

Inferences About Avatars: Sexism, Appropriateness, Anthropomorphism, and the Objectification of Female Virtual Representations

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This study integrated the computers as social actors (CASA) framework with objectification theory to predict that traits, such as sexism, influence perceptions of virtual representations as well as attributions of the source and message. Participants (N = 397) received a message about dating or job interviews presented by a virtual woman in either context-appropriate or context-inappropriate dress. Causal modeling techniques revealed that participants higher on sexism rated the representations as less human (i.e., less anthropomorphic) and less credible. Further, perceived appropriateness of clothing and anthropomorphism influenced perceptions of source trust and message clarity. Implications for understanding the role of trait variables such as sexism on perceptions of virtual representations are discussed.

Keywords: Avatars, Anthropomorphism, Sexism, Source Credibility, Objectification Theory, Computers as Social Actors, Causal Modeling.

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It is important to ascertain how individuals interpret online images and messages both because communication is increasingly taking place online, and for what online processes illustrate about general perception and interactions. Online communications often include a virtual representation to accompany messages or people, such as an image on a Facebook or Twitter account, a photo on an online dating site, an image representing a teacher in an online course, or a virtual agent providing information about a product on a commercial website. People make judgments of the source based in part on those

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images, which influences how they interpret associated information regardless of whether the source of the information is human, animal, or computer.

The notion that people's responses to digital stimuli follow a similar process to responses to offline objects is consistent with the computers as social actors (CASA) paradigm (Nass & Moon, 2000; Reeves & Nass, 1996). Although work focused on how different interfaces, images, or characteristics affect perception is important, so is research examining individual differences influencing the perception process. Objectification theory predicts that cultural norms and exposure to certain types of media lead people to perceive and treat women as objects rather than humans (Fredrickson & Roberts, 1997; Gurung & Chrouser, 2007). These attributions are influenced by individual differences and in turn influence perception of source and messages (Blascovich & Bailenson, 2011; Hamilton & Nowak, 2010; Kim & Sundar, 2012; Lee, 2004, 2008; Nowak, Hamilton, & Hammond, 2009; Peña, 2011).

More research is needed to understand how, why, and how much pre-existing biases and traits shape perceptions of sources and their messages, which have implications for both online and offline interactions. Objectification theory and the computers as social actors (CASA) framework can together help predict and explain how certain biases may influence people's perceptions of computer-generated images and the influence of those perceptions on attributions of sources and associated messages. This project will examine the extent to which sexism influences perceptions of virtual representations of women and messages associated with them.

Predicting Attributions of Online Sources

Online visual representations vary greatly and can include emoticons in online chat applications, static photographs on social networking sites, or three-dimensional, lifelike human agents in an immersive virtual environment. Across all types of images and interfaces, users differentiate between representations based on appearance and other characteristics, particularly the extent to which they are human-like, or anthropomorphic (Lee, 2010; Nass & Moon, 2000; Nowak, 2004, 2015). According to Nass and colleagues' CASA framework, including Reeves and Nass's (1996) media equation, human brains have not evolved to differentiate between offline people and mediated depictions of social entities, so they react to these stimuli using the same processes and making attributions of the same categories.

As people navigate the world, they classify things that come into their range of senses, and the human/not human classification is among the first made (Sheehan, 1991). Although classifying people follows the same predictable processes as classifying objects or animals, different categories become accessible and relevant when perceiving inanimate objects than when perceiving any living things. When perceiving other humans, people must consider intentionality and emotion as well as possible abilities and personality (Sheehan, 1991).

This processing and classification happens online as well, and CASA predicts that users will anthropomorphize computer-based entities (Bailenson, Yee, Merget, & Schroeder, 2006; Hamilton & Nowak, 2010; Nowak et al., 2009). Interactions with others, whether computer-mediated or not, are seen as "fundamentally social and natural" (Reeves & Nass, 1996, p. 5). Essentially, online entities that resemble humans, respond in socially appropriate ways, or display any intelligence or emotion are deemed to have social potential, which has been called a "social bias" effect (Nass & Moon, 2000; Nowak et al., 2009). This is particularly true when an anthropomorphic image is associated with the message or source, as their humanlike appearance or behavior leads them to be perceived to have higher social potential and thus brings expectations of credibility, intelligence, and appropriate social responses (Bailenson et al., 2005; Nowak, 2004; Nowak et al., 2009). Ascribing social potential to an entity has meaning for the perception of the source and its associated messages. Essentially, people allocate more cognitive resources

and create more complex mental models of those they deem to have social potential, which subsequently triggers social category assignments and related judgments (Blascovich et al., 2002; Lee, 2010; Nowak, 2015; Nowak et al., 2009).

Although it is important to examine how different features of images influence perception, it is also important to understand factors influencing variance in perception of the same digital image or avatar across individuals. As would be predicted by CASA, many of the factors that shape how individuals perceive other people's corporeal bodies influence perception of digital images and avatars. There are individual differences in the way people perceive others based on physical attributes in offline interactions (Hamilton & Sherman, 1994; Lakoff, 1987). Similarly, certain individual differences influence perception of the sources encountered online as people integrate their biases and previous experiences to make sense of what they are seeing, which influences the judgment of the virtual representation's social potential (Blascovich et al., 2002; Hamilton & Nowak, 2010; Lee, 2010; Nowak et al., 2009).

Researchers have explored the role of personality traits and priming in predicting how individual differences influence perception and responses to virtual representations. Research has consistently shown that visual characteristics of virtual images and avatars (e.g., clothing, realism, and body type) engage stereotypes associated with physical characteristics of humans, such as biological sex and race (Fox & Bailenson, 2009; Fox, Bailenson, & Tricase, 2013; Groom, Bailenson, & Nass, 2009; Lee, 2008; Nowak & Rauh, 2008; Peña, 2011). This indicates that existing biases lead to the activation of different schema when encountering images and people online (Groom et al., 2009; Lee, 2004; Peña, Hancock, & Merola, 2009), and could at least partially explain the variance in individual perceptions and expectations of the same images, including judgments of humanity.

Objectification and Dehumanization

Dehumanization is a broad conceptualization in which a human is treated as less than fully human (Haslam, 2006). Dehumanization has been described as the "inverse process of anthropomorphism" because it involves the denial of human traits (Waytz, Epley, & Cacioppo, 2010, p. 58). Haslam's (2006) dual model of dehumanization defines two types. In *animalistic dehumanization*, targets are perceived similarly to animals, with decreased cognitive capacity, rationality, and civility. In *mechanistic dehumanization*, also called objectification, targets are perceived similarly to objects, with diminished agency, vitality, or warmth. Scholars have determined that these two types are often intertwined (Haslam & Loughnan, 2014), especially in regards to the treatment of women (Gervais, Bernard, Klein, & Allen, 2013).

Similarly, objectification theory posits that sociocultural forces, including media messages, influence people to diminish or deny the personhood of women and instead treat women as things (Fredrickson & Roberts, 1997; Fredrickson et al., 1998). Scholars have integrated objectification theory with models of dehumanization to help explain why women in particular are targeted (Gervais et al., 2013; Moradi, 2013). When women are objectified, they are perceived as less competent, less moral, and less human (Heflick & Goldenberg, 2009; Heflick, Goldenberg, Cooper, & Puvia, 2011; Vaes, Paladino, & Puvia, 2011).

Several studies have examined the conditions under which people are more likely to dehumanize women, and found certain triggers or situations make women more likely to be objectified. When women are perceived to deviate from social norms, or behavior deemed appropriate in a particular context, including clothing choice, they are more objectified (Gurung & Chrouser, 2007; Infanger, Bosak, & Sczesny, 2012). The appropriateness of clothing worn also influences perceptions of credibility, likability, dominance, and competence (Gorham et al., 1999; Gurung & Chrouser, 2007; White, 1995). This also applies to digital embodiments, and research has shown that the clothing choice associated with avatars

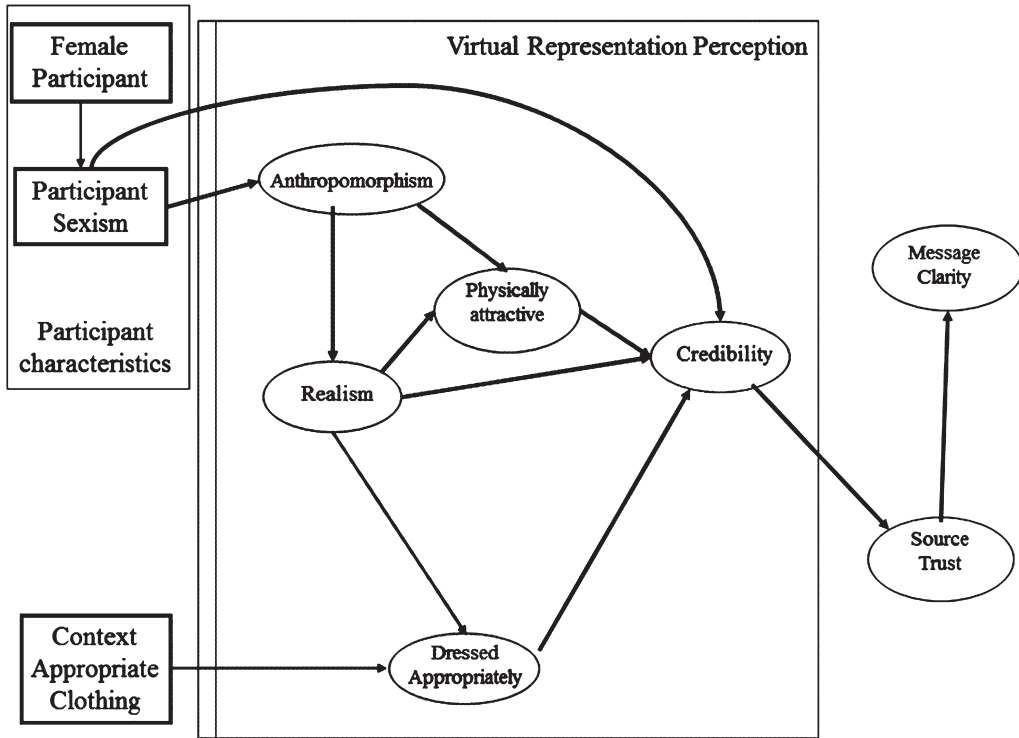


Figure 1 Predicted model

and virtual representations engages sex stereotyping and gender schema (Fox & Bailenson, 2009; Fox, Ralston, Cooper, & Jones, in press). Thus, the model in Figure 1 predicts that those in context appropriate clothing will be perceived to be dressed appropriately, and perceptions of appropriate dress will predict credibility.

Sexism and Objectification of Virtual Others

Synthesizing the predictions of CASA and objectification theory, the model in Figure 1 predicts that virtual women are likely to be objectified based on their appearance, particularly by sexist people. Previous studies have shown that virtual representations of women and femininity can trigger sexist reactions (Behm-Morawitz & Mastro, 2009; Fox & Bailenson, 2009; Lee, 2004, 2008) as well as objectification-related processes (Fox et al., 2013, in press). Given that CASA predicts that people use similar cognitive processes and biases to judge virtual representations and their levels of social potential, the same individual differences that predict person perception and objectification should influence how people process virtual representations and their messages.

Anthropomorphism is the perception of humanness of the other, whereas objectification is a process of dehumanizing the other (Loughnan et al., 2010; Vaes et al., 2011; Waytz et al., 2010). Human images are generally perceived as the most anthropomorphic, followed by animals, with objects generally perceived as the least anthropomorphic (Nowak & Rauh, 2005, 2008). If a perceiver objectifies a virtual woman, she will be dehumanized and seen as less anthropomorphic; in turn, finding the virtual woman

less anthropomorphic would diminish perceptions of social potential and credibility. These predictions are illustrated in the model portrayed in Figure 1.

Individual traits and biases such as sexism lead people to interpret the same stimuli in unique ways and reach different conclusions about the credibility of the source and the value of associated messages (Hamilton & Nowak, 2010; Hamilton & Sherman, 1994; Nowak et al., 2009; Nowak & Rauh, 2008). Sexist individuals are overall more likely to objectify women regardless of other factors (Cikara, Eberhardt, & Fiske, 2011; Rudman & Mescher, 2012; Vaes et al., 2011), and women are generally less sexist than men (Swami et al., 2010; Swim, Aikin, Hall, & Hunter, 1995), explaining the predicted path from female sex to sexism. The model predicts that sexism will explain some of the variance in the perception of the image, with more sexist individuals being more likely to objectify and dehumanize the virtual representations of women than less sexist individuals. This means that sexist people will rate the women as less human and less credible, as shown in negative direct paths from sexism to both anthropomorphism and credibility, and this will influence the remaining judgments.

Anthropomorphism increases perceptions of social potential, and more anthropomorphic images are generally perceived to be more realistic (Bailenson et al., 2006; McGloin, Nowak, & Watt, 2014; Nowak et al., 2009), explaining the predicted path from anthropomorphism to realism. Although there are different dimensions of realism, the one considered here is realism as typical, probable, or likely to exist offline (Busselle & Greenberg, 2000; Hall, 2003; Nowak et al., 2009). This dimension of realism is also likely to influence perception of appropriate dress, as one would typically expect more realistic avatars and virtual images to be dressed appropriately for the interaction goals. Thus, images perceived to be more realistic are predicted to be rated as more appropriately dressed.

Images that are perceived to be more anthropomorphic or more realistic are also more likely to be judged as more attractive and credible (Hamilton & Nowak, 2010; Nowak & Rauh, 2008; Nowak et al., 2009; Seyama & Nagayama, 2007), explaining the path from anthropomorphism and realism to attractiveness and credibility in the predicted model. Image characteristics influence perceived social potential and credibility of the source and its associated messages (Hamilton & Nowak, 2010; Nowak et al., 2009; Seyama & Nagayama, 2007). Thus, images that are more realistic, more attractive, and perceived to be dressed appropriately are predicted to be more credible, explaining the three direct paths to image credibility in the model.

Consistent with predictions based on the CASA model, sexism carries over into the perception and attribution of mediated representations of women (Gurung & Chrouser, 2007) and avatars' clothing has been shown to engage gender schema (Fox et al., in press). In objectification theory terms, women who are perceived to be appropriately dressed for the context will be less objectified than those who are inappropriately dressed (Gurung & Chrouser, 2007). Images depicted as appropriately dressed for the context of the interaction are less likely to be objectified and more likely to be seen as credible. Thus, the model predicts that appropriate dress will increase attributions of credibility and trustworthiness of the source and its messages.

As with offline interactions, the visible features of the source influence perceived credibility of the source, which in turn influences the perception of associated messages (Hamilton & Nowak, 2010; Hamilton & Sherman, 1994). The extent to which participants see the source as trustworthy influences how much attention they allocate, and how they process associated messages even in avatar-based interactions (Bente, Rüggenberg, Krämer, & Eschenburg, 2008; Nowak et al., 2009). Thus, the model predicts that the perceived credibility of the image will influence source trust, and that source trust will influence perceived message clarity (McGloin et al., 2014). In summary, the model predicts that objectified virtual representations will be seen as less anthropomorphic and less anthropomorphic images will be seen as less credible, which will influence perceptions of the source of the message and the clarity of the message itself.

Method

Sample

Participants were recruited from Communication courses at a large public university in the United States ($N = 397$; 174 male and 197 female) ranging in age from 18 to 35 ($M = 19.21$, $SD = 1.49$). Participants who reported their race/ethnicity identified as White ($n = 270$), Asian/Asian-American ($n = 60$), Latino/a ($n = 27$), Black/African-American ($n = 21$), and other ($n = 7$).

Procedure

Stimulus pretest

For the pretest, eight virtual representations were created using Yahoo's free avatar creation website. The same digital image was used, but the clothes varied by condition. Participants ($N = 166$, 72 male and 91 female) were recruited from Communication courses at a large Midwestern university in the United States and filled out online questionnaires indicating their perception of the appropriateness of eight outfits for a job interview or a date on a 7-point scale (1 = *most appropriate*; 7 = *least appropriate*). An ANOVA with repeated measures found the eight virtual representations were perceived to be significantly different on appropriateness for a job interview $F(4.69, 722.87) = 479.56$, $p < .001$, $\eta_p^2 = .76$. The virtual representations were also perceived to differ significantly on appropriateness for a date $F(4.95, 737.95) = 237.69$, $p < .001$, $\eta_p^2 = .62$. The selected job image was ranked most appropriately dressed for a job interview ($M = 4.62$, $SD = .65$) and least appropriate for a date ($M = 1.83$, $SD = .82$). The selected date image was rated as the most appropriately dressed for a date ($M = 4.30$, $SD = .72$), though second least appropriate for a job interview ($M = 1.86$, $SD = .87$). Bonferroni paired comparisons between the selected stimuli showed the job image was significantly more appropriate for a job interview than the date image ($p < .001$), and that the date context image was significantly more appropriate for a date than the job image ($p < .001$).

Experiment procedure

Participants signed up online for an appointment at the lab. When they arrived, they were randomly assigned to one of four conditions: Context Appropriate Job ($n = 95$), Context Appropriate Date ($n = 97$), Context Inappropriate Job ($n = 94$), and Context Inappropriate Date ($n = 93$).

Participants were shown one of four PowerPoint presentations consisting of eight slides. The virtual woman offered the same general advice for either dating or job interviews. The advice was appropriate for either context and included "Be on time for the interview/date," "A key to good interviewing/date discussion is good listening," and "Do not bad mouth previous employers/dates." A slide from each context can be seen in Figure 2. Following the five minute treatment, participants were asked to complete the online survey.

Measures

With the exception of clothing appropriateness, scales were evaluated for acceptable reliability and factor structure. Item quality was assessed with a series of confirmatory factor analyses. Three criteria were employed to test item quality. The first criterion, which concerned the content validity of the items, was homogeneity of item content. To be included on a scale, items had to tap into the same underlying theme. The second criterion was internal consistency. This test examines whether the matrix of correlations among the items on the scale is relatively flat. Internal consistency was measured with coefficient alpha; this criterion is also known as unidimensionality. The third criterion was parallelism, also known as

Arrive on Time



- ▶ Be on time for the interview. On time means five to ten minutes early. If need be, take some time to drive to the location of the interview ahead of time so you know exactly where you are going and how long it will take to get there.
- ▶ You have agreed on the time so don't be late. Being late sends a negative message: "My time is more valuable and the world revolves around me."
- ▶ Greet the interviewer and let them know how pleased you are to meet them.

Arrive on Time



- ▶ Be on time for your date. On time means five to ten minutes early. If need be, take some time to drive to the location of the interview ahead of time so you know exactly where you are going and how long it will take to get there.
- ▶ You have agreed on the time so don't be late. Being late sends a negative message: "My time is more valuable and the world revolves around me."
- ▶ Greet your date and let them know how pleased you are to meet them.

Figure 2 Sample stimuli featuring virtual representations for job and date contexts.

external consistency, which examines the extent to which each item on a scale correlates with other scales in the study to approximately the same degree (in the case of equal item quality) or forms a gradient.

Clothing appropriateness

The same two questions asked in the pretest were used as manipulation check in the experiment to measure participants' perception of appropriateness of the avatar's clothing for a job or a date. Participants

responded to two items on a 5-point scale (1 = *least appropriate*, 5 = *most appropriate*): “This avatar’s clothing is similar to what I would expect to see someone wear on a date,” or “This avatar’s clothing is similar to what I would expect to see someone wear on a job interview.”

Participant sexism

Sexism was measured with five items ($\alpha = .68$) on a 7-point scale (1 = *strongly disagree*; 7 = *strongly agree*) from Swim et al. (1995). These items did not appear together in the questionnaire to reduce demand characteristics. Items included: “Women are generally not as smart as men,” “Women are just as capable of thinking logically as men,” and “I would be equally comfortable having a woman or a man as a boss.”

Credibility

Credibility was measured using five semantic differential items ($\alpha = .94$) on a 7-point scale from Nowak et al. (2009). The items followed the prompt “the avatar I viewed is” and included “unintelligent/intelligent,” “uninformed/informed,” and “unreliable/reliable.”

Anthropomorphism

Anthropomorphism was measured using four retained items ($\alpha = .84$) from Nowak et al.’s (2009) 6-item, 5-point scale (1 = *not at all*; 5 = *very much*). Items had the prompt “This avatar” and included “looks human,” “has human features,” and “has human-like expressions.”

Realism

Eight items measured realism ($\alpha = .74$) on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*). Items for this scale were adopted from Nowak et al. (2009). Some of the items included “This avatar is unreal,” “This avatar is cartoon-like,” and “This avatar is realistic.”

Attractiveness

Perceptions of the avatar’s attractiveness was measured using five items ($\alpha = .87$) from Nowak and Rauh (2005) on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*). Some of the items in the scale included “I don’t like the way this avatar looks,” “I find this avatar attractive,” and “This avatar is not good looking.”

Source trust

Trust was measured using three items that assessed perceptions of the representation’s ability to provide quality advice created for this project ($\alpha = .83$). Participants indicated their agreement with the statements on a 5-point scale (1 = *strongly disagree*; 5 = *strongly agree*). Items included “This avatar is an expert on job interviews/dates,” and “I trust this avatar because of her extensive experience with dating/jobs.”

Message clarity

Clarity was measured using five items ($\alpha = .84$) from McGloin, Nowak, and Watt (2014). Participants indicated their agreement with the statements on a 5-point scale (1 = *strongly disagree*; 5 = *strongly agree*). Items included: “This advice is well written,” “This advice is easy to read,” and “The logic of this advice is easy to follow.”

Results

The predictions specified in the model in Figure 1 about people's reactions to the virtual images were based on a combination of objectification theory and CASA and were tested by using structural equation modeling techniques (PMOD 5). Structural equation modeling is ideally suited for testing multiple relationships together, particularly when the predictions involve covariation between variables or mediating or moderating relationships. These relationships would not be apparent in independent direct tests.

We first created an interaction term for Context Appropriateness such that matching text context and avatar (job avatar with job advice, and date avatar with date advice) were labeled as 1 and not matching (job avatar with date advice, and date avatar with job advice) were -1. The only difference in the images was the clothing worn. An ANOVA showed no significant difference on anthropomorphism, $F(1, 369) = 1.04, p = .31, \eta^2 = .002$, between the date image ($M = 4.00, SD = .69$) and the job image ($M = 4.07, SD = .63$).

In general, the initial model was consistent with the data but outside the range of an acceptable fit ($RMSE = .11, \chi^2 = 116.35, df = 32, p < .00$). All paths were significant, but the missing link analysis revealed three direct paths where only indirect paths were predicted, so these links were added and the model respecified. This respecified model represents a good fit on all indices ($RMSE = .07, \chi^2 = 48.17, df = 28, p < .00$) and is displayed in Figure 3 with the added paths displayed by dashed lines. For models with 400 cases (this model has 397), the RMSEA is the appropriate measure of fit, and is well below the cutoff for poor fitting models of 0.10 (Kenny, 2012).

The respecified final model presented in Figure 3 was consistent with the model as predicted by CASA and objectification theory. The variable correlations and standard deviations are presented in

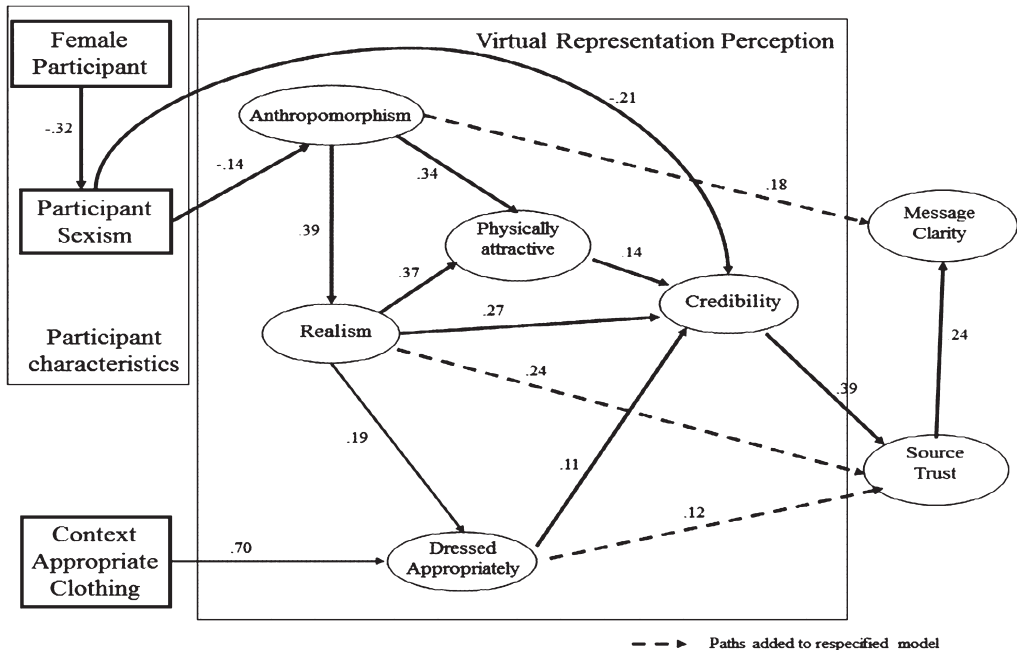


Figure 3 Respecified model with retained paths

Table 1 Correlations, means, and standard deviations

| | <i>M</i> | <i>SD</i> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--------------------------|----------|-----------|-------|-------|-------|------|-------|-------|------|----|
| 1. Anthropomorphism | 4.02 | .66 | -- | | | | | | | |
| 2. Realism | 2.57 | .56 | .31** | -- | | | | | | |
| 3. Attractiveness | 3.34 | .74 | .41** | .40** | -- | | | | | |
| 4. Sexism | 2.27 | .47 | -.03 | .01 | -.13* | -- | | | | |
| 5. Avatar credibility | 3.32 | .64 | .03 | .16** | .12* | .02 | -- | | | |
| 6. Source trust | 2.73 | .85 | .15** | .31** | .23** | -.04 | .43** | -- | | |
| 7. Dressed appropriately | 2.90 | 1.30 | .15** | .21** | .15** | .02 | .17** | .22** | -- | |
| 8. Message clarity | 4.10 | .54 | .18** | .12* | .15** | -.06 | .30** | .23** | .10* | -- |

**Correlation is significant at the $p < 0.01$ level (2-tailed).

*Correlation is significant at the $p < 0.05$ level (2-tailed).

Table 1. As predicted, the virtual representations in different contexts were perceived to be more appropriately dressed in their assigned conditions as evidenced by the large path (.71) from context appropriate image to perception of appropriate clothing. In terms of individual difference variables, males were more sexist than females, and sexist participants objectified the female virtual representations more than less sexist participants as evidenced by the negative direct paths from sexism to anthropomorphism and credibility. The predicted link between anthropomorphism and social potential is supported by the path from anthropomorphism to credibility and from credibility to source trust as well as the direct paths from anthropomorphism to realism and to attractiveness. Further, sources represented by less credible images, or not perceived to be appropriately dressed, are seen as less trustworthy. All of these results support the prediction that images that are not anthropomorphized and seen as less realistic are objectified and seen as less credible.

The model supports predictions that these judgments of the representation and appropriate attire influence perceptions of trustworthiness, and that source trust will influence perceived message clarity. Although the model did not predict the direct path from anthropomorphism to message clarity, or from realism and dressed appropriately directly to source trust, these paths represent direct effects where indirect effects were predicted and are therefore consistent with the overall predicted model. They indicate that messages associated with a less anthropomorphic representation are perceived as less clear, and whether or not the avatar is appropriately dressed and realistic influences trust. These paths provide additional support for the role of judgments of anthropomorphism, and show that images seen as having less social potential directly influence not only perceptions of the source but also the message.

Discussion

This study examined how virtual representations associated with an informative message in two contexts (dating and job interviews) influenced perceptions of source and message. It contributes to our understanding of the objectification of representations of women, as well as the significant influence of individual traits like sexism on the processing of information presented by virtual representations. As CASA suggests, people's responses to virtual representations are similar to responses to offline corporeal bodies, meaning they apply schema and stereotypes based on the visible characteristics of the representations. These results extend this finding and reveal that certain traits such as sexism influence

the attributions people make, explaining some variance found across individuals' perceptions of virtual representations.

CASA argues that computers and computer-generated images are treated as social actors even when minimal social cues are provided, and these findings are consistent with this model. Objectification theory adds some clarity regarding how existing traits and biases (in this case, sexism) can partially moderate these perceptions. Perspectives on dehumanization including objectification theory suggest that ingrained biases lead people to perceive women as less human. Indeed, sexism was associated with dehumanizing the virtual woman and rating the image as less anthropomorphic, which diminished perceptions of her credibility. Thus, these results suggest that the biases against women predicted by objectification theory apply to those represented as virtual women as well. Future researchers employing CASA to interpret reactions to virtual representations should consider assessing biases and stereotypes relevant to the representation. These individual differences may explain variance in the degree to which these representations are perceived and treated in a human manner as opposed to being objectified and dehumanized.

When examining communication theoretically, it is only when we consider characteristics of both the source and receiver that we will fully understand how individuals process and interpret messages. Individual differences are often missing from communication-based theories and models although they may offer substantial insight for gauging perceptions of messages both online and offline. For example, research has demonstrated that traits predict the types of messages people send through social networking sites (Carpenter, 2012), as well as trolling and online sexual harassment (Buckells, Trapnell, & Paulhus, 2014; Fox & Tang, 2014). These findings indicate that scholars should consider trait differences that may influence attention, perception, and response to virtual representations and the messages they share.

From a practical perspective, users should be aware that traits will guide individuals' reactions to representations and the messages they share. Given that individuals treat mediated representations of people as real people, we can expect that targets typically objectified offline (women, ethnoracial minorities, etc.) are likely to be subject to objectification online. Other objectifying aspects of the online environment may further diminish perceptions of anthropomorphism and humanity. For example, if a person wishes to play as a female character in an online game and has no other choices but a hypersexualized avatar, he or she should be aware that this appearance may trigger objectification in the way other players respond to him or her and in self presentation and identity. Indeed, objectification theory may inform a boundary condition for CASA in which some representations are objectified and dehumanized to the point that they are no longer anthropomorphized but are perceived as objects.

These findings also have practical implications for choosing virtual representations in persuasive CMC contexts, ranging from online advertising to virtual classrooms to immersive environments designed to promote behavior change. Choosing context-appropriate dress and bolstering anthropomorphism should enhance perceptions of an avatar's source credibility and message quality. For example, a pajama-clad human avatar or a human-shaped blob is unlikely to persuade someone to quit smoking, but the pajama-clad avatar might be a successful choice for selling a mattress. It is important that people who design and use these systems be aware of the larger implications of the choice of image that represents them and delivers their message.

Limitations and Future Directions

There are many other factors that could influence these results and many avenues for future researchers to consider. To maximize internal validity, the same virtual female representation was used across conditions and only her clothing varied. This study focused on context appropriateness so the images did not vary on anthropomorphism, realism, sex, attractiveness, body type, or a variety of other potentially

influential characteristics. Although sexism only indirectly influenced attractiveness, it is possible that participants, particularly those high on sexism, would have had stronger reactions to images that varied on attractiveness or other characteristics. Further, although there is important work showing that men are increasingly being objectified in media and this is an important area of inquiry, this project focused on representations of women because they are more likely to be objectified (Aubrey, 2006; Loughnan et al., 2010). Another direction for future inquiry is examining different modalities and features of interfaces (e.g., 2D vs. 3D, interactivity, immersion), as it is likely that perceptions of anthropomorphism and realism vary across different digital environments (Blascovich & Bailenson, 2011). To address these possibilities, future researchers should manipulate other features of avatars, such as including male and female representations, and vary levels of attractiveness and anthropomorphism (including animals and objects).

It is important to note that the messages across all conditions were fairly credible messages giving uncontroversial advice for these contexts. It is possible that credible images paired with less than credible or controversial messages would lead to different results (McGloin et al., 2014). Although we attempted to identify contexts that would be relevant to the audience (work and dating), there may be different factors at play across contexts. Future research may investigate different contexts for messages or vary message quality.

Another potential limitation is the reliability of the sexism variable, though the Path program did control for attenuation due to measurement. The path from sexism to anthropomorphism is not large, meaning it is not accounting for a high degree of the variance. Future research should further test the role of sexism and other traits to see how much of the variance in perception of avatars and digital images these individual differences can predict.

Conclusion

This study points to the importance of examining objectification theory in online contexts, suggesting that even virtual representations of women are dehumanized and discredited. Integrated with CASA, these theoretical frameworks predict that group biases carry over to influence perception and attribution in online settings and this may provide some explanation for the so called “social bias” effect (Nass & Moon, 2000; Nowak et al., 2009). As CMC becomes increasingly common and people employ avatars to represent them in social, work, and leisure contexts, people are tasked with both choosing and interpreting representations that will ensure that their humanity is conveyed and help them achieve their social goals.

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