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Recommended Citation

DeWester, David; Nah, Fiona Fui-Hoon; Gervais, Sarah J.; and Siau, Keng, "Are Male and Female Avatars Perceived Equally in 3D Virtual Worlds?" (2009). *AMCIS 2009 Proceedings*. 386.

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Are Male and Female Avatars Perceived Equally in 3-D Virtual Worlds?

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ABSTRACT

Virtual worlds are three-dimensional, computer-generated worlds in which users take the form of avatars and use those avatars to interact with objects and other avatars in the virtual world. Virtual worlds are growing in importance in both educational institutions and businesses. Educational institutions have adopted virtual worlds as a medium for instructional delivery whereas businesses are using virtual worlds for recruitment, training, collaboration, and marketing. Given these emerging phenomena, a better understanding of behavioral and perceptual issues in virtual worlds is warranted. We propose a research model to study the interaction effects of gender stereotypicality of male and female avatars and gender typicality of tasks on trust perceptions. Gender stereotypes have been widely studied in the real world along with their effects on trust perceptions. An experiment is proposed to examine the effects of gender stereotypes on trust perceptions in virtual worlds. Implications and expected contributions are also discussed.

Keywords

Virtual worlds, avatars, stereotypicality, perception of avatars.

1. INTRODUCTION

Three-dimensional virtual worlds (3DVWs), such as Second Life, There.com and others, are a logical extension of the Internet in which people interact through avatars. In addition to those features available on 2D Web, 3DVWs support additional features such as 3D modeling of objects and an enhanced feeling of telepresence, social presence, copresence, and immersive experiences.

The resemblance 3DVWs have with the real world may cause people to respond to certain stimuli in the same manner in both the real world and virtual worlds, resulting in certain behaviors and beliefs being present in both the real and virtual worlds. One such set of stimuli is how people perceive others in virtual worlds. Although avatars are customizable and can be any race or gender, it is possible that people form perceptions of others based on the avatar's appearance. In Eastwick and Gardner (2008), light-skinned and dark-skinned avatars approached strangers in a 3DVW and asked for favors. The light-skinned avatars were significantly more likely to obtain those favors than the dark-skinned avatars.

Gender bias might also be present in 3DVWs. In real worlds, for example, people tend to socially and economically "punish" men and women who engage in gender atypical behavior (e.g., male fashion experts or female football experts, see Rudman and Fairchild, 2004). Extending this finding to 3DVWs, it is possible that male and female avatars suffer similar social and economic sanctions for having gender atypical features, which is the degree to which a person possesses features normally associated with their gender, even though avatars gender may be completely arbitrary. People, and by extension avatars, are called "stereotypic" if they have average features for their gender such as normal build and height. Hyper-stereotypic people have above-average features, such as men with exceptionally large muscles and women with large breasts. Counter-stereotypic people have below-average features, such as men who are shorter than average or women with small breasts. People of different genders can be perceived differently (Rudman and Fairchild, 2004; Vescio et al, 2005) and, furthermore, within each gender, people of different stereotypicality can be perceived differently (Gervais and Vescio, 2008; Zebrowitz, 1997). As 3DVWs become more important in business and education (Eschenbrenner et al. 2008), it will become more important to understand the as yet little studied areas of gender and stereotypicality perceptions.

2. LITERATURE REVIEW

3DVWs allow people to interact with each other in a way that goes beyond e-mail or chat rooms. 3DVWs resemble the real world more than other methods of interaction through computer-mediated environments. Users in a 3DVW are represented using an avatar that can usually be customized in appearance, gender, and race. Therefore, it is of interest to know how an avatar's appearance will affect other people's perception of it.

For example, in a virtual educational environment where instructors and students meet only in 3DVWs, would the selection of certain appearances for the instructor facilitate the pedagogical process? In a virtual business environment, would the selection of certain features for an avatar help the salesperson by facilitating the sales process? In particular, do known issues related to appearances in the real world carry over into virtual worlds? Do biases people hold in the real world also hold in virtual worlds? Very little research has been done to answer these questions.

2.1 Gender Stereotypicality

Researchers have examined why women and men are categorized by their gender, rather than individuated (Tajfel, 1969). Generally speaking, categorization and individuation processes are anchored at opposite ends of the person perception continuum (Fiske and Neuberg, 1990). Categorization is the default unless people are able and motivated to go beyond category-based perception to individuate others (Brewer, 1988; see also Fiske et al., 1999). Once categorized, similarities within groups (e.g., women seen as similar to one another) and differences between groups (e.g., women and men seen as different from one another) are accentuated (see Allport, 1954; Hensley and Duval, 1976) by the self (Oakes et al., 1994; Turner et al., 1994) and others (Stangor et al., 1992; Taylor et al., 1977) and discriminatory behaviors often follow (e.g., Vescio et al., 2005).

Importantly, within any group of people (e.g., White women, White men), there are individual differences in the degree to which a particular individual differs from the normative group member. For example, women with stereotypically feminine physical features, or stereotypic women, represent the "typical" woman because they have larger breasts and smaller waists than men. Women with less stereotypically feminine physical features, or counter-stereotypic women, differ from the normative man, but less so than stereotypic women because they have smaller breasts and larger waists. Although not the focus of much prior work (Gervais and Vescio, 2008; see also Zebrowitz, 1997), women may also have more stereotypically feminine features than stereotypic women. These hyper-stereotypic women have larger breasts and smaller waists than even stereotypic women because they deviate most from the normative man.

A person's stereotypic features affect person perception. For example, Blair et al. (2002) found that hyper-stereotypic African Americans were more likely to be stereotyped than either stereotypic or counter-stereotypic African Americans. Of particular relevance to this paper, Gervais and Vescio (2008) found that hyper-stereotypic men and women were stereotyped and categorized more than stereotypic men and women. Thus, gender stereotypicality has an effect on person perception. People are more likely to be stereotyped and categorized if they have hyper-stereotypic physical features than they are if they are stereotypic or have counter-stereotypic features. Although research has shown this to be true in the real world, it is not clear whether or not the same biases exist in virtual worlds.

2.2 Nature of Task

Importantly, a person perception may result in different judgments depending on the nature of the task. Contexts are not always gender neutral. Success in some fields requires stereotypically masculine traits (e.g., to be influential, to be logical, to be rational) while success in other fields requires stereotypic feminine traits (e.g., to be emotional and sensitive) (Eagly and Karua, 2002; Vescio et al., 2005). For example, men are believed to have more knowledge of stereotypically masculine domains, like automobiles and sports, whereas women are believed to have more knowledge of stereotypically feminine domains, like fashion and parenting. Consistent with the notion that the context may affect judgments of men and women in masculine and feminine domains, Rudman and Fairchild (2004) found that women who outperformed a man in a masculine domain and men who outperformed a woman in a feminine domain were sabotaged more than men and women who succeeded in gender typical domains. We extend this previous research by examining perceptions of competence, benevolence, integrity, and trust of men and women in gender typical and atypical domains.

2.3 Social Research in Virtual Worlds

Virtual worlds present researchers with a new social environment in which to study human behavior. How human behavior differs in virtual worlds compared to the real world is an open research question. This section reviews some of the research that has been conducted on social interaction in virtual worlds.

Several studies have examined how body language behaviors that are exhibited in the real world continue to be exhibited in virtual worlds. Bailenson et al. (2003) found that the concept of personal space carries over into virtual worlds and that people maintain normal interpersonal distances between their avatars, even though there is no reason to do so. People can, however, react to avatar's body language, such as in the Yee and Bailenson (2007) study which found that having an avatar mimic the head movements of another avatar lead to greater trust between the two people controlling the avatars. That result shows that social behaviors and judgments can carry over into virtual worlds.

In addition to general social behaviors and judgments, the few studies that have examined gender perceptions in virtual worlds tend to find effects that support our belief that gender and stereotypicality will produce judgments and behaviors in virtual worlds that are similar to those found in the real world.

Eastwick and Gardner (2008) examined racial bias by having avatars of different apparent races ask strangers for favors in a virtual world. They found that dark-skinned avatars were less likely to obtain favors than light-skinned avatars. This is consistent with research that shows that lighter skinned African Americans are evaluated more positively than darker skinned African Americans (e.g., Livingston and Brewer, 2002) and suggests that race-based stereotyping exists in virtual worlds as it does in the real world.

Gender differences have also been observed. Gender differences in body language were observed by Yee et al. (2007). They found that male dyads in a virtual world made less eye contact with each other than female dyads. Furthermore, male dyads kept their avatars further apart than female dyads. Both of these behaviors reflect what happens in the real world between male and female dyads. Several effects due to gender were observed by Nowak and Rauh (2006) when they examined the perception of images of avatars. They found that androgynous avatars (similar to counter-stereotypic targets) were perceived as less attractive than avatars that were clearly male or female. Also, avatars of the same gender were preferred by both men and women (e.g., ingroup bias, Tajfel, 1969). Hence, gender biases from the real world are also present in virtual worlds.

Extending this research, we examine how gender and stereotypicality of the avatar affect trustworthiness in masculine and feminine domains. In particular, we examine how gender and stereotypicality affect trustworthiness via perceptions of competence, benevolence, and integrity.

2.4 Trust

Trust refers to “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party” (Mayer et al., 1995, p. 712). Trust determines if one is willing to engage another party in establishing a business relationship by bearing any risk associated with it. Thus, trust reduces the fear for manifestations of opportunism (Hill, 1990).

Trust involves at least two parties: a trusting party (trustor) and a party to be trusted (trustee). There are three components or attributes of trust — competence, integrity, and benevolence (Mayer et al. 1995). Competence refers to the trustee's skills, knowledge, and abilities. Integrity refers to the trustor's perception that the trustee will adhere to a set of principles or rules of exchange that is acceptable to the trustor. Benevolence is the extent to which a trustee is believed to want to do good to the trustor. According to the literature, gender stereotypes can affect trust perceptions.

3. THEORETICAL FOUNDATION AND HYPOTHESES

The Social Role Theory argues that gender differences in social behavior are in part caused by the tendency for men and women to behave consistently with their gender roles (Eagly and Wood, 1991). Based on the social role theory, men and women differ in their agentic and communal dimensions (Bakan, 1966). Men are perceived to be more highly competent and independent than women, whereas women are perceived to be more unselfish, concerned about others, and emotionally expressive than men (Eagly and Wood, 1991). Fiske et al. (2002) also found that men are perceived as more competent than women whereas women are perceived to come across as having more warmth than men. However, such perceptions could be moderated by stereotypicality (i.e., masculinity/femininity) of tasks.

Our research examines how people perceive avatars based on the gender of the avatar, stereotypical appearance of the avatar, and the gender typicality type of the task (i.e., whether or not the information in the domain of the task is something that males or females stereotypically know). As explained earlier, avatars of typical stereotypicality look like average people of their gender, whereas hyper-stereotypic avatars have exaggerated features for that gender, and counter-stereotypic avatars attenuated features of that gender. In our study, we will control for attractiveness across stereotypic male and female avatars, and compare the perceptions of avatars across stereotypic dimensions – counter, standard, and hyper.

Our research model is shown in Figure 1. The independent variable is gender of avatar. The mediating variables are perceived competence, integrity, and benevolence, and the dependent variable is trustworthiness. The relationships from gender of

avatar to components of trust are moderated by the gender stereotypicality displayed by the avatar and type task. Operationalization of the constructs is discussed in Section 4. The justifications for our hypotheses are given below.

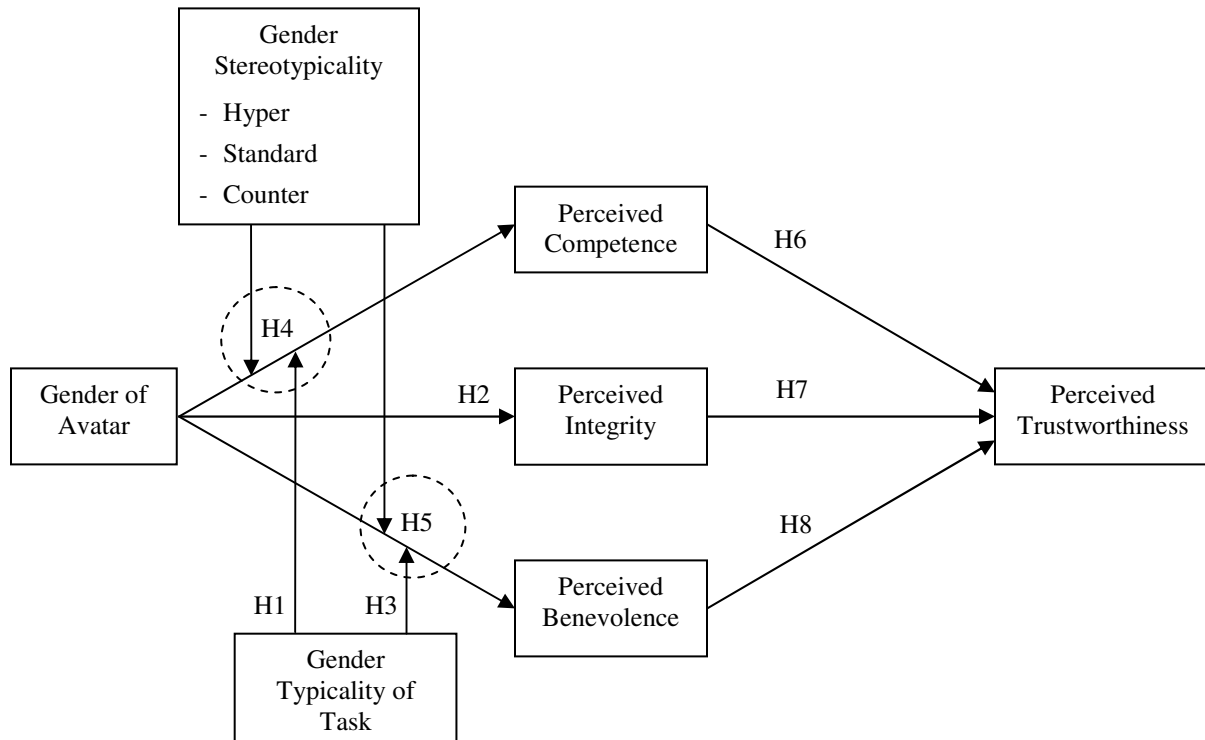


Figure 1. Research Model

Stereotypes suggest that men possess higher levels of agentic qualities such as independence and competence when compared to women (e.g., social role theory, Eagly and Wood, 1991; stereotype content theory, Fiske et al., 2002). However, gender typicality (i.e., masculinity/femininity) of task is an important factor that can affect perceived task competence. Hence, we hypothesize that:

H1a: For masculine tasks, perceived competence is higher in male avatars than female avatars.

H1b: For feminine tasks, perceived competence is higher in female avatars than male avatars.

Based on our review of the literature, the relationship between gender stereotypes and perceived integrity is inconclusive. On one hand, based on the social role theory, women possess higher communal dimensions, such as selflessness, than men (Eagly and Wood, 1991). On the other hand, different patterns of development for girls and boys tend to develop feminine emphasis on relationships and masculine emphasis on justice (Gilligan, 1982).

Because the literature provides opposing support for both perspectives in terms of men's and women's integrity and ethical principles, we hypothesize that there is no perceived relationship between gender of avatars and integrity. Hence,

H2: There is no difference in perceived integrity of female and male avatars.

Given that women tend to be perceived as more interested and knowledgeable about feminine tasks and men tend to be perceived as more interested and knowledgeable about masculine tasks, we hypothesize that the increased interests, knowledge, and understanding of women in femininity tasks and men in masculinity tasks will increase their perceived benevolence. Thus,

H3a: For masculine tasks, perceived benevolence is higher in male avatars than female avatars.

H3b: For feminine tasks, perceived benevolence is higher in female avatars than male avatars.

Another theory, Role Congruity Theory (e.g., Eagly and Karau, 2002), proposes that people hold more favorable opinions of men and women when they are engaged in tasks that fit their gender according to social norms. Hence, men are viewed more favorably than women when engaged in masculine tasks and vice versa for feminine tasks. For masculine tasks, perceived competence is expected to increase as a male avatar takes on an increasing masculine appearance from counter- to hyper-stereotypic and as a female avatar takes on a decreasing feminine appearance from hyper- to counter-stereotypic. The reverse is true for feminine tasks. Thus, we hypothesize a 3-way interaction effect between gender stereotypicality, type of task, and gender of avatar on perceived competence. Thus,

H4a: For masculine tasks, perceived competence increases as male avatars take on an increasing masculine appearance (i.e., from counter- to hyper-stereotypic) and decreases as female avatars take on an increasing feminine appearance.

H4b: For feminine tasks, perceived competence increases as female avatars take on an increasing feminine appearance and decreases as male avatars take on an increasing masculine appearance.

For masculine tasks, the Role Congruity Theory (Eagly and Karau, 2002) suggests that perceived benevolence increases as a male avatar takes on a decreasing masculine appearance and decreases as a female avatar takes on a decreasing feminine appearance. The reverse is true for feminine tasks. Thus, we hypothesize a 3-way interaction effect between gender of avatar, gender stereotypicality, and type of task on perceived benevolence. Thus,

H5a: For masculine tasks, perceived benevolence increases as male avatars take on a decreasing masculine appearance and decreases as female avatars take on a decreasing feminine appearance.

H5b: For feminine tasks, perceived benevolence increases as female avatars take on an increasing feminine appearance and decreases as male avatars take on an increasing masculine appearance.

Since perceived trustworthiness comprises three components or attributes – competence, integrity, and benevolence (Mayer et al., 1995), we hypothesize that perceived competence, integrity, and benevolence of an avatar will influence its perceived trustworthiness, as shown in the three hypotheses below.

H6: Perceived competence of an avatar influences its perceived trustworthiness.

H7: Perceived integrity of an avatar influences its perceived trustworthiness.

H8: Perceived benevolence of an avatar influences its perceived trustworthiness.

4. RESEARCH METHODOLOGY

We propose using a 2x2x3 experimental design to assess the effects of the gender (male or female) and stereotypicality (counter, standard, hyper) of avatars and its interaction with task type (stereotypically masculine or stereotypically feminine) on the trusting beliefs and perceptions of the avatars. Gender and stereotypicality of avatars will be operationalized as within-subject factors while task type will be operationalized as a between-subject factor.

The gender of the avatar, i.e., male or female, will be manipulated and controlled by the researchers. Gender stereotypicality of the avatar will be manipulated as stereotypic, hyper-stereotypic, or counter-stereotypic. Operationalization of these variables, such as designing avatars with the correct levels of stereotypicality, has been finalized through pilot studies. Manipulation checks will also be used to assess our manipulations. We will measure the gender of the subjects and use it as a covariate in our data analysis.

The mediating variables, perceived competence, integrity, and benevolence, will be assessed using the measures by McKnight et al. (2002), and the dependent variable, trustworthiness, will be assessed using the measure used by Galanxhi-Janaqi and Nah (2007).

Subjects will be recruited from psychology classes at a large Midwestern university. The experiment will take place in the Second Life 3DVW. Subjects will be offered a small amount of extra credit (1% of their final grade) for participating in the study. Subjects will report to a computer lab on the university campus where they will be given a brief training session to familiarize them with Second Life. All computers and monitors in the lab are the same model with the same Internet connection speed.

After consenting to participate and answering demographics and other pre-study questions, subjects will enter Second Life and be given an avatar of the same gender as the subject. In other words, the gender of the subject's avatar will be the same as the gender of the subject. Subjects will be in a building in Second Life, where they will enter a total of six rooms, each with a researcher-controlled avatar. Each avatar will be either male or female and one of counter-, standard- or hyper-

stereotypical, with each subject interacting exactly once with each of the six types of avatars. The order of interaction will be counterbalanced.

The interaction between the subject's avatar and researcher's avatar will consist of the subject being provided a question, asking the researcher's avatar (i.e., presumed to be an expert) the answer to that question and then being provided an answer. The answer to the question will be truthful, although the subjects will not know that.

Each subject will be randomly assigned to one of two conditions. In the first condition, all six questions will be stereotypically masculine. In the second condition, the questions will be stereotypically feminine. Rudman and Fairchild (2004) used a set of 60 questions in experiments, with 30 questions being masculine and 30 being feminine. A subset of the questions will be chosen from their list by the researchers and tested in pilot studies. The masculine questions include questions such as, "The paste used for soldering joints is called (gel vs. flux)." and "By Olympic rules, boxing gloves for all weight classes weight (12 ounces vs. 10 ounces)." Examples of feminine questions include, "You wear Manolo Blahniks on your (head vs. feet)." and "A roux is best described as a (sauce vs. cake)." The questions are clearly stereotypically masculine and feminine, but they are also difficult, so the participants are unlikely to know the answers to more than one or two of the questions and will therefore need to ask the researcher's avatar for assistance in answering the question. After each question, participants will be given a web-based form in Second Life asking them to rate the avatar on the factors examined in this study, e.g., competence, integrity, benevolence, and trust. After interacting with all six avatars, the participants will fill out a post-study questionnaire and the experiment will be concluded.

5. EXPECTED CONTRIBUTION AND CONCLUSION

Virtual worlds are a new, emerging phenomenon. They are growing in importance in education, businesses, and entertainment. This paper proposes a research model to study gender biases and their effect on trust in virtual worlds. Avatars of both genders and three levels of stereotypic physical features will be studied. Experimental manipulations will be used and questionnaires collected from subjects will be used to examine the relationships between gender, gender stereotypes, three components of trust (competence, benevolence and integrity), and perceive trustworthiness. Our findings will provide insights into whether gender and gender stereotypicality from the real world transfers into the virtual world.

For academics, the study will provide empirical data on the research model, which can be further enhanced and extended. This study will also serve as a basis for further studies that will specifically examine how gender biases lead to categorization and stereotyping of people in virtual worlds. In addition, the paper will contribute to the literature by providing a more in-depth and complete understanding on gender perceptions and biases in virtual worlds.

For practitioners, the study provides insights on gender stereotypicality in virtual worlds. Specific suggestions can then be made on how to reduce gender biases and stereotyping in virtual worlds, and how to select features and characteristics of avatars to reduce the negative aspects of gender and stereotypicality in virtual worlds.

There are many future research possibilities in the area. One stream of research is the social behavior in virtual worlds. For example, what are the implications for teams of workers who have never met but who collaborate in 3DVWs? Will certain avatar characteristics lead to increased perceptions of trust, competence, and other perceptions of the user behind the avatar? Another stream of research deals with ethical implications. Knowledge on how to reduce gender stereotypes is also knowledge that can be used to exploit gender stereotypes. For example, if certain characteristics of avatars are shown to inspire trustworthiness, then people who have an intention to deceive others in 3DVWs could make their avatars in such a way that it inspires trust. As another example, advertisers make use of gender stereotypes in advertising (Coltrane and Messineo, 2000; Browne, 1998) and the information obtained through this study could be used by advertisers to influence purchases in 3DVWs.

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