11 The Experience of Presence in Persuasive Virtual Environments

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Abstract: The examination of presence is important, as previous studies have shown that the subjective experience of presence can impact the effectiveness of virtual treatments (Villani, Riva, & Riva, 2007) and the degree to which these stimuli translate into real world behavior (e.g., Fox, Bailenson, & Binney, 2009; Persky & Blascovich, 2008; Price & Anderson, 2007). In this chapter, we will explore three components of presence (self, social, and spatial; Lee, 2004) and how they relate to persuasion in virtual environments. Relevant theoretical approaches including media richness and Blascovich's (2002) model of social influence in virtual environments will be discussed. We will also elaborate on studies examining the experience of presence in virtual environments designed with various persuasive goals, including health (e.g., Girard, Turcotte, Bouchard, & Girard, 2009; Skalski & Tamborini, 2007), advertising (e.g., Li, Daugherty, & Biocca, 2002; Shin & Shin, 2011; Yim, Cicchirillo, & Drumwright, 2012), education (e.g., Allmendinger, 2010; Caudle, 2013; Mikropoulos & Strouboulis, 2004), and work collaboration (e.g., Bente, Rüggenberg, Krämer, & Eschenburg, 2008; Ratan & Hasler, 2010). We will draw upon this literature to develop practical suggestions for designing virtual environments to cultivate presence while also achieving persuasive goals.

Keywords: Presence; Persuasion; Virtual Environments; Social Influence; Avatars.

11.1 Introduction to Chapter 11

Homebound, Joe visits with his doctor in an avatar-based virtual world. Given the avatar's brief, generic answers, Joe has his doubts about whether the person he is communicating with is really his doctor or if it is a pre-programmed bot. Skeptical, Joe opts to ignore the advice offered by the doctor's avatar.

Amanda joins a virtual conference hoping to convince a client to hire her to design a new office building. The potential client, however, keeps complaining that the lag and quality of the video feed makes Amanda's presentation difficult to follow; the client says it feels like she's transmitting from another planet. Amanda is unable to persuade the client to hire her.

Max visits an online retailer to buy a new pair of glasses. The website encourages him to link up with his webcam so that he can see what the glasses will look like on his own face. Max is disturbed by his disembodied presence on the screen and the odd, floating glasses on his virtual face. He leaves the website, convinced he would rather visit a shop in person.

As virtual environments become more commonplace for communication across persuasive contexts such as health, work collaboration, and advertising, it is important to assess how the experience of presence in these environments may influence persuasive outcomes. Self, social, and spatial presence can be important determinants in whether a source succeeds or fails in persuading a targeted user. In this chapter we will discuss how various conceptualizations of presence are tied to persuasive outcomes. We will then outline theoretical frameworks that may be implemented in the study of presence in persuasive environments. Finally, we will address several contexts in which presence has been demonstrated to influence persuasive outcomes and discuss what these findings indicate for the design of successful persuasive virtual environments.

11.2 Defining Presence in the Context of Persuasion

Presence has been defined in a variety of ways across the literature (Lombard & Ditton, 1997; Witmer & Singer, 1998), sometimes being referred to as *telepresence* (e.g., Minsky, 1980; Schloerb, 1995), *virtual presence* (Sheridan, 1992), or *mediated presence* (Biocca, Kim, & Choi, 2001). For the purposes of evaluating the utility of virtual environments for persuasive means, Lee's (2004) clarification is useful. Lee (2004) defines presence as "a psychological state in which virtual...objects are experienced as actual objects in either sensory or non-sensory ways" (p. 37). This overall construct can be further divided into three types of presence: *self, social,* and *spatial*.

Self-presence occurs when users experience their avatar (or other virtual self-representation) as if it were their actual self, physically or cognitively (Lee, 2004 ; see also Chapters 1 and 4, this volume). Self-presence may entail a feeling of embodying an avatar and feeling its body as one's own physical form (Ratan & Hasler, 2010). Self-presence may also be experienced cognitively as identification with a character. In this case, individuals feel as though they share the character's self (Klimmt, Hefner, & Vorderer, 2009). Self-presence may be important to persuasion because users need to feel connected to their virtual presence. Otherwise, they may not care what outcomes their virtual presence experiences. Alternatively, if users do not feel linked with their avatar or virtual self-presence, they may be resistant to persuasion because they are merely observing, rather than participating in, the experience.

The second category of presence, social presence, was first elaborated by Short, Williams, and Christie (1976). Lee (2004) defines social presence as a psychological and physical awareness of other social actors in the virtual environment. The representations of these social actors may be vary in their level of anthropomorphism (e.g., a virtual human as opposed to a virtual dog; Nowak, 2004), physical realism (e.g., a virtual human could look realistic or cartoon-like), and behavioral realism (e.g., a virtual human could emote naturally or unrealistically; Blascovich et al., 2002). These representations can be controlled by a human (an avatar), a computer

(an agent), or a hybrid of the two (e.g., a human controls speech while the computer controls the representation's animations). It is also important to note that social presence does not require the user and the social actor to be virtually co-located, or even communicating simultaneously. Lee uses the example of reading a letter from a dear friend to suggest a situation in which social presence is felt, but the communication is asynchronous. In regard to persuasion, Allport (1985) suggests that human actions and psychological experiences are shaped by the actual, imagined, and implied presence of others; that is, people behave in accordance with some degree of social influence. Thus, the degree to which others perceive social presence in a virtual environment will likely shape persuasive outcomes. Low social presence may therefore motivate users to question the credibility of the source, which would be detrimental to persuasive efforts.

Finally, spatial or environmental presence is a psychological state in which people feel like they are physically located within a virtual environment and interacting with virtual objects (Schubert, 2009; Wirth et al., 2007). Lee (2004) originally conceptualized this interaction of the body with virtual objects as physical presence, but his conceptualization was too limiting for many scholars. Subsequently, the concept has been expanded to include the virtual environment more holistically. Spatial presence may be key to persuasion because it may promote more natural interaction with the user's surroundings. If users do not experience spatial presence, they may not be immersed enough in the virtual environment to attend to the persuasive message. Alternatively, low spatial presence may degrade the user experience, which may negativity skew the user's response to the persuasive message.

There are a wide range of factors that have been suggested to impact an individual's overall experience of presence (see also Chapters 1, 2 and 3, this volume). Witmer, Jerome, and Singer (2005) have theorized that the experience of presence is predicated upon two fundamental psychological states, involvement and immersion, and suggest that there are four factors that significantly affect the experience of presence. *Control* refers to the user's control over the virtual environment, whereas the *sensory* dimension encompasses features such as modality (e.g., visual, audio) and environmental richness. *Distraction* refers to the degree to which distractions (both internal and external) exist. Finally, *realism* consists of not only the degree to which the virtual environment adheres to real-world features (e.g., shadows reacting correctly to light sources), but also the meaningfulness of the experience. Lombard and Ditton (1997) also provide a highly-elaborated list of formal (e.g., image fidelity, aural features, interactivity), content (e.g., social realism, nature of the task), and individual (e.g., prior experience, willingness to suspend disbelief) factors that may play a role in the experience of presence.

In terms of empirical research, several factors have been found to influence the experience of the various dimensions of presence. Perceptions of self-presence, for example, tend to increase when there is a high degree of visual similarity between

the real self and the virtual self (Bailenson, Blascovich, & Guadagno, 2008; Ratan, Santa Cruz, & Vorderer, 2007), and when avatars speak with a user's voice (Aymerich-Franch, Karutz, & Bailenson, 2012).

Perceptions of social presence, on the other hand, are increased when participants can interact with a virtual actor (Skalski & Tamborini, 2007), when participants have a previous relationship with a virtual actor (Bailenson et al., 2004), and when participants perceive a virtual actor as similar to themselves (Lee & Nass, 2003). A virtual actor's tone of voice can also influence perceptions of presence. Sources whose tone of voice matches the content of their words are perceived to be more socially present than those with tone/content inconsistencies, and sources whose voices are extroverted in tone are perceived to be more socially present than those whose voices are introverted (Lee & Nass, 2003).

Finally, recent research on spatial presence has suggested that there are two steps involved in a user experiencing spatial presence: the construction of a mental model of the virtual environment and the suppression of external cues that signal the artificiality of the virtual environment (Hofer, Wirth, Kuehne, Schramm, & Sacau, 2012). The first stage is influenced by the user's attention to the virtual environment and, to a lesser degree, their innate ability to create visual representations of the virtual environment in their mind. The second stage relies primarily on the degree to which a user is involved with the virtual environment, which was found to be strongly linked to the amount of interest the user had in the content found in the virtual world (Hofer et al., 2012).

11.3 Theoretical Frameworks for Examining Presence in Persuasive Environments

11.3.1 Media Richness

The concept of media richness was derived from Short et al.'s (1976) exploration of the experience of social presence in various forms of telecommunication and incorporates both a medium-based and user-based conceptualization. *Media richness* refers to the sensory quality of a medium and how it is experienced by the user (Trevino, Lengel, & Daft, 1987). Daft, Lengel, and Trevino (1987) assessed media richness by comparing mediated and face-to-face communication on four criteria: 1) immediate feedback; 2) transmission of multiple cues, such as nonverbal communication or graphics; 3) language variety; and 4) personal focus. In general, richer media are predicted to be more effective in managing equivocal or complex tasks, and greater richness has been associated with better outcomes (e.g., Scheck, Allmendinger, & Hamann, 2008; Timmerman & Kruepke, 2006).

In terms of persuasion, the original postulation of media richness suggests that richer media create more social presence, which can lead to more persuasion. For

example, Rockmann and Northcraft (2008) found that media richness influences trust, which in turn affects levels of cooperation. Other studies have found that existing relationships, goals, and strategies predict the use of more or less rich media in persuasive interactions, suggesting that higher levels of media richness are not always desired or necessary to achieve persuasive outcomes (Schmitz & Fulk, 1991; Wilson, 2003). At this stage, further research is necessary to ascertain whether relationships exist between the medium-based conceptualizations of media richness and user-based conceptualizations of media richness (i.e., social presence), and whether these are able to predict the effectiveness of persuasive messages.

11.3.2 Computers as Social Actors

According to Nass and colleagues' computers as social actors (CASA) framework (Nass, Fogg, & Moon, 1996; Nass & Steuer, 1993), including Reeves and Nass's (1996) media equation, humans have limited abilities to distinguish between real and mediated representations, as the brain has not evolved in response to the latter. Therefore, interactions with media are "fundamentally social and natural" (Reeves & Nass, 1996, p. 5).

The primary force behind CASA is the concept of "mindlessness" (Nass & Moon, 2000). People often process stimuli automatically, conserving cognitive effort and maximizing response efficiency (Langer, 1989). According to CASA, rather than scrutinize a message or evaluate the symbolic representations therein, humans respond in an automatic way to mediated stimuli. If a computer demonstrates social behavior, people do not exert the cognitive effort to determine how to behave with a social machine; rather, they respond and react to computers in a manner similar to how they respond to other people (Nass & Moon, 2000). Thus, CASA would predict high levels of social presence during social interactions in VEs.

11.3.3 Model of Social Influence in Virtual Environments

The model of *Social Influence in Virtual Environments* (SIVE) elaborates several variables believed to affect how persuasive virtual social beings can be (Blascovich, 2002; Blascovich et al., 2002). Perceived agency is important because it affects the degree of social presence an individual feels and thus the likelihood of influence occurring. Blascovich et al. (2002) posit that computers (agents) elicit less social presence than humans (avatars) in virtual interactions, but that this difference diminishes the more behavioral realism agents portray. We tend to automatically experience more social presence—and thus are more persuaded by—human-controlled avatars. Thus, computer-controlled agents must act in a realistic manner to bolster social presence. In essence, when greater social presence is experienced with a virtual representation,

more social influence will occur because users will perceive and interact with the representation as they would with a real person.

Several studies have indicated support for this model of social influence in virtual environments. In a gaming study, players who believed they were playing a video game with other people were more cooperative than people who believed they were playing the game with a computer (Merritt, McGee, Chuah, & Ong, 2011). Guadagno and colleagues (2007) found that avatars were more effective at changing a user's attitudes than agents, and that higher levels of behavioral realism made agents more persuasive. A recent meta-analysis further supported SIVE by demonstrating that avatars are more influential than agents (Fox et al., 2010).

It is important to understand theories related to the experience of presence, as they help us predict what outcomes may be affected by both designers' manipulations and users' experiences of presence. These theories can lend further insight into findings about presence in persuasive virtual environments across several contexts.

11.4 Contexts for Virtual Persuasion

11.4.1 Health

Research has shown that perceptions of presence in persuasive health contexts can significantly increase the effectiveness of health messages communicated via virtual environments and communicators. For example, Skalski and Tamborini (2007) found that when participants experienced social presence during an interaction with a health information agent, they were more likely to feel that the health topic under discussion was important and more likely to report increased behavioral intentions related to that health topic. Greater spatial presence has also been shown to lead to greater enjoyment in an exercise-promoting VE (IJsselsteijn, Kort, Westerink, Jager, & Bonants, 2006).

More subtle behavioral interventions can also benefit from perceptions of presence. In one study, participants in a smoking-cessation program were asked to play a game where they found and crushed cigarettes with their virtual hand as part of their therapy (Girard, Turcotte, Bouchard, & Girard, 2009). The researchers found that increases in participants' perceptions of presence in the virtual environment significantly contributed to reductions in their addictive behaviors (e.g., frequency of smoking). A similar pattern was found in a study by Fox, Bailenson, and Binney (2009). In this study, women experienced a virtual world where their avatar gained or lost weight based on their in-world food choices (chocolate or carrots). Participants were then told they could help themselves to a bowl of candy while they completed a survey. Women who experienced high levels of presence subsequently inhibited their appetites and ate fewer candies in real life as compared to those who experienced

lower levels of presence. In both of these studies, presence in the VE influenced participants' subsequent health behaviors and choices.

There has also been an increasing amount of research done on the ways that presence can enhance the efficacy of virtual experiences during cognitive behavioral therapy (see also Chapter 9, this volume), known as *Virtual Reality Exposure Therapy* (VRET). Krijn and colleagues (2004) found that participants that experienced high levels of presence during VR acrophobia exposure therapy were more likely to complete the course of therapy. Bouchard, Robillard, and Dumoulin (2006) found a similar pattern of results in their investigation of the use of VR in the treatment of individuals with flight phobias; the experience of presence during therapy sessions was predictive of reduction in fear of flying and improved attitude towards flying.

11.4.2 Advertising and E-commerce

Brand attitudes may be affected by presence experienced in response to various electronic advertising formats. When interactivity increases in advertising contexts, those high in need for cognition also experience greater social presence (Fortin & Dholakia, 2005). Positive brand attitudes increased when presence increased in 3D environments (Li, Daugherty, & Biocca, 2002; Yim, Cicchirillo, & Drumwright, 2012) and video games with product placements (Nelson, Yaros, & Keum, 2006). Increases in presence are also associated with a greater ability to recall and recognize brands (Keng & Lin, 2006).

Presence and interactivity with items on e-commerce websites and in virtual environments also affect consumer attitudes and behaviors. The mere presence of others, whether interactive or non-interactive, can influence users' positive and negative emotions (Argo, Dahl, & Manchanda, 2005), trust in a website (Keeling, McGoldrick, & Beatty, 2010; Shin & Shin, 2011), perceived security and risk (Shin & Shin, 2011), and purchase intentions (Luo, 2005). Interestingly, perceived social presence may increase loyalty for a website among women (Cyr, Hassanein, Head, & Ivanov, 2007), whereas men may be more affected by the social presence of a word-of-mouth system (Awad & Ragowsky, 2008). Purchase intention and feelings of presence within the environment may also be affected by perceived usefulness and perceived risk (Dash & Saji, 2007), perceived integrity of the online environment (Gefen & Straub, 2004), and trust and past purchasing behaviors (Weisberg, Te'eni, & Arman, 2011). In an e-commerce environment, presence may also be positively influenced by increased levels of interactivity (Animesh, Pinsonneault, Yang, & Oh, 2011). For instance, text-to-speech technologies increase the social presence of speakers and predict more favorable attitudes toward products (Lee & Nass, 2004; Lee & Nass, 2005).

11.4.3 Education

In online educational settings, social presence plays a crucial role in the learning experience. Social presence influences course satisfaction (Cobb, 2011; Johnson, Hornik, & Salas, 2008), motivation (Allmendinger, 2010), and perceived learning (Cobb, 2011). Student age (e.g., children, adults) may differentially affect the influence of presence (Caudle, 2013). One important factor may be how the instructor's virtual presence in the environment influences students' perceptions of presence (Garrison, Cleveland-Innes, & Fung, 2010) and initiation of the course development process (Ke, 2010).

The structure of online learning may also influence feelings of presence. Persky and colleagues (2009) found that interactive learning promotes greater social presence than more passive learning (e.g., lectures) in virtual environments. When the course develops into a highly collaborative learning environment, social presence may also increase as well. So and Brush (2008) found that offering a variety of communication channels heightens collaborative interaction and social presence (e.g., enabling students to communicate through private chat and email in addition to group chat). By interacting directly with individual students, instructors can promote social presence in virtual settings (Garrison et al., 2010).

11.4.4 Organizations and Work Collaboration

Among organizations and small groups, the use of telecommunications and virtual environments can serve to enhance the group dynamic. For example, social presence may influence trust among groups of varying sizes (Lowry, Roberts, Romano, Cheney, & Hightower, 2006) and cultures (Lowry, Zhang, Zhou, & Fu, 2010). In addition, social presence may enhance trust across different media such as video and audio (Bente, Rüggenberg, Krämer, & Eschenburg, 2008), videoconferencing (Moody & Wieland, 2010), and face-to-face versus computer-mediated communication (Lowry et al., 2010). Among organizations, the effect of social presence may influence decisions made by recruiters (Allen, Van Scotter, & Otondo, 2004), managers and directors (Atkinson, 2008), and trainers (Warkentin & Beranek, 1999). Within groups, social presence affects a variety of variables that can enhance the group dynamic as well as the leaders within the group.

11.5 Implications for Design

Although designers cannot control the amount of presence a user experiences in an environment, they can design VEs to maximize the potential for presence. The goal should be to create immersive environments with behaviorally realistic representations, naturally mapped movement, and appropriately interactive objects.

Maximizing the experience of social presence is perhaps the most crucial aspect of designing persuasive virtual environments. As noted by the SIVE model and supported by numerous studies (see Fox et al., 2010), if an avatar or agent is incorporated as a persuasive source, it is important to convince the user that they are interacting with a human, not a computer. Thus, it is key for the designer to focus on making the agent behave in a realistic manner (e.g., body movement, natural speech, context appropriateness) to enhance the likelihood of influence. Although physical realism may be persuasive in some contexts, it is not required for many interactions if behavioral realism is well-designed. Indeed, designers should note that there are downsides to focusing too much on physical realism with virtual humans as these representations may begin to approach the *uncanny valley*, a point at which people are unsettled by the not-quite-human nature of anthropomorphic representations (Mori, 1970).

Even when avatars are being used, human controllers may need to emphasize their humanness. In many contexts, users have learned to become skeptical about who is controlling a representation. Thus, the persuader may need to reinforce human agency by incorporating appropriate nonverbal behaviors (Bente et al., 2008), emotions (Gratch et al., 2002), and even disfluencies (McFarlane & Latorella, 2002) to promote greater social presence. Regardless of whether agents or avatars are employed, perceived agency should be measured as it can affect social presence and persuasive outcomes (Fox et al., 2010; Vang & Fox, in press).

Spatial or environmental presence may also augment or detract from persuasion. Much as Blascovich et al. (2002) argue for the role of realism in social presence, realism within the VE (e.g., appropriateness of the environment, realistic feedback, or natural mapping) may influence feelings of spatial presence (Skalski, Tamborini, Shelton, Buncher, & Lindmark, 2011). From a hardware perspective, when possible, designers should consider the size, quality, and depth (i.e., stereoscopy) of the depicted virtual environment as this may influence the experience of spatial presence (Bracken & Skalski, 2009; IJsselsteijn, de Ridder, Freeman, Avons, & Bouwhuis, 2001). A fully immersive virtual environment is different than a large desktop computer monitor or a mobile phone (Fox, Arena, & Bailenson, 2009); some features which may work in larger or more immersive environments may be ineffective or even counter-effective via different media as they vary in image and rendering quality, modality, and methods of interactivity. For example, proximity to a target can influence persuasive outcomes, but proximity will be experienced differently in a fully immersive environment as opposed to a mobile interface.

Similarly, virtual environments vary in their ability to promote the feeling of self-presence, although less is known about self-presence in persuasion and further research is needed. One possibility is that identity cues may promote feelings of self-presence, which may lead to persuasive outcomes. For example, photorealistic versions of the self in virtual environments (i.e., doppelgängers; Fox & Bailenson, 2010) have been shown to be powerful persuasive tools, convincing people to exercise (Fox & Bailenson, 2009), eat or restrain eating (Fox, Bailenson, et al., 2009), or save

money (Ersner-Hershfield et al., 2011). Further investigation is necessary to determine if self-presence is driving this influence.

Revisiting the cases of Joe, Amanda, and Max from the introduction, the literature presented here has provided some insight on how to alleviate these issues. To get Joe to adhere to the virtual doctor's advice, Joe's experience of social presence should be bolstered by making sure the doctor is responsive and behaves in a natural, realistic manner (Blascovich et al., 2002). If Amanda's client feels distant and separated, Amanda could give up on a traditional video conference and instead create a virtual model of the building that the client could walk through, thus bolstering the client's feelings of spatial presence and perhaps earning Amanda the contract (Skalski et al., 2011). The online retailer should make sure Max's representation looks like him and is comfortably realistic so that he experiences self-presence when interacting with products and is more persuaded to buy them (Ratan et al., 2009).

11.6 Conclusion to Chapter 11

Presence is an important consideration for both the designers of persuasive environments and the researchers who study them. In the studies presented here, presence is often studied as the mechanism explaining why a virtual environment is successful in persuasion, but future research should also investigate the mechanisms that explain presence as an outcome in persuasive VEs. Further, the role of presence should be tested as a potential mechanism in existing theories of persuasion. For example, the elaboration likelihood model suggests message involvement and level of cognitive processing predict persuasion (Petty & Cacioppo, 1986). In a persuasive VE, how do self-presence, spatial presence, and social presence in a virtual environment influence message involvement and cognitive processing? Future study must probe the role of these forms of presence in the process of persuasion. This way, virtual environments can be created to maximize influence and more readily facilitate persuasive goals.

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