualified
Unskilled	____	____	____	____	____	____	____	Skilled

THIS SECTION WAS INCLUDED ONLY FOR WEB ADVERTISEMENT WITH AN AGENT CONDITION.

You're almost done! These last questions are about you. Again, all of your responses will be kept strictly confidential, so please answer as accurately and honestly as possible.

What is your age? __ __ Years

Please indicate your gender.

____ Male ____ Female

What is your race?

____ White (non hispanic)
____ Black (non hispanic)
____ Hispanic
____ Asian
____ Pacific Islander
____ Other

How long have you been using the World Wide Web?

____ less than 6 months
____ 6-12 months
____ over 1- less than 2 years
____ 2-3 years
____ over 3-less than 4 years
____ 4-5 years
____ over 5 years

How many hours do you spend using the Internet (including World Wide Web) in a typical day? (estimate as closely as possible)

____ 0 hours
____ Less than 1 hour
____ 1 hour
____ 2 hours
____ 3 hours
____ 4 hours
____ More than 4 hours

How often do you use a video game system in a month (at home, work, school, or at an arcade)?

____ Never
____ Less than once a month
____ 1-4 times a month
____ 5-10 times a month
____ 11-20 times a month
____ More than 20 times a month

How many times have you used an interactive virtual reality system (e.g., Virtuosity)?

____ Never
____ 1 time
____ 2-4 times
____ 5-7 times
____ 8 or more times

Did you see a PERSON (animated human character) in Tees & Toes Web site?

____ Yes ____ No

→ If your answer is "*Yes*," who is the person (animated human character)?

____ Customer ____ Sales agent

Thank you very much for the participation.
We truly value and appreciate your time and efforts!!

APPENDIX 2

Scripts for Stimulus Materials

1. Script for the Web advertisement with Salesman Agent (in audio)

Scene 1: Greeting

Welcome to Tees & Toes, your online source for top quality shirts and socks.
I'm Jeff, your sales agent. Glad you stopped by.
I'll be around to help your navigation.
Please click on the continue button when you've made your choice.
All Tees & Toes products are made from fine Supima cotton for durability.
Tees & Toes products use fade-resistant dyes and colors are guaranteed not to run.
Learn all about Tees & Toes by navigating this site and feel free to contact Tees & Toes if you have any questions. Thank you.

Scene 2: Product Search

Please pick a t-shirt.
(after user made a choice)
O.K. Good choice.
I like your selection.
Now let's move to socks.

Please pick your socks and click on me when you are done.
(after user made a choice)
Great selection.
Would you like to continue shopping?

YES→ bring the user to scene 2

NO → bring the user to scene 3

Scene 3: Ending

Thank you for visiting Tees & Toes.
Don't forget to add this Web site to your bookmarks.
Your purchase will arrive in a couple of days.
Contact Information

2. Script for the Web advertisement with Consumer Agent (in audio)

Scene 1: Greeting

Welcome to Tees & Toes, your online source for top quality shirts and socks.
I'm Jeff, a customer. Glad you stopped by.
I'll be around to help your navigation.
Please click on the continue button when you've made your choice.
All Tees & Toes products are made from fine Supima cotton for durability.
Tees & Toes products use fade-resistant dyes and colors are guaranteed not to run.
Learn all about Tees & Toes by navigating this site and feel free to contact Tees & Toes if you have any questions. Thank you.

Scene 2: Product Search

Please pick a t-shirt, while I look for my own.
(after user made a choice)
O.K. Good choice.
I like your selection.
Now let's move to socks.

Please pick your socks and click on me when you are done.
(after user made a choice)
Great selection.
Would you like to continue shopping?

YES→ bring the user to scene 2

NO → bring the user to scene 3

Scene 3: Ending

Thank you for visiting Tees & Toes.
Don't forget to add this Web site to your bookmarks.
Your purchase will arrive in a couple of days.
Contact Information

3. Script for the Web advertisement Without Agent (in text)

Scene 1: Greeting

Welcome to Tees & Toes, your online source for the hottest shirts and socks on the market.
We're glad you stopped by.
I'll be around to help your navigation.
Please click on the continue button when you've made your choice.
All our products are made from fine Supima cotton for durability.
Tees & Toes use fade-resistant dyes and colors are guaranteed not to run.
All out products are shrink resistant too.
Learn all about Tees & Toes by navigating this site and feel free to contact Tees & Toes if you have any questions. Thanks for stopping by.

Scene 2: Product Search

Please pick a t-shirt and click on the button when you are done.
(after user made a choice)
O.K. Good choice.
I like your selection.
Now let's move to socks.

Please pick your socks and click on the button when you are done.
(after user made a choice)
Great selection.
Do you want to pick another shirt and pair of socks?

YES→ bring the user to scene 2

NO → bring the user to scene 3

Scene 3: Ending

Thank you for visiting Tees & Toes.
Don't forget to add this Web site to your bookmarks.
Enjoy and come back real soon.
Contact Information

APPENDIX 3

Pictures for Stimulus Materials

Web Advertisement with a Sales Agent

Web Advertisement with a Consumer Agent

Web Advertisement without an Agent

User Options for Product Search

APPENDIX 4

Scales Used for Data Analysis

Rotated Component Matrix

	Component						
	1	2	3	4	5	6	7
TP15	**.845**						
TP17	**.805**						
TP16	**.797**						
TP8	**.786**						
TP4	**.780**						
TP5	**.767**						
TP9	**.752**						
TP3	**.716**						
TP10	**.683**						
TP14	**.540**						
TP13	**.525**						
SP3		**.816**					
SP4		**.811**					
SP2		**.750**					
SP1		**.649**					
SP9		**.642**					
SP6		**.642**					
SP10		**.619**					
SP7		**.612**					
TP11			.597				
SP11			.534				
SP12			.529				
TP12			.424				
TP6				.785			
TP7				.530			
SP5				.423			
TP1					.825		
TP2					.735		
TP19						.864	
TP18						.629	
SP8							-.875

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Total Variance Explained

Component	Rotated Sum of Squared Loadings		
	Total	% of Variance	Cumulative %
1	**7.396**	**23.857**	**23.857**
2	**5.299**	**17.093**	**40.950**
3	1.956	6.310	47.260
4	1.888	6.090	53.350
5	1.647	5.312	58.662
6	1.568	5.057	63.719
7	1.343	4.331	68.050

Selected Items: component 1 & 2.

Telepresence measure (Component 1)

TP15: To what extent did you feel like you were inside Tees & Toes Web site you saw/heard?
TP17: To what extent did you feel surrounded by the environment you saw/heard in Tees & Toes Web site?
TP16: To what extent did you feel immersed in Tees & Toes Web site you saw/heard?
TP8: To what extent did you experience a sense of being 'really there' inside Tees & Toes Web site you saw/heard?
TP4: How often did Tees & Toes Web site you saw/heard seem more like 'somewhere that you visited' rather than 'something that you saw/heard'?
TP5: How often did you feel "My body was in this room, but my mind was inside Tees & Toes Web site I saw/heard"?
TP9: How often did it feel as if you visited another place?
TP3: How often did you feel you were inside Tees & Toes Web site you saw/heard?
TP10: How much did it feel as if you were inside Tees & Toes Web site you saw/heard observing the products?
TP14: How addictive was the experience?
TP13: How intense was the experience?**

**indicates that these items were not retained for the final analysis due to large error of measurement.

Social presence measure (Component 2)

SP3: Insensitive/Sensitive**
SP4: Cold/Warm
SP2:Unsociable/Sociable
SP1: Impersonal/Personal
SP9: Unfriendly/Friendly
SP6: Dull/Vivid**
SP10: Unemotional/Emotional
SP7: Unresponsive/Responsive

**indicates that these items were not retained for the final analysis due to large error of measurement.

MEASURE OF ADVERTISING EFFECTIVENESS

Attitude toward the advertisement (Aad)
Bad/Good
Dislike/Like
Unfavorable/Favorable
Unenjoyable/Enjoyable
Unpleasant/Pleasant
Entertaining/Not entertaining**
Interesting/Uninteresting**
Awful/Nice

Attitude toward the brand (Ab)
Negative/Positive
Unsatisfactory/Satisfactory
Favorable/Unfavorable**
Bad/Good
Dislikable/Likable

Intention to purchase a product (PI)
Unlikely/Likely
Improbable/Probable
Impossible/Possible**

Intention to revisit the Web site (VI)
Unlikely/Likely
Improbable/Probable
Impossible/Possible

**indicates that these items were not retained for the final analysis due to large error of measurement.

MEASURE OF CREDIBILITY

Attractiveness
Unattractive/Attractive
Not classy/Classy**
Ugly/Handsome
Elegant/Plain*
Not sexy/Sexy

Trustworthiness
Dependable/Undependable*
Dishonest/Honest
Unreliable/Reliable
Insincere/Sincere
Untrustworthy/Trustworthy

Expertise
Not an expert/Expert
Inexperienced/Experienced
Unknowledgeable/Knowledgeable
Qualified/Unqualified**
Unskilled/Skilled**

**indicates that these items were not retained for the final analysis due to large error of measurement.
*indicates that these items were deleted for the final analysis due to low reliability in the items.

APPENDIX 5

Descriptive Statistics for Subjects Used

Composition of the Sample as a Whole

N= 207

Age: M = 20.29 SD = 1.74

Gender: Male (40.6%) Female (59.4%)

Race: White (76.8%) Black (9.7%)
Hispanic (2.4%) Asian (7.7%)
Pacific Islander (0.0%) Other (2.9%)

How long have you been using the World Wide Web?
Less than 6 months (0.0%) 6-12 months (1.0%)
Over 1-less than 2 years (4.3%) 2-3 years (26.1%)
Over 3-less than 4 years (15.9%) 4-5 years (31.9%)
Over 5 years (20.8%)

How many hours do you spend using the internet in a typical day?
0 hours (0.0%) less than 1 hour (25.1%)
1 hour (30.4%) 2 hours (22.7%)
3 hours (9.2%) 4 hours (5.8%)
more than 4 hours (6.8%)

How often do you use a video game in a typical month?
Never (28.0%) Less than once a month (25.1%)
1-4 times a month (18.4%) 5-10 times a month (12.1%)
11-20 times a month (9.2%) More than 20 times a month (7.2%)

How many times have you used an interactive virtual reality system?
Never (44.4%) 1 time (22.7%)
2-4 times (27.5%) 5-7 times (3.4%)
8 or more times (1.9%)

Sample Composition by Treatment Conditions

1. Large Screen Without Agent

N= 32

Age: M = 20.03 SD = 1.26

Gender: Male (40.6%) Female (59.4%)

Race: White (78.1%) Black (9.4%)
Hispanic (6.3%) Asian (6.3%)
Pacific Islander (0.0%) Other (0.0%)

How long have you been using the World Wide Web?
Less than 6 months (0.0%) 6-12 months (0.0%)
Over 1-less than 2 years (3.1%) 2-3 years (15.6%)
Over 3-less than 4 years (18.8%) 4-5 years (31.3%)
Over 5 years (31.3%)

How many hours do you spend using the Internet in a typical day?
0 hours (0.0%) less than 1 hour (18.8%)
1 hour (46.9%) 2 hours (15.6%)
3 hours (12.5%) 4 hours (3.1%)
more than 4 hours (3.1%)

How often do you use a video game in a typical month?
Never (25.0%) Less than once a month (31.3%)
1-4 times a month (15.6%) 5-10 times a month (6.3%)
11-20 times a month (12.5%) More than 20 times a month (9.4%)

How many times have you used an interactive virtual reality system?
Never (46.9%) 1 time (12.5%)
2-4 times (37.5%) 5-7 times (0.0%)
8 or more times (3.1%)

2. Large Screen With Sales Agent

N= 33

Age: M = 20.15 SD = 1.56

Gender: Male (39.4%) Female (60.6%)

Race: White (84.8%) Black (6.1%)
Hispanic (0.0%) Asian (6.1%)
Pacific Islander (0.0%) Other (3.0%)

How long have you been using the World Wide Web?
Less than 6 months (0.0%) 6-12 months (0.0%)
Over 1-less than 2 years (3.0%) 2-3 years (27.3%)
Over 3-less than 4 years (9.1%) 4-5 years (42.4%)
Over 5 years (18.2%)

How many hours do you spend using the Internet in a typical day?
0 hours (0.0%) less than 1 hour (33.3%)
1 hour (12.1%) 2 hours (30.3%)
3 hours (6.1%) 4 hours (6.1%)
more than 4 hours (12.1%)

How often do you use a video game in a typical month?
Never (27.3%) Less than once a month (30.3%)
1-4 times a month (15.2%) 5-10 times a month (9.1%)
11-20 times a month (9.1%) More than 20 times a month (9.1%)

How many times have you used an interactive virtual reality system?
Never (42.4%) 1 time (21.2%)
2-4 times (33.3%) 5-7 times (0.0%)
8 or more times (3.0%)

3. Large Screen With Consumer Agent

N= 32

Age: M = 20.34 SD = 1.84

Gender: Male (43.8%) Female (56.3%)

Race: White (68.8%) Black (15.6%)
Hispanic (0.0%) Asian (9.4%)
Pacific Islander (0.0%) Other (3.1%)

How long have you been using the World Wide Web?
Less than 6 months (0.0%) 6-12 months (0.0%)
Over 1-less than 2 years (6.3%) 2-3 years (21.9%)
Over 3-less than 4 years (21.9%) 4-5 years (34.4%)
Over 5 years (15.6%)

How many hours do you spend using the Internet in a typical day?
0 hours (0.0%) less than 1 hour (25.0%)
1 hour (25.0%) 2 hours (15.6%)
3 hours (12.5%) 4 hours (9.4%)
more than 4 hours (12.5%)

How often do you use a video game in a typical month?
Never (31.3%) Less than once a month (31.3%)
1-4 times a month (9.4%) 5-10 times a month (12.5%)
11-20 times a month (0.0%) More than 20 times a month (15.6%)

How many times have you used an interactive virtual reality system?
Never (37.5%) 1 time (37.5%)
2-4 times (15.6%) 5-7 times (6.3%)
8 or more times (3.1%)

4. Small Monitor Without Agent

N= 37

Age: M = 20.76 SD = 2.37

Gender: Male (37.8%) Female (62.2%)

Race: White (75.7%) Black (8.1%)
Hispanic (0.0%) Asian (13.5%)
Pacific Islander (0.0%) Other (2.7%)

How long have you been using the World Wide Web?
Less than 6 months (0.0%) 6-12 months (2.7%)
Over 1-less than 2 years (0.0%) 2-3 years (27.0%)
Over 3-less than 4 years (16.2%) 4-5 years (24.3%)
Over 5 years (29.7%)

How many hours do you spend using the Internet in a typical day?
0 hours (0.0%) less than 1 hour (24.3%)
1 hour (32.4%) 2 hours (29.7%)
3 hours (8.1%) 4 hours (2.7%)
more than 4 hours (2.7%)

How often do you use a video game in a typical month?
Never (13.5%) Less than once a month (21.6%)
1-4 times a month (29.7%) 5-10 times a month (16.2%)
11-20 times a month (13.5%) More than 20 times a month (5.4%)

How many times have you used an interactive virtual reality system?
Never (45.9%) 1 time (27.0%)
2-4 times (24.3%) 5-7 times (2.7%)
8 or more times (0.0%)

5. Large Screen With Sales Agent

N= 36

Age: M = 20.03 SD = 1.25

Gender: Male (41.7%) Female (58.3%)

Race: White (69.4%) Black (16.7%)
Hispanic (5.6%) Asian (5.6%)
Pacific Islander (0.0%) Other (2.8%)

How long have you been using the World Wide Web?
Less than 6 months (0.0%) 6-12 months (0.0%)
Over 1-less than 2 years (5.6%) 2-3 years (27.8%)
Over 3-less than 4 years (13.9%) 4-5 years (30.6%)
Over 5 years (22.2%)

How many hours do you spend using the Internet in a typical day?
0 hours (0.0%) less than 1 hour (25.0%)
1 hour (27.8%) 2 hours (25.0%)
3 hours (8.3%) 4 hours (11.1%)
more than 4 hours (2.8%)

How often do you use a video game in a typical month?
Never (41.7%) Less than once a month (13.9%)
1-4 times a month (16.7%) 5-10 times a month (19.4%)
11-20 times a month (5.6%) More than 20 times a month (2.8%)

How many times have you used an interactive virtual reality system?
Never (55.6%) 1 time (11.1%)
2-4 times (27.8%) 5-7 times (5.6%)
8 or more times (0.0%)

6. Large Screen With Consumer Agent

N= 37

Age: M = 20.40 SD = 1.85

Gender: Male (40.5%) Female (59.5%)

Race: White (83.8%) Black (2.7%)
Hispanic (2.7%) Asian (5.4%)
Pacific Islander (0.0%) Other (5.4%)

How long have you been using the World Wide Web?
Less than 6 months (0.0%) 6-12 months (2.7%)
Over 1-less than 2 years (8.1%) 2-3 years (35.1%)
Over 3-less than 4 years (16.2%) 4-5 years (29.7%)
Over 5 years (8.1%)

How many hours do you spend using the Internet in a typical day?
0 hours (0.0%) less than 1 hour (24.3%)
1 hour (37.8%) 2 hours (18.9%)
3 hours (8.1%) 4 hours (2.7%)
more than 4 hours (8.1%)

How often do you use a video game in a typical month?
Never (29.7%) Less than once a month (24.3%)
1-4 times a month (21.6%) 5-10 times a month (8.1%)
11-20 times a month (13.5%) More than 20 times a month (2.7%)

How many times have you used an interactive virtual reality system?
Never (37.8%) 1 time (27.0%)
2-4 times (27.0%) 5-7 times (5.4%)
8 or more times (2.7%)

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