



# The embodiment of sexualized virtual selves: The Proteus effect and experiences of self-objectification via avatars



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## ABSTRACT

Research has indicated that many video games and virtual worlds are populated by unrealistic, hypersexualized representations of women, but the effects of embodying these representations remains understudied. The Proteus effect proposed by Yee and Bailenson (2007) suggests that embodiment may lead to shifts in self-perception both online and offline based on the avatar's features or behaviors. A  $2 \times 2$  experiment, the first of its kind, examined how self-perception and attitudes changed after women ( $N = 86$ ) entered a fully immersive virtual environment and embodied sexualized or nonsexualized avatars which featured either the participant's face or the face of an unknown other. Findings supported the Proteus effect. Participants who wore sexualized avatars internalized the avatar's appearance and self-objectified, reporting more body-related thoughts than those wearing nonsexualized avatars. Participants who saw their own faces, particularly on sexualized avatars, expressed more rape myth acceptance than those in other conditions. Implications for both online and offline consequences of using sexualized avatars are discussed.

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## 1. Introduction

Avatar-based virtual environments, such as online worlds, massively multiplayer online role playing games (MMOs), and video games, are quickly becoming one of the most popular forms of media entertainment around the world. Last year, U.S. consumers spent \$16.6 billion on video games (Entertainment Software Association, 2012). In Asia, users spend nearly \$1 billion each year on virtual goods for avatars on social networking sites; the popular site Cyworld has 25 million users in South Korea (UPI, 2011). *World of Warcraft* is the most popular MMO around the globe, reaching 12 million subscribers in eight different languages (Blizzard Entertainment, 2011). A recent survey by the Kaiser Family Foundation (2010) revealed that a child in the U.S. between the ages of 8 and 18 spends an average of nearly 1.5 h at a computer and 1.25 h playing video games every day. With such widespread use, exploring the psychological effects of the representations within these virtual environments is crucial.

Agents and avatars in these spaces often take the form of virtual humans with realistic features that mimic the human form. Users often infer sex, age, race, and personality traits from human-like representations, just as they would when meeting another person (Guadagno, Swinith, & Blascovich, 2011; Nowak & Rauh, 2006, 2008). Although virtual men and virtual women often co-exist in these virtual spaces, their portrayals are quite different. Examinations of video games and virtual worlds reveal that men outnumber women (Williams, Martins, Consalvo, & Ivory, 2009) and that female representations are overwhelmingly stereotypical (e.g., kidnapped princesses in need of rescue) and often sexualized (Beasley & Standley, 2002; Burgess, Stermer, & Burgess, 2007; Dietz, 1998; Downs & Smith, 2010). Despite the inequitable and objectified nature of women's representations in virtual environments, as well as a large body of research noting the deleterious effects of sexualized portrayals of women in other media (American Psychological Association, 2010), limited research has addressed the effects of exposure to, and especially the embodiment of, sexualized virtual women.

It is imperative to investigate the effects of virtual representations because they have distinct features compared to other media figures. Unlike images in other media, virtual humans are typically designed to be engaging and to respond to a user's actions (Bente, Rüggenberg, Krämer, & Eschenburg, 2008). This dynamic creates a new and powerful experience beyond passive media consumption; rather, these interactions mirror communication in the physical world, and users often react to virtual humans in natural and social

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ways (Blascovich et al., 2002; Nass & Moon, 2000). Also, rather than merely observing characters, users may embody characters in virtual worlds and experience the virtual body as their own, which has been shown to have stronger effects than passively watching them (Ahn, Le, & Bailenson, in press; Yee & Bailenson, 2009). Because of the enhanced realism, the opportunities for interactivity, and the experience of embodiment, it is possible that these representations will have powerful effects on users' beliefs, attitudes, and behaviors offline as well (Williams, 2006; Yee & Bailenson, 2007).

The current study sought to investigate the effects of embodying female representations that commonly populate video games and other virtual worlds. Specifically, we examine the effects of placing women in sexualized compared to nonsexualized virtual bodies in an immersive virtual environment. Additionally, we explored whether self-resemblance of the avatar moderated any effects. Whereas previous research has examined the effects of passively exposing men and women to sexualized images, the current studies advance research in this area by exploring women's active embodiment and control of sexualized representations.

## 2. Virtual environments

Virtual environments are two- or three-dimensional digital representations of natural or imagined spaces that typically feature objects or representations of humans (Blascovich et al., 2002; Lanier, 2001). As the user moves, either with physical motions in real space or through keypresses, the virtual environment updates in response to those movements. This responsiveness enhances the experience of *presence*, the user's feelings that the virtual environment is real and that the user's sensations and actions are responsive to the virtual world as opposed to the real, physical one (Lee, 2004; Lombard & Ditton, 1997; Loomis, 1992). Individuals who experience presence feel as though they are interacting with their virtual surroundings instead of the physical space they occupy, and there is a greater sense of connection with the avatar they embody (Ahn et al., in press; Behm-Morawitz, 2013).

### 2.1. Avatars, agents, and virtual humans

Representations of people in online virtual worlds and video games vary from photographs on social networking sites to emoticons in online chat to animals in online role-playing games (see Nowak & Rauh, 2006, for a review). *Virtual humans* are digital representations that resemble the human form. Virtual humans may be either *avatars*, which are controlled by a human user, or *agents*, which are controlled by a computer algorithm (Bailenson & Blascovich, 2004). For example, in single-player video games, the player at the controls is represented by an avatar, whereas the other characters on the screen are agents controlled by the computer.

Virtual humans can vary along many dimensions, and these traits often influence outcomes. Representations that behave like humans would in the real world (by conversing or expressing emotions, for example) lead to natural social interaction in virtual environments (Blascovich et al., 2002; von der Pütten, Krämer, Gratch, & Kang, 2010). Appearance-wise, technologies are enabling engineers to create increasingly lifelike virtual humans. The research here focuses on two additional features of virtual humans: resemblance to the self and sexualization.

#### 2.1.1. Virtual selves and doppelgängers

The concept of identification suggests that people feel more kindred to and may be more likely to behave like others who appear similar to them (Bandura, 1977, 2001; Kelman, 1961). Due to this experience of identification, we are more likely to imitate the

behaviors of similar others rather than dissimilar others. Thus, mediated representations that resemble the self are anticipated to yield stronger effects and promote behavioral modeling (Bandura, 1977, 2001).

Previous studies have found that virtual humans who resemble the self, also known as *virtual doppelgängers*, can be powerful persuasive agents. Fox and Bailenson (2009a) used photographs of participants to build doppelgängers and compared their effectiveness to representations of unknown people. They found that exposure to exercising doppelgängers, as opposed to exercising virtual others or loitering doppelgängers, led to more exercise both immediately following exposure and in the 24 h after exposure. Ersner-Hershfield et al. (2011) found that exposure to an aged virtual self was more effective than an aged virtual other in promoting financial savings behavior. Doppelgängers have also caused participants to replicate real world eating patterns (Fox, Bailenson, & Binney, 2009), experience physiological arousal (Fox, Bailenson, & Ricciardi, 2012), or prefer a brand of product endorsed by the doppelgänger (Ahn & Bailenson, 2011). Considering these findings, we would anticipate that an avatar's resemblance to the physical self may influence the effects of embodiment.

### 2.2. Sexualized virtual representations

In virtual worlds and video games, there is marked disparity in how men and women are portrayed. Female characters are more likely than male characters to be portrayed in a sexualized manner in video game advertisements (Scharrer, 2004), gaming magazines (Dill & Thill, 2007; Miller & Summers, 2007), game covers (Burgess et al., 2007) and in the games themselves (Beasley & Standley, 2002; Downs & Smith, 2010).

Although some argue that this content is "just a game," scientific evidence suggests that there are both short-term and long-term effects from exposure to sexualized representations of women. Sexually explicit and objectifying depictions of women have been linked to self-objectification (Aubrey, 2006), rape myth acceptance (i.e., false beliefs about rape that blame the victim; Allen, Emmers, Gebhardt, & Giery, 1995; Burt, 1980), acceptance of interpersonal violence and violence against women (Mundorf, D'Alessio, Allen, & Emmers-Sommer, 2006), and aggression (Allen, D'Alessio, & Brezgel, 1995; Malamuth, Addison, & Koss, 2000).

Given these findings, it is imperative to examine the effects of sexualized depictions of women in virtual environments, but research is limited. Yao, Mahood, and Linz (2010) found that men who played a video game wherein female characters were objectified indicated a greater likelihood of sexually harassing women compared to men who played games with non-objectifying content. Behm-Morawitz and Mastro (2009) found that women who played a game as a sexualized female character reported significantly lower self-efficacy (i.e., belief that one could achieve a goal) than women who played with a nonsexualized female character or men who played with either character. They also found that both men and women in the sexualized character condition had less favorable attitudes toward women's cognitive abilities. Fox and Bailenson (2009b) found that men and women who encountered a stereotype-confirming virtual woman in an immersive virtual environment reported higher levels of sexism and rape myth acceptance than those who encountered a stereotype-defying virtual woman.

Virtual worlds and video games provide the opportunity for an experience beyond mere exposure to these images, however. Users embody avatars, controlling their movements and interactions. The avatar becomes a proxy for the physical self in the virtual world (Biocca, 1997). Due to these processes, embodiment creates a realistic and particularly potent experience for the user that is more powerful than exposure to noninteractive imagery (Ahn et al., in

press). Considering the prevalence of highly sexualized avatars and the known consequences of these representations, the effects of embodiment of such avatars should be explored.

### 3. Theoretical framework

#### 3.1. The Proteus effect

The Proteus effect stems from Bem's (1972) self-perception theory, which suggests that people often infer their own attitudes and beliefs by observing their behaviors in the same manner they would observe another person. A virtual context may enhance the possibility for self-perception processes: it becomes easier to externally observe one's own behaviors as these behaviors are typically enacted by an avatar that is rendered in the virtual environment.

The *Proteus effect* occurs when a user's self-representation is modified in a meaningful way that is often dissimilar to the physical self. The user then embodies the self-representation, observes him or herself behaving in this virtual form, and draws inferences regarding his or her internal beliefs or attitudes based on these observations. After embodiment occurs, the user's behavior then conforms to the modified self-representation regardless of the true physical self (Yee & Bailenson, 2007; Yee, Bailenson, & Ducheneaut, 2009). Users adopt beliefs and attitudes fitting for the virtual representation rather or not they are fitting for the true self. For example, when participants embody attractive avatars, they disclose more personal information and approach another avatar more closely, regardless of their actual physical attractiveness. When participants embody taller avatars, they are more confident in a negotiation task, regardless of their actual height (Yee & Bailenson, 2007). MMO players who control female avatars engage in more stereotypically female in-game behaviors than those in male avatars, regardless of the players' actual sex (Yee, Ducheneaut, Yao, & Nelson, 2011). If women embody sexualized avatars, then, they may focus on and internalize the prevalent feature (sexualization) and infer that their beliefs and attitudes support the sexualization and objectification of women.

#### 3.2. Objectification theory

Objectification theory states that "the cultural milieu of sexual objectification functions to socialize girls and women to, at some level, treat themselves as objects to be looked at and evaluated" (Fredrickson & Roberts, 1997, p. 177). Rather than being respected as individuals, women are depersonalized and judged as bodies and objects with solely sexual worth. The result is that women gradually internalize this perspective, learning to see and value themselves based on their appearance (Fredrickson & Roberts, 1997). This process of *self-objectification* has been tied to disordered eating (Noll & Fredrickson, 1998), depression (Muehlenkamp & Saris-Baglama, 2002), body preoccupation (Quinn, Kallen, & Cathey, 2006) and decreased cognitive performance (Fredrickson, Roberts, Noll, Quinn, & Twenge, 1998). Exposure to mediated sexual imagery has been shown to trigger the experience of self-objectification (Aubrey, 2006), but research has yet to address whether virtual embodiment yields the same effects.

Based on the predictions of the Proteus effect and objectification theory, we expect that women wearing a sexualized avatar will experience greater self-objectification and body preoccupation than women embodying a nonsexualized avatar:

H1: Participants who embody a sexualized avatar will report more body-related thoughts than participants who wear a nonsexualized avatar.

Another factor that may moderate this experience is how much the avatar resembles the physical self. From the perspective of the Proteus effect, if the avatar resembles the user, it might cue the user's natural behaviors and the manipulation of dress may be rendered ineffective. Alternatively, seeing one's physical self associated with the avatar's other salient features (i.e., manner of dress) may reinforce the perception of the embodied avatar as an extension of the self and maximize the internalization of the avatar's other features.

RQ1: Will self-resemblance of the avatar moderate the effect of sexualization on body-related thoughts?

#### 3.3. Rape myth acceptance

*Rape myths* are another detrimental set of beliefs associated with exposure to sexualized portrayals of women. *Rape myth acceptance* (RMA) is the endorsement of false and stereotypical beliefs about rape that often place blame on the victim (Burt, 1980; Lonsway & Fitzgerald, 1994). Examples of rape myths include that women do something to "deserve" getting raped (such as drinking, being out late at night, or dressing suggestively), that rape victims are promiscuous, or that a "legitimate" rape victim can prevent her own pregnancy (Burt, 1980; Moore, 2012). Not only is RMA associated with callousness towards rape victims, but also towards victims of interpersonal violence and women in general (Burt, 1980). Women who endorse rape myths are less likely to take precautionary measures against rape (Hickman & Muehlenhard, 1997). Men who endorse rape myths also demonstrate a greater likelihood to rape (Bohner, Jarvis, Eyssele, & Siebler, 2005; Chapleau & Oswald, 2010). Thus, RMA has been associated with destructive beliefs, attitudes, and behaviors among both sexes.

Although Burt's (1980) initial research focused on identifying personality predictors of RMA, subsequent studies have elaborated on the role of media consumption. General television viewing has been positively correlated with RMA (Kahlor & Eastin, 2011; Kahlor & Morrison, 2007). Meta-analyses have synthesized dozens of studies and determined that exposure to sexualized media can also increase RMA (Allen et al., 1995; Mundorf, D'Alessio, Allen, & Emmers-Sommer, 2006).

At this stage, however, interactive media such as video games and virtual worlds remain largely understudied. One study found that interacting with stereotypical virtual representations of women can promote rape myth acceptance (Fox & Bailenson, 2009b). Limited research has investigated the effects of actually controlling a sexualized avatar, although Behm-Morawitz and Mastro (2009) observed that playing as a sexualized video game character diminished self-efficacy for women. The Proteus effect also indicates that users will internalize the salient features (here, sexualization) and conform to social expectancies associated with those features. If a woman wears a sexualized avatar, she may expect to be treated like a sex object or feel that she does not merit respect. Thus, we expect that:

H2: Participants who wear a sexualized avatar will express more rape myth acceptance than participants who wear a nonsexualized avatar.

It is uncertain whether exposure to the self would counteract the experience of self-objectification by triggering a self-protective reaction, or whether associating sexualization with the self will magnify self-objectification. When viewing themselves in a sexualized body, women may feel defensive or sympathetic, which may minimize rape myth acceptance. Alternatively, seeing the self sexualized may cause a negative reaction or self-blame, which may trigger RMA. Thus:



RQ2: Will self-resemblance of the avatar moderate the effect of sexualization on rape myth acceptance?

Theoretically, there were two interrelated goals for this study. First, we wanted to determine if the Proteus effect occurs when women embody sexualized avatars and whether women will subsequently self-objectify. This question is also practically applicable considering the prevalence of sexualized female avatars in video game environments (Downs & Smith, 2010) and that women's most frequent behaviors in virtual worlds include modifying their avatar's appearance and purchasing virtual clothing (Guadagno, Muscanell, Okdie, Burk, & Ward, 2011). Second, we wanted to determine whether self-resemblance of the embodied avatar moderates the Proteus effect. Thus, in this study, participants were embodied in an avatar that was either sexualized (wearing tight and revealing clothing that accentuated a voluptuous body) or nonsexualized (wearing conservative clothing on a nonvoluptuous body). Additionally, the face of the avatar was manipulated in that participants either saw their own face (Self) or someone else's face (Other) on the virtual body. This study makes a unique contribution to both avatar research and research on the sexualization of women in media as it is the first to embody women in sexualized avatars in a fully immersive virtual environment and also the first to incorporate sexualized, photorealistic virtual doppelgängers.

## 4. Method

### 4.1. Sample

Female participants from a medium-sized West Coast university received course credit or \$15 for their participation. Four participants were dropped from the initial sample ( $N = 90$ ) due to technical failure during the experiment. The final sample ( $N = 86$ ) ranged in age from 18 to 41 ( $M = 21.16$ ,  $SD = 3.68$ ) and was racially diverse: 53.5% White/Caucasian/European-American ( $n = 46$ ); 24.4% Asian/Asian-American ( $n = 21$ ); 7% Black/African/African-American ( $n = 6$ ); 7% Latina/o/Hispanic ( $n = 6$ ); 2.3% multiracial ( $n = 2$ ); and 5.8% Other ( $n = 5$ ).

### 4.2. Apparatus

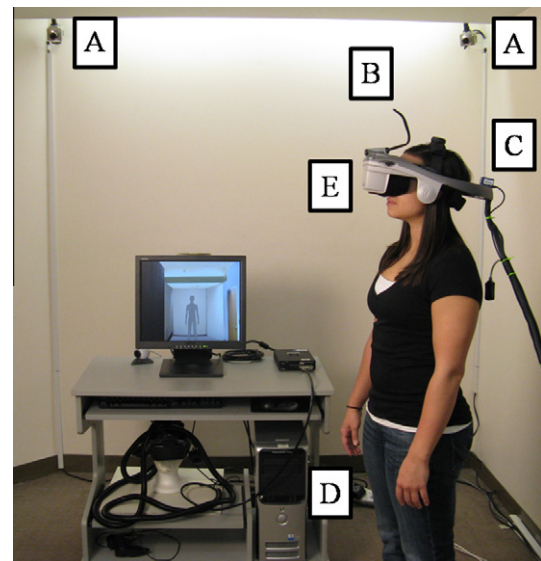
Participants were placed in a fully immersive virtual environment. Fig. 1 illustrates the room setup. They donned a head-mounted display (HMD) through which they were able to view the stimulus. Sensing equipment tracked users' motions (e.g., walking, turning their heads) so that a realistic visual depiction of the environment could be updated constantly based on their movements and the direction of the participant's view could be recorded at all times.

### 4.3. Stimuli

The virtual bodies used as stimuli were selected based on a pretest. All of the adult female representations from the Vizard Complete Characters avatar database were coded independently by one male and one female research assistant. From this data, 16 figures were chosen for pretesting. Thirty participants from a separate pool from the main experiment viewed the figures and rated them on several qualities derived from previous content analyses of mediated representations (Stern & Mastro, 2004).

#### 4.3.1. Dress

The variables of interest analyzed for this manipulation were "How sexy is this representation?" (1 = *Not sexy at all*; 5 = *Very sexy*) and "How is this representation dressed?" (1 = *Conservatively*



**Fig. 1.** The setup of the immersive virtual environment. Cameras at the corners of the room (A) track the position of an infrared light (B) on the HMD to determine where the participant is located in X, Y, Z space while an accelerometer (C) assesses the rotation of the participant's head. These data are then transmitted to the rendering computer (D), which recreates the image of the room based on the tracking data stereoscopically on the HMD's screens (E).

*clad*; 5 = *Suggestively clad*). Two representations that demonstrated high scores as both sexy ( $M = 3.33$ ,  $SD = 1.01$ ) and suggestively dressed ( $M = 4.27$ ,  $SD = .49$ ) and two that ranked as both not sexy ( $M = 2.08$ ,  $SD = .93$ ) and conservatively dressed ( $M = 2.20$ ,  $SD = .77$ ) were selected. The sexualized, suggestively clad representations were ranked as significantly more sexy,  $t(29) = 5.47$ ,  $p < .0005$ , Cohen's  $d = 1.29$ , and suggestively clad,  $t(29) = 12.75$ ,  $p < .0005$ , Cohen's  $d = 3.21$ , than the nonsexualized, conservatively clad agents. Fig. 2 shows the sexualized and nonsexualized representations that were selected for use in the study based on the pretest.

#### 4.3.2. Face

Participants had their photographs taken with a digital camera for a presumably unrelated study and these photographs were developed into virtual heads to affix to the bodies viewed in Fig. 2. Approximately 6 weeks after the photo session, participants were solicited for the current study. For the Self conditions, the avatar featured the participant's face. For the Other conditions, the avatar featured an unknown female of approximately the same age that was selected randomly for each participant from a pool of past experimental participants not involved in the current study.

### 4.4. Procedure

A  $2 \times 2$  (Dress  $\times$  Face) between-subjects design was employed. Participants were randomly assigned to one of four Conditions: Sexualized Self ( $n = 23$ ), Sexualized Other ( $n = 19$ ), Nonsexualized Self ( $n = 19$ ), and Nonsexualized Other ( $n = 25$ ).

Participants were outfitted in the HMD and immersed in the virtual world. Once inside the virtual world, they were asked to turn around and face a mirror. In that mirror, they saw an avatar matching their assigned condition. Following previous studies (e.g., Yee & Bailenson, 2007), participants were guided through a series of motions (turning the head side-to-side, dropping down to one knee and standing back up, etc.) so that they could observe the avatar moving with them in a naturalistic manner, the same way their own mirror reflection would behave in response to their physical movements.



Fig. 2. The avatars used as stimuli. Top row: sexualized avatars; bottom row: nonsexualized avatars.

After the mirror task, participants were told they would be meeting another participant. A male confederate was brought into the room and outfitted in an HMD. The participant was asked to turn around and approach the confederate's avatar so that they could interact in the virtual world. The confederate followed a scripted conversation and engaged participants in a brief task. Then, the confederate left the room without the participant seeing him. The participant was taken out of the HMD and asked to complete the questionnaire, which included the measures of interest among filler items to conceal the nature of the study.

#### 4.5. Measurement

##### 4.5.1. Manipulation checks

To assess if the sexualized dress manipulation was successful, participants were asked to indicate on a 5-point scale (1 = *Not at all*; 5 = *Extremely*) how sexy ( $M = 1.83$ ,  $SD = 1.03$ ) and how suggestively dressed ( $M = 2.23$ ,  $SD = 1.54$ ) the avatar in the mirror was. To

assess the self-other manipulation, participants were also asked to indicate on a 5-point scale (1 = *Not at all*; 5 = *Extremely*) the degree to which they believed the avatar resembled them in the face ( $M = 2.35$ ,  $SD = 1.15$ ).

##### 4.5.2. Presence

Twelve items were used to assess participants' experience of presence while immersed in the virtual world. Based on previous studies indicating the role of presence in affecting virtual outcomes (Fox et al., 2009; Price & Anderson, 2007), presence was entered as a covariate in the analyses. Participants indicated on a 5-point scale (1 = *Not at all*; 5 = *Extremely*) the degree to which they felt present in the virtual environment ( $M = 3.05$ ,  $SD = .68$ ). Cronbach's alpha was  $\alpha = .90$ .

##### 4.5.3. Rape myth acceptance scale

Burt's (1980) rape myth acceptance scale is used to determine the degree to which one endorses false beliefs about rape and rape

victims. Following the recommendations of Lonsway and Fitzgerald (1994), 11 items from the scale were employed. Participants responded to items on a 5-point scale (1 = *Strongly disagree*; 5 = *Strongly agree*) including “Women who get raped while hitchhiking get what they deserve” and “In the majority of rapes, the victim is promiscuous or has a bad reputation.” Reliability for this scale ( $M = 1.76$ ,  $SD = .48$ ) was  $\alpha = .78$ .

#### 4.5.4. Body-related thoughts

At the end of the study, following some distractor tasks, participants were asked to free write their current thoughts. Following Quinn et al. (2006), these responses were coded for body-related thoughts, which are indicators of self-objectification ( $M = .56$ ,  $SD = 1.00$ ). Two coders blind to condition analyzed the responses, achieving intercoder reliability of Cohen's  $\kappa = .74$ , deemed a “substantial” level of agreement (Landis & Koch, 1977).

## 5. Results

### 5.1. Manipulation checks

The Dress manipulation was successful. An independent samples *t*-test revealed that participants in the Sexualized conditions indicated that the avatar was more sexy ( $M = 2.36$ ,  $SD = 1.10$ ) and suggestively dressed ( $M = 3.49$ ,  $SD = 1.07$ ) than participants in the Nonsexualized conditions (sexy,  $M = 1.36$ ,  $SD = .72$ ; suggestively dressed,  $M = 1.07$ ,  $SD = .33$ ), sexy:  $t(70.07) = 4.93$ ,  $p < .0005$ , Cohen's  $d = 1.07$ ; suggestively dressed:  $t(44.35) = 10.93$ ,  $p < .0005$ , Cohen's  $d = 3.06$ .

The Face manipulation was also successful. An independent samples *t*-test revealed that participants in the Self conditions ( $M = 3.24$ ,  $SD = .92$ ) indicated that the avatar resembled them in the face significantly more than participants in the Other conditions ( $M = 1.55$ ,  $SD = .70$ ),  $t(83) = 9.66$ ,  $p < .0005$ , Cohen's  $d = 2.08$ .

### 5.2. Hypotheses and research questions

For the analyses,  $2 \times 2$  factorial ANOVAs were run and the main and interaction effects were examined. Presence was incorporated as a covariate.

H1 and RQ1 investigated whether the conditions affected body-related thoughts. Presence was not a significant factor in this analysis. The main effect for Dress was significant,  $F(1, 81) = 7.10$ ,  $p < .01$ , partial  $\eta^2 = .08$ . Participants in Sexualized conditions ( $M = .86$ ,  $SD = 1.24$ ) reported significantly more body-related thoughts than participants in Nonsexualized conditions ( $M = .27$ ,  $SD = .59$ ). Neither the main effect for Face,  $F(1, 81) = .83$ ,  $p > .05$ , partial  $\eta^2 = .01$ , nor the interaction effect,  $F(1, 81) = .60$ ,  $p > .05$ , partial  $\eta^2 = .01$ , were significant.

H2 and RQ2 addressed the effects of Dress and Face on rape myth acceptance. Presence was a significant factor in this analysis,  $F(1, 81) = 3.93$ ,  $p = .05$ , partial  $\eta^2 = .05$ . The main effect for Dress was not significant,  $F(1, 81) = .04$ ,  $p > .05$ , partial  $\eta^2 = .00$ . The main effect for Face was significant,  $F(1, 81) = 4.97$ ,  $p < .05$ , partial  $\eta^2 = .06$ ; participants in Self conditions ( $M = 1.89$ ,  $SD = .51$ ) reported greater rape myth acceptance than participants in Other conditions ( $M = 1.64$ ,  $SD = .42$ ). However, as Fig. 3 shows, this main effect was largely driven by the significant interaction effect,  $F(1, 81) = 4.31$ ,  $p < .05$ , partial  $\eta^2 = .05$ . Post hoc comparisons with a Bonferroni correction revealed that participants who wore a Sexualized Self ( $M = 1.95$ ,  $SD = .57$ ) expressed greater rape myth acceptance than participants who saw a Sexualized Other ( $M = 1.54$ ,  $SD = .36$ ) although there were no significant differences with the Nonsexualized Self ( $M = 1.82$ ,  $SD = .42$ ) or Nonsexualized Other ( $M = 1.72$ ,  $SD = .45$ ).

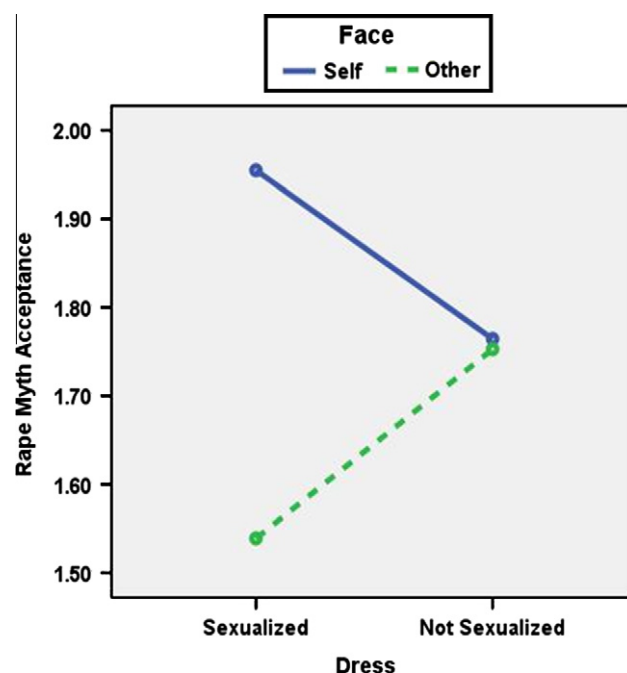


Fig. 3. Rape myth acceptance by condition.

## 6. Discussion

This study supported the Proteus effect and demonstrated that there are psychological consequences associated with embodying sexualized avatars. The findings here added new insights on the effects of exposure to sexualized representations in new media and what happens when images of the self are incorporated. Women who were embodied in sexualized avatars that resembled the self demonstrated greater rape myth acceptance than women who were embodied in other avatars. Women in sexualized avatars reported more body-related thoughts than women in nonsexualized avatars, indicating that sexualized avatars may promote self-objectification. It appears that users of sexualized avatars may be at risk for developing negative attitudes towards women and the self outside of the virtual environment.

Why did seeing oneself sexualized yield negative attitudes toward rape victims? Possibly, the sexualized self might have triggered a form of self-defense; that is, participants might have attributed blame to rape victims because they did not want to imagine themselves in a similar situation. Lonsway and Fitzgerald (1994) argued that women might perpetuate rape myths to justify why victims were raped and thus “reaffirm an individual's false sense of security that they are somehow immune to rape” (p. 137). Another possibility is that seeing the suggestively dressed self might have triggered memories of being told by a parent or authority figure that dressing in such a manner was “asking for it,” resulting in a sense of blame.

Quinn et al. (2006) previously found that women who tried on a swimsuit reported more body-related thoughts afterwards than women who had tried on a sweater. Similarly, women in this study who “tried on” a sexualized avatar reported more body-related thoughts than women who “tried on” a nonsexualized avatar. These findings indicate that wearing sexualized avatars in virtual environments and video games may lead to a similar experience of self-objectification as women wearing revealing clothing in the physical world. Following the Proteus effect, the results indicate that women who wear sexualized avatars may internalize the features of their avatars and start perceiving themselves in a sexually objectified manner.



These studies have forged ground into an important new realm: investigating the psychological impact of sexualized virtual representations of the self. Due to the increasing popularity of video games—31% of girls aged 8–18 report playing on any given day (KFF, 2010)—and the prevalence of sexualized representations therein (Downs & Smith, 2010), it is essential to investigate the cumulative and long-term effects of such exposure. Girls and women who embody these avatars may be subjecting themselves to an ongoing process of self-objectification during what they may consider harmless play. Internalization of these attitudes over time may result in decreased self-esteem, depressive symptoms, eating disorders, or diminished cognitive performance for female game players (Moradi & Huang, 2008).

A major implication of this research is the carryover effects of avatars. Several studies have shown that the avatars people wear can influence their behaviors outside of virtual environments (Ersner-Hershfield et al., 2011; Fox & Bailenson, 2009a; Yee & Bailenson, 2007). In this study, simply wearing certain avatars led women to blame rape victims for their assault—a dangerous attitude for a woman to have as a potential juror, confidante, voter, family member, or even a victim herself. The prevalence of violence in video games may exacerbate the effects of these representations (Anderson & Bushman, 2001), particularly when sexualized women are victimized (Dietz, 1998). Future research should address the intersection between sexualization and violence in video games on rape myth acceptance and attitudes toward women.

The results also indicate that sexualized representations that resemble the self can be additionally damaging. Negative attitudes may develop after seeing oneself objectified in that manner. Gurung and Chrouser (2007) found that women who saw pictures of sexualized female Olympic athletes (as opposed to the same athletes in sporting gear) judged the athletes as less competent, less intelligent, less determined, and having less self-respect. Seeing the virtual self objectified may lead women to make those same judgments about themselves, diminishing their self-worth.

### 6.1. Limitations and future directions

These findings are limited in that they were obtained from mostly college-aged women. At this age, sexuality and mate attraction are particularly salient, and these variables likely influenced the users' experiences. Also, the fact that this sample has accessed a college education may have influenced their attitudes and behaviors towards sexuality and sexual display. Future research should consider a broader sample of women as well as adolescent girls.

A methodological concern is that the impact of the self-other and sexualization manipulations generated by the first task (the mirror task) on attitudes may have been affected by the second task, the subsequent interaction with a male avatar. Saguy, Quinn, Dovidio, and Pratto (2010) found that women who felt objectified in their presentation to a male interactant reported discomfort and spent less time chatting than women who were not objectified or who were interacting with another woman. The experiment was designed, however, to resemble potential interactions that would take place in an online social world (i.e., being conscious of one's own avatar and then encountering others while embodying that avatar), and so the findings should be considered in that context. Future research should isolate the experience of embodying an avatar under these conditions without an immediate social interaction.

A final limitation is that this study relied on self-report questionnaire responses. Given the socially undesirable nature of many responses, however, it seems that participants were responding in a relatively uncensored manner. Going forward, analyzing behavioral data within the virtual world—as well as outside of it—will lend more richness to future findings.

Future studies should also consider the breadth of choices in avatar-based platforms as well as how frequently women select sexualized or self-resembling avatars for interaction and play. Given that avatars often vary in both their sexuality as well as their purported strength or power, this intersection of features merits further investigation (Royse, Lee, Undrahbuyan, Hopson, & Consalvo, 2007). Perceived behavioral realism or degree of perceived control of these representations may also be crucial in ascertaining their effects (Guadagno et al., 2011; von der Pütten et al., 2010). Women's previous experience within avatar-based environments may also play a role; with the burgeoning numbers of female gamers, this population may experience avatars differently than casual or non-users (Williams, Consalvo, Caplan, & Yee, 2009). Other personality factors, such as neuroticism or self-esteem, may also moderate the effects of avatar embodiment or predict the likelihood of selecting a sexualized or nonsexualized avatar (Dunn & Guadagno, 2012).

### 6.2. Conclusions

In sum, this study has demonstrated that women can be affected negatively by the avatars they wear. Women may be at risk for experiencing self-objectification and developing greater rape myth acceptance, and these attitudes may influence their behaviors both on- and offline. Future studies need to clarify the extent of these effects as well as how avatars can be used to elicit positive changes in attitudes and self-image. In the meantime, users of video games, online social worlds, and other virtual environments should be made aware of the potential effects and implications of the avatars they embody.

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