Affecting Racial Bias via Perspective-Taking in a Virtual Environment

THESIS

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Abstract

Virtual environments offer a unique space to investigate human interactions with diverse groups. Many inequalities in society can be traced to many learned behaviors that pertain to one’s racial identity. Past research has found that negative social influence of minority group stereotypes are experienced within virtual environments much the same way that they are in the real world. Embodying an avatar of a different race may activate a person’s stereotypes towards that race, making it difficult to take the perspective of a person from that avatar’s race. Narrative research has shown that lowering a participants’ self-concept increased their willingness to take the perspective of a minority by revealing the identity of the character later in the story as opposed to early. The current study randomly assigned participants to not only embody a Black or White avatar, but also to one of two conditions which revealed the racial identity of their avatar early or later in Second Life, an online virtual world. The results indicate that manipulating the avatar’s race and time of revelation to the participant had no effect on their implicit and explicit bias, their ability to take the perspective of the racial group the avatar belonged to, or their behavior. Implications for the Proteus Effect and perspective-taking within virtual environments are discussed.
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Chapter 1: Introduction

New media technologies offer certain affordances that make it possible for social scientists to study social issues in new ways that would be difficult to do in the real world (Blascovich et al., 2002). A number of studies have investigated the issue of stereotypes, such as racial and gender, and the biases that they perpetuate inside virtual environments (VEs) across multiple cultures (Dotsch & Wigboldus, 2008; Fox, Bailenson, & Tricase, 2013; Groom, Bailenson, & Nass, 2009; Lee & Park, 2011). Users have experienced social interactions within VEs that are only unique to these digital worlds by manipulating the usually immutable qualities of the physical world in ways that would only be possible in VEs (Bailenson & Beall, 2006; Bailenson, Beall, Loomis, Blascovich, & Turk, 2005; Bailenson et al., 2008).

Researchers have used many methods to have participants empathetically take the perspective of members of traditionally marginalized groups, with mixed results. Experiments manipulating perspective-taking in VEs have shown that participants’ implicit and explicit racial biases were affected after embodying a digital representation of themselves in different races compared to imagining themselves as another race (Groom et al., 2009). Past research has shown through a series of studies that activating the portion of the mind that allows a person to empathetically try to understand how another experiences the world could result in the unconscious activation of implicitly stored stereotypes (Galinsky & Moskowitz (2000). In another series of studies,
researchers suppressed participants’ access to those implicit stereotypes, while still enabling them to take the perspective of another using a narrative, resulting in positive evaluations of members from marginalized groups (Kaufman & Libby, 2012). Together these studies show that it is possible to manipulate a person’s ability to take the perspective of another person while suppressing their stereotypes of stigmatized groups.

The current study aims to manipulate participants’ perspective-taking within a VE using Second Life, by revealing the identity of their avatar at different times throughout the VE experience to measure how their implicit associations of stereotypes are affected. Past studies in VE have revealed the identity of the user’s digital representation immediately upon entering the virtual world; this study looks to contribute to the area of research within VEs by manipulating that revelation. Implications for transformed social interactions and the Proteus Effect will be examined.
Chapter 2: Literature Review

Virtual Environments

VEs are digital worlds where synthesized sensory information causes the perception of an environment and its objects to be perceived as authentic (Blascovich et al., 2002). VEs replicate a world, real or imagined, that stimulates multiple senses, such as sight and sound in a 2 or 3-dimensional setting with mediated technologies that a user can interact with. Present media technology examples of interactive VEs can range from game consoles such as Nintendo’s Wii and Microsoft’s Kinect (Blascovich & Bailenson, 2011), to upcoming virtual reality devices, such as Sony’s Morpheus and Facebook’s Oculus Rift (Avila & Bailey, 2014), to the online virtual communities of World of Warcraft and Second Life. These virtual worlds have certain qualities that differentiate them from the physical one, in that VEs do not adhere to the physical laws that govern the real world as explained by the research paradigm known as transformed social interaction (TSI).

TSI states that VEs have unique affordances that can be used to manipulate a user’s sensory abilities (i.e., the perceptual experiences of one user may differ from that of others), their situational context (i.e., changes to temporal and/or spatial interactions with others or objects), and self-representation (i.e., the rendering of a user’s digital appearance or behavior that is different from the actual person controlling the representation; Bailenson & Beall, 2006). The manipulation of sensory abilities and
social context can be explained with the use of virtual classrooms. Studies have shown that teachers who maintain regular eye contact with their students can result in better learning outcomes for students (Woolfolk & Brooks, 1985). With the use of VEs teachers can manipulate their gaze in order to spread their attention equally to the whole classroom by having each student view the teacher from the same angle and distance (Bailenson et al., 2008). With everybody in the classroom experiencing the same vantage point from which to see the teacher, the students will experience the same amount of eye contact that can result in better educational learning outcomes.

A user’s self-representation can be rendered the same or very different from their actual appearance. This means that users can choose to represent themselves as another gender, race, or even a different species (Yee & Bailenson, 2009). An advantage to this is to imagine a user who cannot walk in the real world, but through the use of VE could experience a leisurely stroll through a virtual street via their digital representation. The present study looks to manipulate a user’s situational context by having them see the race of their digital representation early or late and their self-representation by randomly assigning them into a digital representation of the same or different race.

Avatars, Proteus Effect, and Embodiment

Video game players and online virtual community users must interact with their location’s environment in order to progress through a mission, story line, or simply to interact with virtual others or objects. The proxy through whom this interaction is accomplished is through a digital-representation not only of the user, but of others (Biocca, 1997). A digital representation within VEs extends a user’s identity from the physical to the digital, however, there are different types of digital representations that
must be explained in order to differentiate between a user’s representation and representations controlled by computer algorithms. Avatars are digital representations that are controlled by humans, whereas agents are digital representations that are controlled by computer algorithms (Fox et al., 2014). For example, the main character in a video game can be considered the player’s avatar; they control the avatar’s movements and actions within the game’s environment. Algorithm controlled agents are the other characters in video games which the main character interacts with, such as the spectators in every fight scene from *Capcom’s Street Fighter 2*, or Tingle from Nintendo’s *Legend of Zelda: Majora’s Masks*. However, the process by which a person has control over their body is much the same way that a user holds control over the actions and subtle movements of their avatar – as an extension of action originating from thought. Once the mind thinks about walking, the legs begin to move.

The human body can be thought of as a “representational medium for the mind” (Biocca, 1997, p. 3). If the mind wants to reach out to shake someone’s hand, the body carries through with that intention. That act of carrying through with an action that originated in the mind is also referred to as *embodiment*. Embodiment also takes place between a user and their avatar. User’s control their avatar and see the immediate action on the screen that originated from their thought and in turn their avatar’s experience within VE affects them emotionally, cognitively, and physiologically (Costa, Kim, & Biocca, 2013). For example, users within the MMORPG *World of Warcraft* perform missions to accomplish a goal. Throughout these mission users invest themselves, they become attached to their group of friends within their guilds, and feel an emotional bond with them and their avatar to succeed in their missions (Yee, 2006). Cognitively, users
feel a sense of embodiment with their avatar when they can see the world through a
vantage point similar to their real world perspective.

A user’s sense of embodiment is also strengthened by how well their avatar maps
the internal schema of how their physical body is mapped (Biocca, 1997). This means
that when a user in a VE looks down they can see that their virtual hands are where they
should be as they pertain to their embodied avatar. Just like in the real world, users export
their physical perspective of how they experience the immediate world around them into
how their avatar experiences the world within VEs (Murray & Sixsmith, 1999). The
sense of embodiment a user feels with an avatar is connected to how authentic the
experience within a VE is felt. Embodiment can have profound effects on how they not
only see themselves within VEs, but also how it affects their sense of self in the real
world.

The Proteus Effect hypothesizes that when a user’s self-representation is changed
in ways that differ from how they actually are in the real world they will conform to the
self-representation they embody; regardless of how different it actually is (Yee &
Bailenson, 2007). This effect lies within the previously mentioned theoretical framework
of TSI, particularly the ability to manipulate the dimensions of a user’s self-
representations. Self-perception theory explains that people infer their own attitudes by
observing themselves and interpreting those behaviors the same way they would observe,
judge, and attribute certain attitudes and beliefs to another person according to the
context of observation (Bem, 1972). For example, if Person A was riding a public bus
and they were to ask Person B, who is sitting towards the front, if they like to sit in the
front, Person B would reply that they must, because every time they ride the bus they always sit there.

The Proteus Effect uses self-perception theory to predict that as users embody their avatar they will embody those same behaviors and attitudes associated with that avatar and conform to the attitudes and beliefs that they infer their avatar to have as well (Fox, Bailenson, & Tricase, 2013). The current study relies on the predictions made by the Proteus Effect to observe if users embodying an avatar of a different race will come to internalize their avatar’s race and reduce any stereotypes associated with that race. Though many studies on the effects of the Proteus Effect have been designed with other confederate avatars, the effects should also operate when a user is alone (Yee & Bailenson, 2007). Another important aspect to consider in how a user’s sense of embodiment is experienced is how well the VE facilitates their sense of actually being present within the synthetic world.

Presence

Presence has been explored by many communication researchers and is relevant in helping to understand how users respond to VEs (Bowman & McMahan, 2008; Lee, 2004; Lombard & Ditton, 1997; Mennecke et al., 2011; Weibel, Wissmath, Habegger, Steiner, & Groner, 2008). Presence has been defined many ways. Presence has been defined as the “perceptual illusion of nonmediation,” meaning that an experience through mediated technology elicits a sense of presence with the environment depicted by that medium that is perceived as occurring without the medium (Lombard & Ditton, 1997). For example, when a movie-goer sits down in an IMAX theater to watch the latest space exploration movie, they may forget that they are sitting in the movie theater and lose
themselves in the environment depicted in the movie. Other researchers have offered a
different definition to presence as a “psychological state in which virtual… objects are
experienced as the actual objects in either sensory or nonsensory ways” (Lee, 2004, p.
37). This definition does not limit presence to only mediated experiences, but broadens it
to include other experiences that could elicit a sense of presence. Although the definitions
may differ, they illustrate how a user’s experience is affected by the perception of
environments and objects as being present in the VE with them. The dimensions of
presence will be discussed as they pertain to the current study within VEs and emerge
prominently in the presence literature. These dimensions include social, spatial, and self-
presence.

Social presence is defined as “a psychological state in which virtual… social
actors are experienced as actual social actors in either sensory or nonsensory ways” (Lee,
2004, p. 45). This definition explains how users can interact with other avatars or agents
in ways that do not draw attention to their artificiality; in addition, a user can perceive the
social-presence of another in a VE if they read a virtual note that was left there by
someone, or something intelligent. This note is not an avatar or an agent, but a piece of
virtual evidence that is treated as authentic.

Spatial presence is defined by a user’s experience of feeling physically present in
a mediated environment (Ravaja et al., 2004). This definition falls more in line with what
the traditional definition of presence with mediated technology put forth by Lombard and
Ditton’s (1997) “perceptual illusion of nonmediation.” However, spatial presence is the
sense of actually being in a synthetic world and perceiving it to be authentic.
Where spatial presence has to do with a user’s perception of the environment being authentic, self-presence is defined as a “psychological state in which virtual… self/selves are experienced as the actual self in either sensory or nonsensory ways” (Lee, 2004, p. 46). Self-presence coupled with the interactive affordance of VEs, can enhance a user’s perceptual feelings of being in the synthesized world; as the user interacts with the VE and the VE in turn responds to the user’s actions, their sense of embodiment becomes stronger (Tamborini & Skalski, 2006) and can also lead to an increase in their general self-efficacy (Lee, 2004). This embodied interactive relationship coupled with the sense of presence between a user, their avatar, and the VE can lead to a user’s sense of self overlapping with that of their avatar. Just as the body is an extension of the mind a user’s avatar may also be considered a virtual extension of the mind.

Identification

Identification appears to rest on the foundation of similarities between people. According to Kelman’s theory of opinion change (Basil, 1996; Kelman, 1961), identification with another occurs when individuals adopt the behaviors of other people that share self-defining qualities, which the individual either lacks themselves or wants to maintain. For example, imagine an individual who wants to pursue a healthy lifestyle so they associate themselves with a friend that is healthy and works out. The individual that wants to become healthy begins to say or do the same things the healthy friend does in an attempt to be like or strive to be them. Similarly, social cognitive theory suggests that people learn through vicarious observations of individuals that model behaviors (Bandura, 1991). This is strengthened by the perceived similarities that are shared
between the observer and the model successfully performing the behavior. These theories have influenced current theoretical frameworks of identification with media characters.

Similar to Kelman and Bandura’s theories about identification, Cohen’s (2001) theoretical framework for audience identification with media characters states that in order to identify with a media character the viewer must forget themselves and become the other. Cohen conceptualizes four operationalized and measureable sub-dimensional constructs. The first involves empathically sharing the feelings with the media characters; the second is the cognitive aspect of perspective-taking or the ability of the viewer to understand the behavioral motivations of the characters; the third is the motivation to internalize and share the goals of the character; and the fourth dimension is the degree to which self-awareness is lost during the audience’s exposure to the media.

Cohen’s theoretical framework was influenced by Kelman and Bandura’s theories of identification; however, the latter two, and to some extent Cohen’s as well, define identification as a relationship between two entities. Although these theories help explain observed learned behaviors through identification, identification within VEs should be viewed more as a merger of identities into one. Assumptions about active and passive audiences could shed light on how interactivity may be a stronger mechanism to achieve identification (Hefner, Klimmt, & Vorderer, 2007). Active audiences actively engage rather than witness the story, “and in this way the audience more deeply [internalizes] and personalizes the story events … the consequences of those events are felt more deeply” (Hand & Varan, 2008, p. 13). In turn, a theory of identification with an interactive affordance utilized by an active audience is necessary.
Klimmt, Hefner, and Vorderer (2009) present a theory of identification with video game characters that begins to blur the boundary lines of where the player ends and where video game character begins. Video game players identify with the characters and take on the salient properties of those characters temporarily and incorporate them into their own self-perception (Klimmt et al, 2009). The degree to which they take on salient attributes from any of the characters depends on how motivated they are to enjoy the game. Similar to how VE users may be affected by the Proteus Effect via their avatar, video game players temporarily import the salient qualities of the characters, due to the character still having a story and bio, whereas avatars are completely driven by users and are not necessarily guided by a story line.

Cohen’s (2001) theoretical framework considers perspective-taking and empathy to be cognitive aspects of identification. Although his dimension of empathy associates the shared feelings of the character, perspective-taking is the manifestation of empathy that leads to the shared perspective of the character with the player. This shared perspective, driven by a strong identification with the character can lead to a merging of identities during an interaction. However, other researchers look into the gaming experience of players and avatars as a fluid relationship where players may view the experience with their avatar as being a social other or an extension of the self through embodiment (Banks and Bowman, 2016). Differentiating whether users experience their avatar as social others or extensions of themselves may have implications for how their experience inside a VE can facilitate attitude or behavioral change, particularly if they experience the avatar as a social other.
Perspective-Taking

Perspective-taking, according to Cohen (2001), is a dimension of identification that facilitates the merger of the audience member with the identity of a media character, by trying to understand the motivations of the character. Contrasted against other areas outside of media characters, Galinsky and Moskowitz (2000) propose that taking the perspective of another person facilitates empathy and an observer’s emotional state comes to resemble that of a target other. There is one difference between the two conceptualizations of perspective-taking; when taking the perspective of a media character the character is readily available, no other work is necessary apart from just being exposed to the character and whether or not the audience feels an empathic connection to them.

Embodying an avatar in a VE can be a more visceral experience than imaging being in the shoes of another person (Groom et al., 2009). The interactive component of video games, like VEs, can enhance the vicarious experience of the player who is not only observing, but driving the actions of the game character (Bandura, 2001). So, embodying an avatar’s performance can lead to internalizing the performance, which may increase a user’s self-efficacy as it pertains to that performance. Yee and Bailenson (2006), conducted a study in a VE where they placed one group of participants into a condition embodying the avatar of an elderly person and had another group embody a younger avatar, they found that the participants who directly took the perspective of an elderly person (embodying the elderly avatar) reported reduced negative stereotyping compared to the participants in the youthful condition (embodying the younger avatar).
According to Meyer et al. (2012), the process through which perspective-taking occurs relies on a person’s ability to access their self-concept.

A person’s self-concept is assumed to be activated either by external stimuli or by excitation through their associations with other, already active, concepts (Greenwald et al., 2002). The process of perspective-taking causes people to ascribe personal traits to another (Davis, Conkline, Smith, & Luce, 1996). An explanation as to why people ascribe those traits to another can be explained by two process that occur simultaneously that are both conscious and unconscious. Studies have found that when people take the perspective of another they could unconsciously activate their self-concept or introspective processes, and also activate learned stereotypes (Galinsky & Moskowitz, 2000). In a study conducted by Kaufman and Libby (2012), researchers sought to manipulate participant’s self-concept by employing a number of tactics that lowered participants’ self-concept with the hopes of reducing their negative stereotypes towards the people that the participants took the perspective of. They found that lowering participants’ self-concept by revealing the group affiliation of the protagonist later in a story resulted in participants being more socially accepting of minority group members, compared to participants whose self-concept stayed the same.

Stereotyping and VEs

Stereotypes are representations shared by people within a culture, as well as an individual’s mind (Macrae, Stangor, & Hewstone, 1996, p. 4). A person’s stereotypes can be activated externally or through associations. Many of these associations are the result of the media’s misconceptions about aspects of life that are a modeling of stereotypes within society (Bandura, 2001). For example, it was found that heavy viewers of
television held many negative stereotypes about other ethnicities, these same viewers, however, also reported Caucasians as having less negative stereotypes (Lee, Bichard, Irey, Walt, & Carlson, 2009).

There is growing research that shows that many real world stereotypes get imported into a VE. A number of studies have found that negative social influence of minority group stereotypes are experienced within VEs much the same way that they are in the real world (Eastwick & Gardner, 2009; Dotsch & Wigboldus, 2008; Lee & Park, 2011). If presence facilitates a user’s sense of authenticity within a VE, it is no surprise that VE users would import their stereotype heuristics into a synthesized world (Harris, Bailenson, Nielson, & Yee, 2009). For example, researchers in Denmark found that participants in VEs kept their distance from virtual agents of a darker skin color standing at a virtual bus stop, because they were modeled after individuals of Moroccan descent (Dotsch & Wigboldus, 2008). Eastwick and Gardner (2009) point out that although VEs may offer ways to escape the physical laws of the real world, laws of social influence from the real-world can infiltrate a user’s social interactions in VEs. They found that avatars who appeared more African-American were not as successful with attempting to perform a compliance task with users of a virtual community. Other researchers found that having Whites embody a Black character in a video game resulted in stronger implicit and explicit negative attitudes towards Blacks and stronger associations between Black faces and weapons (Gibson, Lueke, Huesmann, & Bushman, 2014). This indicates that user’s real world stereotypes can influence their experience within a VE and can even reaffirm those stereotypes by activating them in a VE context. If a user’s stereotypes
can be imported into a VE, then perhaps a user’s acceptance of a Black avatar can be exported into the real world.

These types of interactions within VEs can have detrimental effects on a minority group’s willingness to participate in online VE settings, such as Second Life. Research has confirmed that presenting marginalized groups with White-dominated Second Life profiles lowered not only their intentions of participating in the virtual online community, but of belonging as well (Lee & Park, 2011). External activation of stereotypes can occur readily within VEs, even if VEs are synthesized worlds within a computer network. The previous section on perspective-taking explained how a user’s self-concept through perspective-taking can facilitate the activation of implicit thoughts of their internal traits and bestow them onto a character or avatar. However, activation of a person’s self-concept can also activate stereotypical thoughts that the mind uses heuristically as quick associations towards other groups.
Chapter 3: The Current Experiment

The current experiment tests a user’s ability to take the perspective of a White or Black avatar by manipulating their self-concept inside Second Life. The participant’s perspective will be further manipulated by revealing the identity of the avatar either early or later within the VE. Past research manipulated participants’ self-concept in a narrative in order to enhance their ability to take the perspective of a member of a marginalized group (Kaufman & Libby, 2012). The late revelation of the protagonist as a member of a marginalized group resulted in participants reporting lower racial bias towards marginalized group members compared to participants whose protagonist’s identity were revealed early. In another study that sought to elicit perspective-taking from participants within immersive VE, participants saw the reflection of their avatar in a virtual mirror immediately upon entering the VE (Groom et al., 2009). Participants who embodied White and Black avatars were observed to have higher implicit racial bias that favored Whites. Participants who embodied Black avatars were also observed to have higher levels of implicit and explicit racial bias against Blacks. The results of the Groom et al. (2009) study predicted an activation of the participants’ negative stereotypes towards Blacks after first seeing their virtual reflection in the virtual mirror while in the VE. The current study looks to test whether the timing of when a user is presented the identity of their avatar will moderate the activation of negative stereotypes towards Blacks.
Implicit attitude measures can predict a person’s unconscious prejudices that are present in their nonverbal behaviors and explicit attitude measures can predict overt social behaviors (Payne et al., 2010). If implicit associations towards others can be activated as stereotypes when a person’s self-concept is accessed, then lowering the accessibility to their self-concept could result in incorporating a marginalized group member’s trait which may lead to taking the perspective of a person from another race that may reduce implicit racial bias.

The process of perspective-taking begins with an individual starting out anchored from their own perspective and slowly adjusting their perspective to take into account the perspective of another; however, this process can be hindered when individuals are not given sufficient time to adjust to another’s perspective, which may increase their sense of self towards another (Epley, Keysar, Van Boven, & Gilovich, 2004). This egocentric bias occurs because an individual’s self-concept is accessible when they start off from their own perspective and is processed at the unconscious level (Galinsky & Moskowitz, 2000).

The study conducted by Groom et al. (2009) had participants immediately look into a virtual mirror while embodying an avatar of another race. The virtual mirror may have hindered the process of perspective-taking and allowed their own implicit associations towards a stigmatized group to interfere with their ability to take the perspective of another. Kaufman and Libby (2012) revealed the identity of their main character over time which resulted in participants successfully taking the perspective of another and lowering their social distance to a marginalized group member. Perhaps manipulating the time participants are presented with the identity of an avatar of another
race could facilitate the participant’s ability to perspective-take and effect their implicit associations towards a marginalized group member. Using a VE, such as Second Life, makes it possible to manipulate the timing a user can actually see their representation and test whether in fact the timing of this revelation will facilitate a decrease in a user’s implicit bias towards another while embodying an avatar of another race. To test this, the following hypotheses were developed:

H1a: Participants in Black avatars will experience more implicit racial bias than participants in White avatars.

H1b: Participants in the late avatar reveal condition will show lower implicit racial bias than participants in the early reveal condition.

H1c: There will be an interaction between the time of revelation and the avatar’s race, such that participants who embody Black avatars revealed later will have lower implicit racial bias scores compared to embodied Black avatars revealed early.

A person’s explicit racial bias is a conscious attitude that is driven by how valid their stored associations between people seem to them (Payne et al., 2010). If a person was in a public space and ran into a Black person, they may have unconscious negative thoughts about the Black person, but it is their conscious thought that would suppress their initial negative thought. So, even after seeing a Black avatar a user might not want to appear to have negative stereotypes towards their avatar and they may explicitly appear to not hold a racially biased attitude towards Black people. In order to test whether or not a late reveal will also affect a participant’s explicit attitudes the following hypothesis were developed:
H2a: Participants in Black Avatars will show more explicit racial bias than participants in White avatars.

H2b: Participants in the late avatar reveal condition will show less explicit racial bias than participants in early reveal condition.

H2c: There will be an interaction between the time of revelation and the avatar’s race, such that participants who embody Black avatars revealed later will have lower explicit racial bias scores compared to embodied Black avatars revealed early.

Perspective-taking is recognized as the ability to entertain the perspective of another that may lead to proper social functioning by imaging the situation of another and empathizing with their experience (Galinsky & Moskowitz, 2000). In addition, witnessing the experiences of another person similar to oneself may make the situation more salient and may therefore make it easier to take their perspective (Bandura, 1991). To test whether the avatar’s race and the timing of the revelation has an effect on a user’s ability to perspective-take, the following hypotheses were developed:

H3a: Participants in White avatars will report higher perspective-taking than participants in Black avatars.

H3b: Participants in the late avatar reveal condition will experience more perspective-taking than participants in the early reveal condition.

H3c: There will be an interaction between the time of revelation and the avatar’s race, such that participants who embody Black avatars revealed later will experience more perspective-taking compared to embodied Black avatars revealed early.
If the interactive affordance of VEs can promote self-presence through the embodiment of an avatar then the race of the avatar may be more salient for some users, which may facilitate the feeling of self-presence. In addition, if a user’s self-concept is lowered by not having any external stimuli that would stimulate an association to themselves, then perhaps they will import their sense of self into their respective avatar. To test whether the race and the time the identity of the avatar is revealed affects a user’s self-presence, the following hypotheses were developed:

H4a: Participants in White avatars will report feeling more self-presence than participants in Black avatars.

H4b: Participants whose avatar’s racial identity is revealed later will experience more self-presence than participants whose avatar’s racial identity is revealed early.

H4c: There will be an interaction between the time of revelation and the avatar’s race, such that participants who embody Black avatars revealed later will feel more self-presence compared to embodied Black avatars revealed early.

Spatial presence can give a user the perception of actually being in a synthetic world and sense it as authentic, particularly if the race of the avatar is a salient property of the user. If a user is interrupted from their VE experience than this may jolt them out of the VE world and remind them that it is in fact not authentic. However, the timing of the revelation and race of their avatar may affect the momentary pause in their VE experience to show different levels of feeling spatial presence in the synthetic world. To test if the race and timing of the revelation of the avatar’s race affects users’ feelings of spatial presence during a VE experience the following hypotheses were developed:
H5a: Participants embodying White avatars will report feeling more spatially present in their Second Life experience, than participants embodying Black avatars.

H5b: Participants will report feeling more spatially present in their Second Life experience when race of the avatar is revealed later, compared to participants whose avatar race is revealed early.

H5c: There will be an interaction between the time of revelation and the avatar’s race, such that participants who embody Black avatars revealed later will feel more spatial presence compared to embodied Black avatars revealed early.

Identification with video game characters, as Klimmt et al. (2009) theorizes, can have a lasting effect on the player, given that the player sees the character as an extension of themselves. Other research explicates that there is a reciprocal interaction between a player and their avatar in the form of a social other (Banks & Bowman, 2016). To test how the timing of revelation and race of the avatar facilitates a user’s sense of identification with the avatar or whether they view the avatar as a social other, the following hypotheses were developed:

H6a: Participants embodying White avatars will report feeling more player-avatar interaction in their Second Life experience than participants embodying Black avatars.

H6b: Participants will report feeling more player-avatar interaction in their Second Life experience when race of the avatar is revealed later compared to participants whose avatar race is revealed early.
H6c: There will be an interaction between the time of revelation and the avatar’s race, such that participants who embody Black avatars revealed later will experience more player-avatar interaction compared to embodied Black avatars revealed early.

In order to investigate if the avatar’s race and the time the avatar was revealed to the participants had any effect on their behaviors, an extra chair was placed in the same room with the participants. Following the completion of their post-survey questionnaires the participants were asked place move the chairs closer together so that they could speak to another participant that was to go into the same room to discuss their VE experience with them. The following hypotheses were developed:

H7a: Participants embodying White avatars will move their chairs closer to the other participants’ chair compared to participants’ embodying Black avatars.

H7b: Participants whose avatar’s are revealed later in the VE experience will move their chairs closer to the other participants’ chair compared to participants’ whose avatar were revealed earlier.

H7c: There will be an interaction between the time of revelation and the avatar’s race, such that participants who embody Black avatars revealed later will move their chairs closer to the other participants’ chair compared to participants’ who embody Black avatars revealed early.
Chapter 4: Method

Participants

Sample. White male and female participants were recruited using the School of Communication participant pool, for which they received course credit for participating. Participants were also recruited from undergraduate Communication courses for course extra-credit offered by their instructors.

Sample size and power. The sample size was calculated using G*Power version 3.1 (Faul, Erdfelder, Lang, & Buchner, 2007) for a 2x2 factorial design and a medium effect size of .25 for an analysis of covariance (ANCOVA). The target sample size calculated was \(N = 179\), but was increased to an \(N = 180\) in order have \(n = 45\) participants in each of the four conditions. The parameters of the power analysis were set using a two-tailed \(\alpha\) set at .05, with a small to medium effect size set at .25 and power set at .80 (Chase & Tucker, 1996; Cohen, 1992). However, to make sure to account for respondent error, the number of participants sought for recruitment was increased to \(n = 220\). The four conditions are as follows: 1) White avatar/ early reveal; 2) White avatar/ late reveal; 3) Black avatar/ early reveal; and 4) Black avatar/ late reveal.
Data collection for the study took place from February 2016 to June 2016 and yielded a sample size of 150 participants. Participants were recruited from the OSU School of Communication research participant pool (C-Rep) and were awarded research participation credit. In addition to C-Rep, participants were also recruited from undergraduate Communication courses for course extra-credit offered by their instructors. Twenty-five participants were excluded from the final analysis; eleven participants were excluded from the final analysis for seeing their avatar multiple times, four participants were excluded from the final analysis for not following instructions during the implicit attitudes task (AMP), six participants were excluded from the final analysis for failing two out of three attentions checks, two participants were excluded from the final analysis for technical issues due to network connectivity, and two participants were excluded from final analysis due to researcher error. Participant dropout was relatively equal across all conditions.

The final sample included 125 students (64 males and 61 females; $M_{age} = 21.74$, $SD_{age} = 4.81$, $Range_{age} 18-57$). The participants were distributed across the four conditions as follows: 1) White avatar/ early reveal: $n = 29$ (Male = 14, Female = 15), 2) White avatar/ late reveal: $n = 29$ (Male = 16, Female = 13), 3) Black avatar/ early reveal: $n = 32$ (Male = 15, Female = 17), 4) Black avatar/ late reveal: $n = 35$ (Male = 19, Female = 16).
Materials

Face pretest. A face pretest was conducted using 8 avatar models for each race (Black and White), as well as gender (male and female). Two avatars were chosen for each race and gender. A sample of 29 participants rated the avatar models across attractiveness (i.e., How attractive do you think the following avatars are?), racial ambiguity (i.e., How Black/ White do the following avatars look?), and aggressiveness (i.e., How aggressive do the following avatars look?). The pretest questionnaire consisted of a single item question across the three dimensions, each using a 5-point scale anchored at 1 (not at all) and 5 (a great deal; see Appendix A for images of the avatars).

The results for the racial ambiguity of the avatars chosen were as follows: Black male avatars had a mean of 4.17 (SD = 1.26) and 4.10 (SD = 1.21), *t*(28) = .39, *p* = .702; Black female avatars had a mean of 3.76 (SD = 1.12) and 3.83 (SD = 1.04); *t*(28) = -.70, *p* = .489; White male avatars had a mean of 4.59 (SD = .78) and 4.48 (SD = .87), *t*(28) = 1.00, *p* = .326; White female avatars had a mean of 4.28 (SD = .96) and 4.28 (SD = .88), *t*(28) = .00, *p* = 1.00. An ANOVA was conducted looking at all eight avatars. Pre-test results show that the avatars were significantly different from each other along their racial ambiguity, *F*(7, 224) = 2.29, *p* = .029, η² = .067. Post-hoc analysis show that White Male Avatar One were perceived as being less racially ambiguous compared to Black Female Avatar One, *p* = .049 (lower scores indicate more racial ambiguity).

The results for the aggressiveness of the avatars chosen were as follows: Black male avatars had a mean of 2.03 (SD = 1.02) and 2.28 (SD = 1.10), *t*(28) = -1.43, *p* = .165; Black female avatars had a mean of 1.69 (SD = 0.97) and 1.55 (SD = 0.74); *t*(28) = 0.75, *p* = .459; White male avatars had a mean of 1.97 (SD = 0.87) and 2.34 (SD = 0.86), *t*(28)
White female avatars had a mean of 1.69 ($SD = 0.97$) and 2.00 ($SD = 1.07$), $t(28) = 1.47, p = .153$. An ANOVA was conducted looking at all eight avatars. Pre-test results show that the avatars were significantly different from each other along their perceived aggressiveness, $F(7, 224) = 2.58, p = .014, \eta^2_p = .074$. Post-hoc analysis show that White Male Avatar Two were perceived as being more aggressive compared to Black Female Avatar Two, $p = .037$.

The results for attractiveness of the avatars chosen were as follows: Black male avatars had a mean of 3.41, ($SD = 1.09$) and 3.48 ($SD = 0.99$), $t(28) = 4.41, p = .663$; Black female avatars had a mean of 4.21 ($SD = 0.82$) and 4.41 ($SD = 0.63$), $t(28) = 1.54, p = .136$; White male avatars had a mean of 3.31 ($SD = 0.76$) and 3.55 ($SD = 1.12$), $t(28) = 1.16, p = .257$; White female avatars had a mean of 3.72 ($SD = 1.00$) and 4.48 ($SD = 0.63$), $t(28) = 3.64, p < .01$.

The white female avatars did significantly differ on their perceived attractiveness, and although internal validity may be slightly at risk with this pair of avatars, they were kept as priority was given to racial ambiguity and aggression of the avatars over attractiveness.

An ANOVA was conducted looking at all eight avatars. Pre-test results show that the avatars were significantly different from each other along their perceived aggressiveness, $F(7, 224) = 8.03, p < .001, \eta^2_p = .201$. Post-hoc analysis show that Black Male Avatar One was perceived as being less attractive compared to Black Female Avatar One, $p = .020$, Black Female Avatar Two, $p = .001$, and White Female Avatar Two, $p < .001$; Black Male Avatar Two was perceived as being less attractive compared to Black Female Avatar One, $p = .048$, Black Female Avatar Two, $p = .003$, and White
Female Avatar Two, \( p = .001 \); White Male Avatar One was perceived as being less attractive compared to Black Female Avatar One, \( p = .004 \), Black Female Avatar Two, \( p > .001 \), and White Female Avatar Two, \( p < .001 \); White Male Avatar Two was perceived as being less attractive compared to Black Female Avatar Two, \( p = .008 \), and White Female Avatar Two, \( p = .003 \); White Female Avatar One was perceived as being less attractive compared to White Female Avatar Two, \( p = .031 \).

Virtual platform. Second Life is a collaborative 3D virtual environment where many real world social interactions take place between users through customizable avatars. Users can create different groups to socialize, share interests, and collaborate with other members on projects. Users and groups can also own land and buildings in-world, either as meeting locations or just to escape from the real world. See Appendix B for a screenshot of the environment used for the current study.

Procedures

The study used a 2 (avatar race: Black vs. White) x 2 (time of revelation: Early vs. Late) between-subjects design. The participants came into the lab, read and signed the informed consent (Appendix C). Following the informed consent, the participants were randomly assigned to embody a Black or White avatar, as well as one of two conditions where they will either see their avatar early or later in their experience. After being randomly assigned to the avatar and reveal conditions, participants were instructed to rearrange the furniture in the Second Life virtual house room by room.

Participants in the early reveal condition saw their avatar’s reflection in a virtual mirror at the two-minute mark, revealing the identity of their avatar. At the six-minute mark all participants, regardless of their reveal condition, paused their VE experience to
complete the presence and PAX questionnaires. The participants in the early reveal condition continued with the rest of their virtual experience without interruption. Participants in the late reveal condition saw the reflection of their avatar five minutes after the presence and PAX questionnaires at the 11-minute mark. All of the participants ended their time in Second Life after 15 minutes (see Appendix D for an example of the avatar’s reflection). Once the VE experience was finished, the participants moved to another room to complete the affective misattribution procedure (AMP) to assess their implicit racial biases, followed by the modern racism scale (MRS), they then completed another set of presence and PAX questionnaires, followed by the items outlined by Cohen (2001) for measuring identification in the experience-taking measure (ETM).

The affect misattribution procedure (AMP) was completed immediately after the participant’s VE experience to make sure that the participants’ unconscious stereotype associations with their avatar were still fresh. The MRS followed the AMP, because it is the next important dependent variable. After the MRS was completed the PAX questionnaire was completed, followed by the self/spatial-presence questionnaires and the ETM. The motivation to control prejudice reactions questionnaire (MCPR) was completed last to prevent any sensitizing effects that would have possibly influenced the participants to control their prejudice reactions following the AMP and the MRS.

Although the first two measures may clue the participants in on the nature of the study they must be measured first for their importance to the overall study. Following the MCPR, participants answered several demographic questions asking them to indicate their age, gender, race/ethnicity, and technology use (Appendix E).
A behavioral measure was used following the AMP and questionnaires in order to investigate if any of the conditions had any effect on the participants’ behaviors. A chair was placed against the back wall of the room the participants completed the questionnaires following their VE experience. Once the participants completed all of the questionnaire items they were told that they would be speaking with another participant about the furniture they saw in the virtual room that contained the mirror. Under the guise of going to retrieve the other participant, they were instructed to move the chairs in the room closer for the other participant. The researcher left the room, then returned a minute later to inform them that there was no other participant and were subsequently debriefed. The chairs were measured in inches using a measuring tape and were then converted into centimeters.

Measures

All the measures and items are located in Appendix F.

Affect misattribution procedure. Payne, Cheng, Govorun, and Stewart’s (2005) AMP asks participants to make evaluative judgments in an ambiguous judgment situation. For each judgment the participants are exposed to an attitude priming target (the face of a Black or White male) that gives rise to a positive or negative evaluative reaction. They were also presented with a judgment target that is ambiguous in how it should be evaluated (an abstract Chinese symbol). They were instructed to avoid expressing any influence from the priming target (faces), and only evaluate the Chinese symbol. However, to the extent that individuals misattribute their reactions from the symbol to the target, the Black or White faces, participants should still systematically bias evaluations of the Chinese symbol (Payne et al., 2005). Previous research shows that
the procedure is a valid measure of prejudice that is resistant to social desirability pressures (Payne et al., 2010; Payne, Burkley, & Stokes, 2008).

The AMP produces three scores for neutral, Black, and White targets across 24 trials for each target. The participants indicated whether or not they found the symbol (Chinese symbol) pleasant, or unpleasant based on the previous target image that was either a neutral symbol (a similar Chinese symbol), Black, or White face. To indicate whether or not they found the targets pleasant or unpleasant, the participants pressed the “/” key or the “z” key respectively. The key selections were assigned a 1 for pleasant evaluations (/) and a -1 for unpleasant evaluations (z) and then summed, resulting in three scores for neutral, Black, and White targets.

According to Payne and Lundberg (2014), the binary responses the AMP elicits from participants does not necessarily capture especially extreme scores, but attitude strength. They recommend only dropping participants when it is clear that they pressed the same key throughout the task and not the lag in response times, as any extreme response time may not necessarily indicate a strong attitude, but may just be the result of distractions throughout the task. Other researchers have recommend removing participants who used one of the two response keys in over 90% of trials (Heerdink, van Kleef, Homan, & Fischer, 2014). The current study removed four participants who pressed the same key in over 90% of the trials.

The final AMP scores indicate how pleasant or unpleasant the participants felt after being presented with the neutral symbol that followed the priming image (a similar Chinese symbol, Black, and White faces). Higher scores for any of the targets indicate that the participants found the targets to be more pleasant, while lower scores for any of
the targets indicate that the participants found the targets to be more unpleasant; neutral $M = 3.62$ ($SD = 11.53$), White $M = 2.96$ ($SD = 12.05$), and Black $M = 0.58$, ($SD = 12.37$).
Modern racism scale. McConahay’s (1986) modern racism scale (MRS) was developed to measure racial attitudes in the post-civil rights era as modern racism. This measure consists of seven items, each using a 5-point scale anchored at 1 (*strongly disagree*) and 5 (*strongly agree*), which will require participants to indicate how much they agree with the statements of the scale (e.g. “Discrimination against blacks is no longer a problem in the United States”; “It is easy to understand the anger of black people in America”). A high score represents high levels of prejudice towards racial minorities. The MRS has been found to have an internal reliability of .81 (Godfrey, Richman, and Withers, 2000). The current study found the scale to have a Cronbach $\alpha = .85$, $M = 2.13$, $SD = 0.70$.

Experience-taking. Participants’ perspective-taking will be measured using a modified version of the scale Kaufman and Libby (2012) used, based on Cohen’s (2001) identification conceptualization, to measure participants’ amount of experience-taking during the reading of narratives where the identity of the characters were revealed early or late in the story. This measure consists of seven items, each using a 9-point scale anchored at 1 (*strongly disagree*) and 9 (*strongly agree*), which will require users to report the extent to which they adopted the psychological perspective of the avatar (e.g., “I felt like I could put myself in the shoes of the avatar in the virtual world”) and experienced the same emotions (e.g., “I found myself feeling what the avatar in the virtual world was feeling”) and thoughts (e.g., “I felt I could get inside the avatar’s head”) as the character while reading. The authors reported a Cronbach $\alpha = .80$ reliability. The current study found the scale to have a Cronbach $\alpha = .75$, $M = 3.24$, $SD = 0.97$. 

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Self-presence. A five-item scale will be used to assess participants’ sense of the virtual self as the actual self (e.g., To what extent did you feel that … If something happened to the avatar, it was happening to me; The avatar’s body was my own body) and will use a 5-point scale anchored at 1 (very strongly) and 5 (not at all). The scale has been used by previous studies using VEs and assessed to have a Cronbach $\alpha = .85$ reliability (Aymerich-Franch, Karutz, & Bailenson, 2012). The current study found the scale to have a Cronbach $\alpha = .86, M = 1.97, SD = 0.82$.

Spatial presence. A five-item scale will be used to assess participants’ sense of the VE as authentic/real (e.g., To what extent did you feel that … I was really inside the virtual environment; I was surrounded by the virtual environment; I really visited the virtual environment; The virtual environment seemed like the real world; I could reach out and touch the objects in the virtual environment) and will use a 5-point scale anchored at 1 (not at all) and 5 (very strongly). The scale has been used by previous studies using VEs and assessed to have a Cronbach $\alpha = .77$ reliability (Bailey, Bailenson, Won, Flora, & Armel, 2012). The current study found the scale to have a Cronbach $\alpha = .87, M = 2.35, SD = 0.80$. 
Player-avatar interaction. User-avatar interaction will be assessed using the player-avatar interaction scale (PAX). The PAX is made up of four dimensions that look at the “perceived social and functional association” between a user and an avatar (Banks & Bowman, 2016, p. 215). It consists of 15 items, each using a 7-point scale anchored at 1 (strongly disagree) and 7 (strongly agree). The measure measures four dimensions. The first dimension of emotional involvement (PAX-EI) asks participants how much they agree with the statements concerning the avatar (e.g. “This avatar is very special to me”), and has been shown to have a Cronbach α = .84 reliability. The current study found the emotional involvement items to have a Cronbach α = .86, M = 2.13, SD = 0.89. The second dimension of anthropomorphic autonomy (PAX-AA; e.g. “This avatar has its own thoughts and ideas”), has been shown to have a Cronbach α = .88 reliability. The current study found the anthropomorphic autonomy items to have a Cronbach α = .88, M = 1.73, SD = 0.87. The third dimension of suspension of disbelief (PAX-SoD; e.g. “I pay attention to errors or contradictions in this avatar's world”), has been shown to have a Cronbach α = .82 reliability. The current study found the suspension of disbelief items to have a Cronbach α = .88, M = 3.97, SD = 1.55. The final fourth dimension of sense of control (PAX-SoC; e.g. “This avatar does what I want”), has been shown to have a Cronbach α = .80 reliability. The current study found the sense of control items to have a Cronbach α = .55, M = 5.97, SD = 0.91.
Motivation to control for prejudice reactions. A person’s motivation to control prejudice reactions is included as a covariate to account for social desirability. The motivation to control prejudice reactions (MCPR) will be used to assess users’ attempts to suppress initial automatic activation of prejudice as measured through explicit measures (Dunton & Fazio, 1997). This motivation may also influence their ability to take the perspective of another, their feelings of self- and spatial presence, and the extent to which they experience an interaction with their avatar as a social other. A university setting should provide an environment that promotes the suppression of racial bias. It consists of 17-items, each using a 7-point scale anchored at 1 (strongly disagree) and 7 (strongly agree). It asks participants the extent they agree or disagree with each statement (e.g. “In today’s society it is important that one not be perceived as prejudiced in any manner”; “When speaking to a Black person, it’s important to me that he/she not think I’m prejudiced”; “If someone who made me uncomfortable sat next to me on a bus, I would not hesitate to move to another seat”). The scale has been shown to have a Cronbach α = .81 reliability (Dunton & Fazio, 1997). The current study found the MCPR to have a Cronbach α = .75, M = 4.31, SD = 0.69.
Chapter 5: Results

The data were examined with the MCPR as a covariate in the analyses. The MCPR was used as a covariate, because there is usually a negative correlation between implicit and explicit measures of racial attitudes (Payne et al., 2008). It was used to control for the motivation to see if the explicit measures would show an opposite association. Also, if participants were motivated to control their attitudes, that motivation may have also factored into how they respond on other measures (e.g., self- & spatial presence, ETM and PAX). However, the MCPR was dropped as a covariate if the results indicated that it was not a significant covariate and retained if it was a significant covariate.

The experimental conditions of the avatar’s race and the time of revelation were dummy coded as follows: 0 = White avatar, 1 = Black avatar; and 0 = early reveal, 1 = late reveal. The correlations matrix table is in Table 2 of Appendix G.

Implicit Bias

H1a proposes that participants embodying Black avatars would experience more implicit racial bias towards Blacks compared to participants embodying White avatars. The MCPR was excluded because it was not significant, $F (1, 120) = .68, p = .412, \eta_p^2 = .006$. The results indicate that there was no significant main effect for avatar’s race on
participants’ implicit racial bias score ($M_{\text{white avatar}} = -0.79, SD = 10.75; M_{\text{black avatar}} = 1.76, SD = 13.58), F (1, 121) = 1.33, p = .251, \eta^2_p = .011$. The results do not support H1a.

The results from the analysis for H1b indicate that there was no significant main effect for the time of the avatar’s revelation on the participant’s implicit racial bias scores ($M_{\text{early reveal}} = -1.54, SD = 11.78; M_{\text{late reveal}} = 2.59, SD = 12.66), F (1, 121) = 3.83, p = .053, \eta^2_p = .031$. The results were in the predicted direction and were nearly significant, but did not support H1b.

The results from the analysis of H1c indicate that there was no significant interaction effect between the avatar’s race and the time of revelation on participants’ implicit bias scores ($M_{\text{white early reveal}} = -4.35, SD = 10.19; M_{\text{white late reveal}} = 2.76, SD = 10.26; M_{\text{black early reveal}} = 1.00, SD = 12.69; M_{\text{black late reveal}} = 2.46, SD = 14.50), F (1, 121) = 1.67, p = .199, \eta^2_p = .014$. The results do not support H1c.

**Explicit Bias**

The following analysis for H2a tests whether participants embodying Black avatars will show more explicit racial bias towards Blacks compared to participants embodying White avatars. The MCPR was found to be a significant and was therefore included as a covariate in the analysis, $F (1, 120) = 16.44, p < .001, \eta^2_p = .120$. The results indicate that there was no significant main effect for avatar’s race among participants on their explicit racial bias scores ($M_{\text{white avatar}} = 2.09, SD = 0.75; M_{\text{black avatar}} = 2.16, SD = 0.67), F (1, 120) = 0.84, p = .360, \eta^2_p = .007$. Thus, the results do not support H2a.

The results from the analysis for H2b indicate that there was no significant main effect for the time of the avatar’s revelation on the participants’ explicit racial bias scores
(\(M_{\text{early reveal}} = 2.14, SD = 0.69; M_{\text{late reveal}} = 2.12, SD = 0.73\)), \(F (1, 120) = 0.01, p = .919, \eta_p^2 = .00\). Thus, the results do not support H2b.

The results from the analysis for H2c indicate that there was no significant interaction effect between the avatar’s race and the time of revelation on participants’ explicit racial bias scores (\(M_{\text{white early reveal}} = 2.14, SD = 0.79; M_{\text{white late reveal}} = 2.04, SD = 0.71; M_{\text{black early reveal}} = 2.15, SD = 0.58; M_{\text{black late reveal}} = 2.18, SD = 0.74\)), \(F (1, 120) = 0.39, p = .532, \eta_p^2 = .003\). Thus, the results do not support H2c.

Perspective-taking

The following analysis for H3a tests whether participants in White avatars will report higher perspective-taking than participants in Black avatars. The MCPR was found to not be a significant covariate and was therefore excluded from the model, \(F (1, 120) = 1.17, p = .281, \eta_p^2 = .010\). The results indicate that there was no significant main effect for avatar’s race on participants’ perspective-taking scores (\(M_{\text{white avatar}} = 3.12, SD = 0.94; M_{\text{black avatar}} = 3.34, SD = 0.99\)), \(F (1, 121) = 1.70, p = .195, \eta_p^2 = .014\). Thus, the results do not support H3a.

The results from the analysis for H3b indicate that there was no significant main effect for the time of the avatar’s revelation on participant’s perspective-taking scores (\(M_{\text{early reveal}} = 3.40, SD = 0.92; M_{\text{late reveal}} = 3.09, SD = 1.00\)), \(F (1, 121) = 3.24, p = .075, \eta_p^2 = .026\). Thus, the results do not support H3b.

The results from the analysis of H3c indicate that there was no significant interaction effect between the avatar’s race and the time of revelation on participants’ perspective-taking scores (\(M_{\text{white early reveal}} = 3.23, SD = 1.03; M_{\text{white late reveal}} = 3.01, SD = 0.94\)), \(F (1, 121) = 1.32, p = .254, \eta_p^2 = .010\). Thus, the results do not support H3c.
self-presence

The following analysis for H4a tests whether participants embodying White avatars will report feeling more self-presence compared to participants embodying Black avatars. MCPR was not included as a covariate because it was not significantly related to self-presence, \( F(1, 120) = 0.64, p = .425, \eta^2_p = .005 \). The results indicate that there was no significant main effect for avatar’s race on participants’ self-presence scores (\( M_{white\ avatar} = 1.91, SD = 0.76; M_{black\ avatar} = 2.03, SD = 0.87 \), \( F(1, 121) = 0.72, p = .399, \eta^2_p = .006 \). Thus, the results do not support H4a.

The results from the analysis for H4b indicate that there was no significant main effect for the time of the avatar’s revelation on participant’s self-presence scores (\( M_{early\ reveal} = 2.10, SD = 0.83; M_{late\ reveal} = 1.85, SD = 0.80 \), \( F(1, 121) = 3.17, p = .078, \eta^2_p = .026 \). Thus, the results do not support H4b.

The results from the analysis of H4c indicate that there was no significant interaction effect between the avatar’s race and the time of revelation on participants’ self-presence scores (\( M_{white\ early\ reveal} = 2.07, SD = 0.83; M_{white\ late\ reveal} = 1.75, SD = 0.67; M_{black\ early\ reveal} = 2.14, SD = 0.84; M_{black\ late\ reveal} = 1.93, SD = 0.90 \), \( F(1, 121) = 0.12, p = .730, \eta^2_p = .001 \). Thus, the results do not support H4c.

Spatial-presence

The analysis for H5a tests whether participants embodying White avatars will report feeling more spatial-presence compared to participants embodying Black avatars. MCPR was not included as a covariate because it was not significantly related to spatial-
presence, $F(1, 120) = 0.93, p = .336, \eta_p^2 = .008$. The results indicate that there was no significant main effect for avatar’s race on participants’ spatial-presence scores ($M_{\text{white avatar}} = 2.24, SD = 0.82; M_{\text{black avatar}} = 2.44, SD = 0.78$), $F(1, 121) = 2.17, p = .143, \eta_p^2 = .018$. Thus, the results do not support H5a.

The results from the analysis for H5b indicate that there was a nearly significant main effect for the time of the avatar’s revelation on participant’s spatial-presence scores ($M_{\text{early reveal}} = 2.49, SD = 0.80; M_{\text{late reveal}} = 2.21, SD = 0.79$), $F(1, 121) = 3.78, p = .054, \eta_p^2 = .030$. The results bordered on significant, but did not support H5b.

The results from the analysis of H5c indicate that there was no significant interaction effect between the avatar’s race and the time of revelation on participants’ spatial-presence scores ($M_{\text{white early reveal}} = 2.34, SD = 0.87; M_{\text{white late reveal}} = 2.14, SD = 0.78; M_{\text{black early reveal}} = 2.63, SD = 0.71; M_{\text{black late reveal}} = 2.27, SD = 0.81$), $F(1, 121) = 0.33, p = .570, \eta_p^2 = .003$. The results do not support H5c.

Player-avatar interaction

The following analyses for H6a tests whether participants embodying White avatars will report feeling more player-avatar interaction compared to participants embodying Black avatars along the four PAX dimensions separately. The MCPR was not included as a covariate because it was not significantly related to player-avatar interactions, PAX-EI: $F(1, 120) = 0.26, p = .611, \eta_p^2 = .002$; PAX-AA: $F(1, 120) = 0.91, p = .343, \eta_p^2 = .008$; PAX-SoD: $F(1, 120) = 0.09, p = .770, \eta_p^2 = .001$; and PAX-SoC: $F(1, 120) = 3.69, p = .057, \eta_p^2 = .030$. The results indicate that there was no significant main effect for avatar’s race on participants’ PAX-EI scores ($M_{\text{white avatar}} =$
There was a significant main effect for avatar’s race on participants’ PAX-AA scores ($M_{\text{white avatar}} = 1.55$, $SD = 0.69$; $M_{\text{black avatar}} = 1.88$, $SD = 0.98$), $F (1, 121) = 4.90$, $p = .029$, $\eta_p^2 = .039$. There was no significant main effect for avatar’s race on participants’ PAX-SoD scores ($M_{\text{white avatar}} = 3.79$, $SD = 1.69$; $M_{\text{black avatar}} = 4.13$, $SD = 1.42$), $F (1, 121) = 1.44$, $p = .232$, $\eta_p^2 = .012$. There was no significant main effect for avatar’s race on participants’ PAX-SoC scores ($M_{\text{white avatar}} = 6.03$, $SD = 0.82$; $M_{\text{black avatar}} = 5.93$, $SD = 0.98$), $F (1, 121) = 0.37$, $p = .545$, $\eta_p^2 = .003$.

The results for the dimension of anthropomorphic autonomy, are significant in the opposite direction. Participants that embodied Black avatars felt their avatars possessed more human-like agency compared to participants that embodied White avatars. So, although the results are significant along this dimension, they do not support H6a.

The results from the analyses for H6b indicate that there was no significant main effect for the time of the avatar’s revelation among the participants’ PAX-EI scores ($M_{\text{early reveal}} = 2.22$, $SD = 1.00$; $M_{\text{late reveal}} = 2.04$, $SD = 0.77$), $F (1, 121) = 1.59$, $p = .210$, $\eta_p^2 = .013$. There was no significant main effect for the time of the avatar’s revelation among the participants’ PAX-AA scores ($M_{\text{early reveal}} = 1.81$, $SD = 0.92$; $M_{\text{late reveal}} = 1.64$, $SD = 0.82$), $F (1, 121) = 1.14$, $p = .288$, $\eta_p^2 = .009$. There was no significant main effect for the time of the avatar’s revelation among the participants’ PAX-SoD scores ($M_{\text{early reveal}} = 4.03$, $SD = 1.67$; $M_{\text{late reveal}} = 3.92$, $SD = 1.45$), $F (1, 121) = 0.23$, $p = .629$, $\eta_p^2 = .002$. There was no significant main effect for the time of the avatar’s revelation among
the participants’ PAX-SoC scores ($M_{\text{early reveal}} = 5.93$, $SD = 1.08$; $M_{\text{late reveal}} = 6.01$, $SD = 0.70$), $F(1, 121) = 0.27, \ p = .602, \ \eta^2_p = .002$. Thus, the results do not support H6b.

The results from the analyses for H6c indicate that there was no significant interaction effect between the avatar’s race and the time of revelation on participants’ PAX-EI scores ($M_{\text{white early reveal}} = 2.18$, $SD = 1.22$; $M_{\text{white late reveal}} = 1.82$, $SD = 0.55$; $M_{\text{black early reveal}} = 2.27$, $SD = 0.78$; $M_{\text{black late reveal}} = 2.22$, $SD = 0.88$), $F(1, 121) = 0.94, \ p = .334, \ \eta^2_p = .008$. There was no significant interaction effect between the avatar’s race and the time of revelation on participants’ PAX-AA scores ($M_{\text{white early reveal}} = 1.52$, $SD = 0.72$; $M_{\text{white late reveal}} = 1.58$, $SD = 0.68$; $M_{\text{black early reveal}} = 2.08$, $SD = 1.01$; $M_{\text{black late reveal}} = 1.69$, $SD = 0.93$), $F(1, 121) = 2.19, \ p = .142, \ \eta^2_p = .018$. There was no significant interaction effect between the avatar’s race and the time of revelation on participants’ PAX-SoD scores ($M_{\text{white early reveal}} = 3.94$, $SD = 1.78$; $M_{\text{white late reveal}} = 3.64$, $SD = 1.60$; $M_{\text{black early reveal}} = 4.12$, $SD = 1.58$; $M_{\text{black late reveal}} = 4.14$, $SD = 1.28$), $F(1, 121) = 0.34, \ p = .560 \ \eta^2_p = .003$. There was no significant interaction effect between the avatar’s race and the time of revelation on participants’ PAX-SoC scores ($M_{\text{white early reveal}} = 5.91$, $SD = 0.99$; $M_{\text{white late reveal}} = 6.14$, $SD = 0.60$; $M_{\text{black early reveal}} = 5.95$, $SD = 1.17$; $M_{\text{black late reveal}} = 5.90$, $SD = 0.78$, $F(1, 121) = 0.72, \ p = .398, \ \eta^2_p = .006$. Thus, the results do not support H6c.

Behavioral

The following analysis for H7a tests whether participants embodying White avatars will move their chairs closer to the other participant’s chair compared to participants embodying Black avatars. MCPR was not included as a covariate because it was not significantly related to behavior, $F(1, 120) = 3.49, \ p = .064, \ \eta^2_p = .028$. The results indicate that there was no significant main effect for the avatar’s race on the
distance between chairs ($M_{\text{white avatar}} = 143.29, SD = 39.30; M_{\text{black avatar}} = 134.77, SD = 33.10), F (1, 121) = 1.77, p = .186, \eta^2_p = .014$. Thus, the results do not support H7a.

The results from the analysis of H7b indicate that there was no significant main effect for the time of the avatar’s revelation on the distance participants moved the chairs ($M_{\text{early reveal}} = 137.38, SD = 36.03; M_{\text{late reveal}} = 140.00, SD = 36.62), F (1, 121) = 0.15, p = .698, \eta^2_p = .001$. The results do not support H7b.

The results from the analysis of H7c indicate that there was no significant interaction effect between the avatar’s race and the time of revelation on the distance participants moved the chairs ($M_{\text{white early reveal}} = 143.95, SD = 38.00; M_{\text{white late reveal}} = 142.64, SD = 41.22; M_{\text{black early reveal}} = 131.43, SD = 33.64; M_{\text{black late reveal}} = 137.82, SD = 32.78), F (1, 121) = 0.35, p = .556, \eta^2_p = .003$. Thus, the results do not support H7c.
Chapter 6: Further Analysis

At the recommendation of a committee member, the MCPR was analyzed as a possible moderator of the individual relationships between the experimental conditions and the DVs. To evaluate the MCPR’s role as moderating variable, Model 1 of the PROCESS macro for SPSS (Hayes, 2013) was used. The macro estimates coefficients, including interactions terms, using OLS regression models and can probe interactions using the Johnson-Neyman technique. The PROCESS macro has also been updated to allow for multi-categorical predictors and moderators, so experimental conditions were coded 1 = White avatar/late reveal, 2 = Black avatar/early reveal, and 3 = Black avatar/late reveal (Hayes, n.d.). The white avatar/early condition was coded as zero and used as the control group for analyses, because the final sample had only White participants; therefore, revealing their avatars as the same race as the participants early would not have as much of an effect on them as the other conditions would.
Table 1

*Self/Spatial – Presence Scales, PAX, AMP, MRS, ETM, and Behavioral – Chair Distance Variables: Moderation Analysis Results*

<table>
<thead>
<tr>
<th>D.V. – Condition</th>
<th>( b )</th>
<th>S.E.</th>
<th>( T )</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMP – WL</td>
<td>-4.08</td>
<td>4.32</td>
<td>-0.95</td>
</tr>
<tr>
<td>AMP – BE</td>
<td>0.75</td>
<td>4.50</td>
<td>0.17</td>
</tr>
<tr>
<td>AMP – BL</td>
<td>0.28</td>
<td>4.56</td>
<td>0.06</td>
</tr>
<tr>
<td>MRS – WL</td>
<td>-0.11</td>
<td>0.24</td>
<td>-0.48</td>
</tr>
<tr>
<td>MRS – BE</td>
<td>0.07</td>
<td>0.25</td>
<td>0.30</td>
</tr>
<tr>
<td>MRS – BL</td>
<td>-0.14</td>
<td>0.25</td>
<td>-0.55</td>
</tr>
<tr>
<td>ETM – WL</td>
<td>-0.24</td>
<td>0.34</td>
<td>-0.70</td>
</tr>
<tr>
<td>ETM – BE</td>
<td>-0.12</td>
<td>0.36</td>
<td>-0.34</td>
</tr>
<tr>
<td>ETM – BL</td>
<td>-0.21</td>
<td>0.36</td>
<td>-0.57</td>
</tr>
<tr>
<td>Self-Presence – WL</td>
<td>-0.11</td>
<td>0.29</td>
<td>-0.39</td>
</tr>
<tr>
<td>Self-Presence – BE</td>
<td>0.17</td>
<td>0.30</td>
<td>0.55</td>
</tr>
<tr>
<td>Self-Presence – BL</td>
<td>0.23</td>
<td>0.31</td>
<td>0.75</td>
</tr>
<tr>
<td>Spatial Presence – WL</td>
<td>-0.08</td>
<td>0.28</td>
<td>-0.29</td>
</tr>
<tr>
<td>Spatial Presence – BE</td>
<td>-0.25</td>
<td>0.29</td>
<td>-0.84</td>
</tr>
<tr>
<td>Spatial Presence – BL</td>
<td>0.19</td>
<td>0.29</td>
<td>0.64</td>
</tr>
<tr>
<td>PAX (EI) – WL</td>
<td>0.08</td>
<td>0.32</td>
<td>0.25</td>
</tr>
<tr>
<td>PAX (EI) – BE</td>
<td>0.24</td>
<td>0.33</td>
<td>0.72</td>
</tr>
<tr>
<td>PAX (EI) – BL</td>
<td>-0.01</td>
<td>0.33</td>
<td>-0.04</td>
</tr>
<tr>
<td>PAX (AA) – WL</td>
<td>0.02</td>
<td>0.30</td>
<td>0.07</td>
</tr>
<tr>
<td>PAX (AA) – BE</td>
<td>0.56</td>
<td>0.31</td>
<td>1.79</td>
</tr>
<tr>
<td>PAX (AA) – BL</td>
<td>-0.05</td>
<td>0.32</td>
<td>-0.16</td>
</tr>
<tr>
<td>PAX (SoD) – WL</td>
<td>0.23</td>
<td>0.55</td>
<td>0.41</td>
</tr>
<tr>
<td>PAX (SoD) – BE</td>
<td>0.02</td>
<td>0.58</td>
<td>0.03</td>
</tr>
<tr>
<td>PAX (SoD) – BL</td>
<td>-0.49</td>
<td>0.58</td>
<td>-0.84</td>
</tr>
<tr>
<td>PAX (SoC) – WL</td>
<td>0.29</td>
<td>0.30</td>
<td>0.97</td>
</tr>
<tr>
<td>PAX (SoC) – BE</td>
<td>-0.74*</td>
<td>0.31</td>
<td>-2.34*</td>
</tr>
<tr>
<td>PAX (SoC) – BL</td>
<td>0.50</td>
<td>0.32</td>
<td>1.56</td>
</tr>
<tr>
<td>Chair Distance – WL</td>
<td>-4.76</td>
<td>12.66</td>
<td>-0.38</td>
</tr>
<tr>
<td>Chair Distance – BE</td>
<td>14.70</td>
<td>13.21</td>
<td>1.11</td>
</tr>
<tr>
<td>Chair Distance – BL</td>
<td>7.00</td>
<td>13.37</td>
<td>0.52</td>
</tr>
</tbody>
</table>

*Note. PAX = Player-Avatar Interaction; EI = Emotional Involvement, AA = Anthropomorphic Autonomy, SoD = Suspension of Disbelief, SoC = Sense of Control. AMP = Affective Misattribution Procedure. MRS = Modern Racism Scale. ETM = Experience-Taking Measure. WL = White Avatar/ Late Reveal. BE = Black Avatar/ Early Reveal. BL = Black Avatar/ Late Reveal. *p < .05.*
See Table 1 for a summary of moderation results. Overall, the interaction between the experimental conditions and the MCPR was not significant with one exception. Analysis considering if the MCPR moderated the relationship between the four experimental conditions and the PAX yielded one significant interaction. Specifically, the analysis found that there was a significant interaction between the MCPR and the black avatar/early reveal condition on the participants’ sense of control over their avatar ($b = -0.74$, $SE = 0.31$, $t (117) = -2.36$, $p = .0202$). Probing the interaction with the Johnson-Neyman technique revealed that participants in the Black avatar/early reveal condition with scores lower than 3.37 on the MCPR had a significantly lower sense of control over their avatar compared to participants that embodied white avatars revealed early. In contrast, those that scored higher than 4.89 on the MCPR had a significantly higher sense of control over their avatar compared to participants that embodied white avatars revealed early.

Chapter 7: Discussion

The results indicate that many of the hypotheses were not statistical significant. However, many of the means show a trend towards the hypothesized outcomes and a few show the complete opposite. For instance, on measures of racial bias there were no significant differences on implicit racial bias or explicit racial bias towards Black faces between participants who embodied Black or White avatars and those whose avatars were revealed early as opposed to later in the virtual experience.

There may have been a confounding interaction between the race of the avatars and the images used as stimuli for the AMP task. Perhaps the participants’ stored stereotypes were not activated, because they did not feel that they really did embody an
avatar of a different race, after seeing real-life images of Black and White faces. Past research on behavioral realism in VEs mention that photographic realism is not as important as behavioral realism, how “virtual humans and other objects behave like their counterparts in the physical world” (Blascovich et al., 2002, p. 112). Other VE studies using immersive VEs technology directed participants to move their heads to confirm that those movements were replicated by their avatar (Groom et al., 2009).

This lack of replicated movement in a desktop VE, may have suppressed the participants’ stereotype activation during their Second Life experience. As such, in order to affect the participants implicit racial bias towards Black faces it may be required that the participant initiate some type of movement in their avatar during the mirror segment to overcome the lack of photographic realism. Showing behavior that reflects that movement in the real world may enhance the participants’ sense of embodiment, which may influence their implicit racial bias depending on the race of the avatar that they embody.

Embodying an avatar of a different race did not affect participants’ explicit racial bias towards Black people. After completing the AMP, the participants may have been sensitized and experienced significant carry-over effects that clued them in to the purpose of the study, which may have influenced their MRS scores. In addition to the carry-over effects that they may have experienced, their responses to the MRS may have been an artifact of social desirability. After rating how pleasant and unpleasant Black and White faces made them feel, they may have wanted to counter what they think the AMP captured about their implicit racial biases.
The timing that participants saw the identity of their avatar had no effect on their implicit racial bias towards Black faces. There was no difference in AMP scores for participants that saw their avatar early versus those that saw their avatar later in their virtual experience. This is contrary to what past research has found when participants’ self-concept was manipulated (Kaufman & Libby, 2012). Participants’ self-concept may have not been sufficiently lowered to allow for the acceptance of traits that the avatars possess. A reason for this may be that their task of rearranging furniture in the virtual home did not follow a narrative. A backstory as simple as rearranging the furniture movers had unloaded in the avatars new house could have been sufficient to accept as a narrative, since many undergraduate students may be thinking about where they will live after they graduate with a degree.

This lack of a simple narrative may have also affected the MRS scores, in addition to the carry-over effects that the AMP may have caused as mentioned previously. Another reason explicit racial bias scores showed no differences may be that this study was conducted in a lab setting. Knowing that the experimenter is in the next room may have influenced their responses. Then again, it may just be that seeing your avatar later rather than early has no effect on participants’ explicit racial bias towards Blacks. Although the study’s concept has worked in previous narrative studies, the current study is the first to operationalize the manipulation within a virtual setting. Future studies should include this manipulation with a different virtual platform that incorporates more sophisticated interactive affordances.

The current study showed that there was no difference on the participants’ ability to take the perspective of an avatar regardless of the race of the avatar. Participants were
not explicitly told to take the perspective of the avatar before their virtual experience. Past studies have instructed participants to imagine a day in the life of a target other, providing a simple backstory (Galinsky & Moskowitz, 2000; Groom et al., 2009). These particular results may be an indication that since the virtual experience was not narrative in nature, the participants did not think that there was any backstory to the avatar as they may have just perceived them to be an extension of themselves, as opposed to a character.

Revealing the avatar’s identity later did not result in more perspective-taking compared to revealing the avatar’s identity early. Past narrative research manipulated the time the main character’s identity was revealed, which resulted in more perspective-taking among the participants that read a narrative where the character was revealed later as opposed to early (Kaufman & Libby, 2012). Revealing the avatar later in a virtual experience compared to early did not replicate the narrative study’s findings. Again, the lack of a narrative may have confounded the participants’ ability to take the perspective of the avatar they embodied and a simple backstory may have justified rearranging the virtual furniture which may have facilitated more perspective-taking in participants in the late reveal condition. It may also be that the current study found no differences because the virtual experience may have been too short. Participants in the early reveal condition saw their avatar two minutes into their Second Life experience as opposed to participants in the late reveal condition that saw their avatars eleven minutes into their experience. Perhaps a longer time within Second Life coupled with a backstory, to add an element of narrative, may have facilitated more perspective-taking.
In regards to self-and spatial presence measures, there was no significant
difference in scores between participants’ that embodied Black or White avatars. Perhaps
the non-significant findings for participants’ self-presence scores were not a result of the
race of the avatars, but a result of them seeing them in the virtual mirror. Seeing their
avatars reflection may have reminded them of how different they were from their avatar.
Social cognitive theory suggests that witnessing the experiences of another person similar
to oneself may make the situation more salient (Bandura, 1991). The avatars may have
looked different enough for the participants during the mirror segment to interrupt their
feelings of self-presence. Spatial presence may have been affected due to the lack of
motion that avatar was unable to make during the mirror segment. The mirror segment
locked the image of the avatar in a two dimensional screenshot (see Appendix D),
making it impossible for participants to move their avatars in any direction. It may have
also hindered the participants’ ability to look around the room affecting their ability to
gauge exactly where in the room they were.

There was also no effect in participants’ self-and spatial presence scores when the
avatar was revealed later as opposed to being revealed earlier. It may be that participants’
sense of virtual-self remained the same across the conditions, indicating that self-
presence is felt regardless of when the avatar is revealed to the participant. The results for
spatial presence also saw no significant differences in scores across early and late reveal
conditions. Perhaps, spatial presence is more difficult to sense in a desktop VE, like
Second Life, and may be more pronounced in an immersive world that utilizes a head
mount to simulate the virtual world. Participants may have been jolted out of their
experience when it was time to show them their avatars in the virtual mirror affecting
their feelings of spatial presence. Taking the time to interrupt their furniture rearranging task could have made them feel like they were in a room with a desktop computer, as opposed to a virtual room.

Participants embodying White avatars did not experience more interaction with their avatar as opposed to those that embodied Black avatars along three of the four PAX dimensions – emotional intimacy, suspension of disbelief, and sense of control. The avatar’s race may not have affected theses PAX dimensions, however, it may have been that once the participants saw their avatar in the virtual mirror they realized how different they were from them. The majority of avatars available in Second Life are similar in physical appearances and the majority of the time the only thing that distinguishes them as belonging to another race is their skin tone. It may have been that the avatars physical characteristics, apart from skin tone, did not match up with what the image that the all-White participants held about people of other races in the real-world and may be reflected in the PAX scores, with the exception of anthropomorphic autonomy.

Participants reported their avatars as having more anthropomorphic autonomy, a dimension of the PAX, when they embodied Black avatars as opposed to White avatars. This interesting finding is contrary to H6a, but may indicate that the simple distinctive characteristic of the Black avatar’s skin tone may be enough for participants to consider the avatar to be different from them along this one dimension. According to Banks and Bowman (2016), a lower score along this dimension indicates that participants see the avatar as a representation controlled by them, and a higher score indicates that the participants see the avatar as having more human-like agency that is distinct from them. In other words, the findings indicate that the participants that embodied a White avatar
viewed their avatar as more of a representation of themselves, and the participants that embodied a Black avatar viewed the avatar as being more distinct from themselves.

There was no difference on the participants PAX scores across all dimensions when the identity of the avatar was revealed later compared to the participants whose avatars were revealed earlier. This indicates that perhaps the manipulation of the participants’ self-concept has no affect with how they experienced the avatar in Second Life. In addition, Second Life is not seen as a game, but as a social environment for its users to interact in. The study was conducted with the participants embodying the only avatar in the house, with no interaction with any other avatar or agent. The lack of a narrative in Second Life coupled with the lack of interaction with another avatar may have hindered the participants’ player-avatar interaction.

Participants embodying White avatars not differ on the distance they moved the chair for the “other” participant compared to those that embodied Black avatars. This indicates that their behavior was not influenced by the avatar’s race. In addition, there was also no difference in the distance the chair was moved between participants whose avatars was revealed later in their virtual experience compared to participants whose avatars were revealed earlier. It is conceivable that their behaviors were not affected by the experimental manipulations. A possible explanation is because participants did not interact with another avatar or agent (of the same or different race). The presence of another avatar in the virtual house may have provided the participant a target that could have affected their movement of the chair. Future studies should look at manipulating the race of a confederate avatar and the timing in which that avatar is introduced into the virtual experience.
Finally, the results of the moderation analysis suggest that participants were only motivated to control their prejudice reactions only when they were aware that their avatar was Black very early in their VE experience. They may not have been motivated to control their prejudiced reactions when the avatar was White as there may have been no difference in their self-concept, because a White avatar would probably be too salient to a White participant for them to notice much of a difference between themselves and the avatar. They also may not have reported feeling much sense of control when they embodied White avatars, because they were of a similar race. However, they may have felt that they had a higher sense of control over the actions of the Black avatar which was obviously dissimilar.

The participants who learned very early in their VE experience that they embodied a Black avatar may have had their self-concept activated by how notable the racial differences were between them and their avatar. The results suggest that the sense of control felt over their avatar was moderated by how motivated they were to control their prejudice reactions. Studies have shown that context cues matter when presented with pictures of different races. Research has shown that when presented with contexts that have cues associated with prejudice (e.g., jail) and with White and Black faces, participants with a low MCPR indicated having a higher in-group bias towards Whites and those with a high MCPR indicated having a higher out-group bias towards Blacks (Maddux, Barden, Brewer, & Petty, 2005). Of course a virtual home may not be perceived as being a context with cues normally associated with prejudice. So, perhaps in the absence of threatening contexts with cues associated with prejudice, participants with a higher MCPR that saw their Black avatar early may have actively suppressed their
prejudiced reactions to the point that they felt they had more control over the Black avatar as it was seen as to be very distinct from them, compared to those with a low MCPR.

Furthermore, there was not a significant interaction between the MCPR and the Black avatar/late reveal condition suggesting that the participants’ self-concept was impacted enough that they may have not felt motivated to exert control over the avatar. However, it is important to note that the two items used to measure the participants’ sense of control had a low reliability, which may indicate other processes at play.

Limitations

There are several limitations to the current study that need to be addressed. One big limitation is that several of the avatars used for the study were significantly different along perceived racial ambiguity, aggressiveness, and attractiveness. Many of the customized avatars were designed as variations of avatars available within Second Life. The majority of avatars available are White and the majority of avatars available that represent different races are presented as caricatures of that race, most of the time in offensive ways. The avatars were customized to look different from each other to attempt to create ethnically distinct representations, however the limited diversity of the avatars may have influenced the results of their perceived racial ambiguity, aggressiveness, and attractiveness as measured in the pre-test.

A second limitation is the sample size of the study. The current sample size of 125, is smaller from the sample size derived from an a priori power analysis, \( N = 180 \). An additional 55 participants spread across the four conditions could provide a more robust sample size that would perhaps be able to detect any true effects of the manipulation of
the participants’ self-concept. Several effect sizes suggest that there may be some trend towards Type II error, that is, several of the timing of revelation hypotheses could have resulted in significant differences between the early and late reveal manipulations with a few additional participants across the conditions.

The third limitation addresses the implicit attitudes measure used in the study. The AMP measures automatically activated responses from participants based on how they misattribute their attitudes towards neutral symbol after being primed with an image of a Black or White male (Payne & Lundberg, 2014). The creators of the AMP do not use response time to measure extreme attitudes, rather they measure the cumulative scores from pleasant or unpleasant responses after being presented with the images described above. Past research using VEs have used other implicit attitudes measures, namely the implicit attitudes test (IAT; Groom et al., 2009). The IAT uses the response times of participants to assess attitude strength between attribution words (i.e., “good” or “bad”) and a target (pictures of faces of different races) to draw conclusions of the participants’ attitudes towards the target race (Greenwald, McGhee, & Schwartz, 1998).

Two additional limitations to the AMP are the stimuli images and the instructions. All of the face images in the AMP are of males. It may be that this may have affected how pleasant or unpleasant the participants found the images to be influencing the results obtained. The instructions do a good job of reminding the participants which keys to press for their assessments of the images before beginning the task, however, it may also be that some participants forgot which keys to press and end up indicating unpleasantness when they really meant to press the pleasant key.
A final limitation to consider has to do with the VE platform used. Apart from fantasy role-playing games, like *World of Warcraft*, Second Life is a popular online virtual community where users can interact with each other through their avatars. However, there were multiple occasions during the experiment that the participants pointed out that they had heard of the website, but had never used it, citing that they believed it to be an old game. With the current VE devices making their way to the market, many participants may have expected to take part in a study where they were connected to an immersive virtual environment (IVE), much like the Oculus Rift provides. These expectations could have played a role in how participants perceived their avatars to be an extension of themselves within Second Life. The lack of narrative and interactive aspects of Second Life may have affected the impact of the manipulations, especially when participants may expect a more immersive virtual experience. In general, the last limitation of the platform may have had an overall impact on the manipulations and all of the outcome variables.

Future Directions

Any attempts to replicate this study should focus on improving the pre-test of the avatars, improving the power by collecting the sample size suggested by an a priori power analysis, ways to remind participants of the keys to select while completing the AMP task, perhaps using a different implicit measure, and the use of newer VR devices over Second Life.

Avatars should be thoroughly pre-tested to make sure that there are no differences across perceived racial ambiguity, aggressiveness, and attractiveness. Any significant differences between the avatars could confound the findings, for this reason future studies
should establish a threshold that all avatar should be rated on and inspect pre-test results to make sure that there are no significant differences between the different raced avatars and their respective genders.

The study’s low power could affect the self-concept revelation manipulations more than the avatar race manipulations. Many participants could have been sensitized by the AMP task and may have also been sensitized by extrapersonal sources such as media reporting on recent race issues in society. The effect sizes show that the time the avatar is revealed may produce significant differences between the two groups and a more robust sample size that gets closer to collecting more power could produce significant findings in future study results.

Future studies should also replicate the study using a diverse sample that includes participants of different ages, cultural backgrounds, and races. Different backgrounds and ethnicities may share stereotypes based on societal norms, but they also have different perspectives on how those norms affect themselves and others, which may impact the degree to which they take the perspective of another.

If the AMP task is used to assess implicit attitudes, the task should include reminders as to which keys mean pleasant and unpleasant during the task to counter any confusion the participants may experience in the middle of the task, as well as, including gender as a potential moderator to investigate if there are differences between the genders. In addition, the manipulation of the participants’ self-concept would probably benefit from including a different implicit measure for attitudes, such as the personal IAT. Response times may be a better measure of attitude strength as opposed to the cumulative pleasant and unpleasant scores that the AMP produces. In addition, the
personal IAT distinguishes associations that are rooted in personal preferences, whereas its predecessor, the IAT, does not distinguish association based on personal preferences and preferences based on extrapersonal information (e.g., cultural norms, training, media, and the opinions of others; MacDorman, Vasudevan, & Ho, 2007). Compared to the AMP, the personal IAT may better capture truer implicit attitudes.

Manipulating the participants’ self-concept by revealing their avatar much later should incorporate newer IVE devices, where the immersiveness of the environment may enhance their sense of embodiment through their avatar regardless of race and with the help of more interactivity. Although, Second Life does have an interactive affordance, the affordance is not replicated consistently throughout the VE experience, so new devices that can use narrative and interactive elements should be considered for future studies.

Finally, more manipulation checks that asks specifically how much the participants feels themselves similar to their avatar could improve the interpretation of the results. A funneled debriefing could also help weed-out any participants that did not have much interest in being honest research participants. Combined with the manipulation checks, the funneled debriefing could help to inform future studies about how to improve manipulations and materials. Findings may be somewhat misleading and a funneled debriefing adds another layer of redundancy to ensure the quality of the data analyzed.
Chapter 8: Conclusion

The results of this study may not have shown that benefits of VE affordances on reducing people’s racial bias and increasing perspective-taking, but future studies could take advantage of new technologies that are to be released. Many video game companies have developed VE systems that are more affordable and sophisticated than previous VE programs available to the public. The need to investigate the effects they may have on its users will only increase, both for commercial and academic research. The affordances VE technology possesses can help promote pro-social behaviors through prediction made by the Proteus Effect. They can be used to understand other cultures or see the world through another’s eyes. As the world grows smaller by the speed with which we communicate, seeing the world through another’s eyes and walking a mile in their shoes could be a benefit that is worth exploring.
References


personality and social psychology, 74(6), 1464. doi: 10.1037/0022-3514.76.6.1464.


Appendix A: Avatars

Black Male Avatars

White Male Avatars
Black Female Avatars

White Female Avatars
Appendix B: Virtual Home
Appendix C: Consent Form

The Ohio State University Consent to Participate in Research

Study Title:
At Home in a Virtual Environment

Researchers:
Jose Monroy

This is a consent form for research participation. It contains important information about this study and what to expect if you decide to participate.

Your participation is voluntary.

Please consider the information carefully. Feel free to email and ask questions before making your decision whether or not to participate. If you decide to participate, you will be asked to click below. By clicking the continue button below and providing the sign-up information, you indicate that you consent and want to participate in the study.

Purpose: The study evaluates the manner and organization to which students arrange furniture in a virtual living space.

Procedures/Tasks: The experiment will be completed in lab and move furniture throughout a virtual living space. This will be followed by several questionnaires concerning your virtual experience.

Duration: Approximately a maximum of 45 minutes.

You may leave the study at any time. If you decide to stop participating in this study, there will be no penalty to you, and you will not lose any benefits to which you are otherwise entitled. Your decision will not affect your current or future relationship with The Ohio State University.

Risks and Benefits: This study does not involve any more than minimal risk to you. In other words, there are no harms or discomforts beyond what is ordinarily encountered in daily life or during the performance of routine physical or psychological tests. No benefits are anticipated from participation. If you choose to fill out the questionnaires for the session online, steps will be taken to protect your confidentiality as described below as there is a small risk to a breach in confidentiality due to the nature of the research conducted online.
Confidentiality: Although every effort to protect confidentiality will be made, no guarantee of internet security can be given as, although unlikely, transmissions can be intercepted and IP addresses can be identified. We will ask for your email address, but it will only be used to identify you to award the incentive (by informing instructors about C-REP credit) in exchange for your participation. This information will be removed from your responses to the questionnaires in order to maintain your confidentiality. The only risk, albeit minor, is a breach of confidentiality due to the use of an online questionnaire where potentially sensitive information may be leaked. However, Qualtrics programming minimizes the risk of confidentiality breaches by encrypting their transmissions. Once the study is completed, there will be no way to connect your answers back to you personally. The only record of your name that will be kept is the fact that you participated in this study, but this will not be connected to the answers you gave. Efforts will be made to keep this study-related information confidential. The data will be reported only in aggregate form. Your anonymous responses will be combined with those of others and may become part of a scientific article for publication. However, there may be circumstances where this information must be released. For example, personal information regarding your participation in this study may be disclosed if required by state law. Also, your records may be reviewed by the following groups (as applicable to the research):

- Office for Human Research Protections or other federal, state, or international regulatory agencies;
- The Ohio State University Institutional Review Board or Office of Responsible Research Practices.

Incentives: You will receive 1 C-REP credits in exchange for your participation.

Participant Rights: Your participation in this experiment is voluntary. You can refuse to participate without any penalties. If you are a student or employee at Ohio State, your decision will not affect your grades or employment status. Remember that you should be 18 years or older to participate in this study.

If you choose to participate in the study, you may discontinue participation at any time without any penalty.

If after you have completed the study you wish to withdraw your data from the study, you can contact the investigators to do so. Withdrawing your data will not incur any penalties.

By clicking below, you do not give up any personal legal rights you may have as a participant in this study.

Contacts and Questions:

For questions, concerns, or complaints about the study you may contact Jose Monroy at Monroy.12@osu.edu.

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

If you are harmed as a result of participating in this study or for questions about study-related harm, you may contact Jose Monroy at Monroy.12@osu.edu.
I have read this form and I am aware that I am being asked to participate in a research study. By checking the box and clicking “Next” below, I voluntarily agree to participate in this study, and I am not giving up any legal rights.

To verify consent and confirm that you are over 18 years of age, please check the box and press continue. [CHECK BOX]

Consent. I agree to participate in this study as described in the above consent form.

[“Next” BUTTON TO CLICK TO START SURVEY]
Appendix D: Example of Avatar Reflection
Appendix E: General Demographic and Background Questionnaire

Please answer all of these questions to the best of your abilities by selecting your answer. It is important that you are as honest as possible, as this can affect the validity of our data.

1. Are you at least 18 years of age or older?
   Yes  No

2. Gender:
   Female  Male  Other: _____

3. Race/ Ethnicity:
   Caucasian  Black or American  Latino/ Asian  Native  Other:
   African  Indian or Latina  Hawaiian  ______
   America  Alaskan Native  or Pacific
   Islander

4. Rate your level of experience with virtual worlds (e.g., Second Life, World of Warcraft, WhyVille, etc.):
   None  Basic  Intermediate  Expert

5. How would you rate your knowledge of virtual reality (i.e. how it works)?
   None  Basic  Intermediate  Expert

6. Rate how often do you play video games (Please circle one):
   Never  Occasionally  Often  Regularly
   (one to three times a month)  (one to three times a week)  (four or more times a week)
Appendix F: Measures and Questionnaires

Rate the extent to which you agree with the following statements about how you felt while inside the virtual world. (1 = “strongly disagree”, 2 = “somewhat disagree”, 3 = “neither disagree nor agree”, 4 = “somewhat agree”, and 5 = “strongly agree”)

1. Discrimination against blacks is no longer a problem in the United States.
2. It is easy to understand the anger of black people in America.*
3. Blacks have more influence upon school desegregation plans than they ought to have.
4. Blacks are getting too demanding in their push for equal rights.
5. Blacks should not push themselves where they are not wanted.
6. Over the past few years, blacks have gotten more economically than they deserve.
7. Over the past few years, the government and news media have shown more respect to blacks than they deserve.

Note: *Indicates a reverse coded item.

Experience-Taking Measure

Rate the extent to which you agree or disagree with the following statements about how you felt while inside the virtual world.

(1 = “strongly disagree,” 2 = “disagree,” 3 = “somewhat disagree,” 4 = “neither agree nor disagree,” 5 = “somewhat agree,” 6 = “agree,” and 7 = “strongly agree”)

1. I felt like I could put myself in the shoes of the avatar in the virtual world.
2. I found myself thinking what the avatar in the virtual world was thinking.
3. I found myself feeling what the avatar in the virtual world was feeling.
4. I could empathize with the situation of the avatar in the virtual world.
5. I understood the events of the story as though I were the avatar in the virtual world.
6. I was not able to get inside the avatar’s head.

At key moments in the virtual world, I felt I knew what the avatar was going through.

Self-Presence Scale
These questions concern your experience in the virtual world and your evaluations of the avatar(s) you saw. Please read each question carefully and choose the answer that best reflects your feelings.

(1 = “very strongly,” 2 = “strongly,” 3 = “somewhat strongly,” 4 = “not very strongly,” and 5 = “not at all.”)

To what extent did you feel that…

1. If something happened to the avatar, it was happening to me.
2. The avatar’s body was my own body.
3. I was in the avatar’s body.
4. The avatar was an extension of me.
5. The avatar was me.

Spatial Presence Scale

These questions concern your experience in the virtual world and your evaluations of the avatar(s) you saw. Please read each question carefully and choose the answer that best reflects your feelings.

(1 = “very strongly,” 2 = “strongly,” 3 = “somewhat strongly,” 4 = “not very strongly,” and 5 = “not at all”)

To what extent did you feel that…

1. I felt like I was really inside the virtual environment.
2. I felt surrounded by the virtual environment.
3. I felt like I really visited the virtual environment.
4. The virtual environment seemed like the real world.
5. I felt like I could reach out and touch the objects in the environment.

Player-Avatar Interaction (PAX) Scale

Rate the extent to which you agree or disagree with the following statements concerning your avatar.

(1 = “strongly disagree,” 2 = “disagree,” 3 = “somewhat disagree,” 4 = “neither agree nor disagree,” 5 = “somewhat agree,” 6 = “agree,” and 7 = “strongly agree”)

Emotional Investment

1. This avatar is very special to me.
2. I don't really care about this avatar.*
3. I have no emotional connection to this avatar.*
4. I would be heartbroken if I lost this avatar.
5. I appreciate this avatar.
6. I love this avatar.

Anthropomorphic Autonomy
7. This avatar has its own thoughts and ideas.
8. This avatar has its own feelings.
9. This avatar is autonomous and acts on its own.
10. When I log out of the game, this avatar has its own life.

**Suspension of Disbelief**

11. I pay attention to errors or contradictions in this avatar's world.
12. It is important to check for inconsistencies in this avatar's game.
13. I concentrate on inconsistencies in this avatar's story and the game story.

**Sense of Control**

14. This avatar does what I want.
15. I control this avatar.

*Reverse Coded.

**Motivation to Control Prejudice Reactions**

Rate the extent to which you agree or disagree with the following statements:

(1 = “strongly disagree,” 2 = “disagree,” 3 = “somewhat disagree,” 4 = “neither agree nor disagree,” 5 = “somewhat agree,” 6 = “agree,” and 7 = “strongly agree”)

1. In today’s society it is important that one not be perceived as prejudiced in any manner.
2. I always express my thoughts and feelings, regardless of how controversial they might be.*
3. I get angry with myself when I have a thought or feeling that might be considered prejudiced.
4. If I were participating in a class discussion and a Black student expressed an opinion with which I disagreed, I would be hesitant to express my own viewpoint.
5. Going through life worrying about whether you might offend someone is just more trouble than its worth.*
6. It’s important to me that other people not think I’m prejudiced.
7. I feel it’s important to behave according to society’s standards.
8. I’m careful not to offend my friends, but I don’t worry about offending people I don’t know or don’t like.*
9. I think that it is important to speak one’s mind rather than to worry about offending someone.*
10. It’s never acceptable to express one’s prejudices.
11. I feel guilty when I have a negative thought or feeling about a Black person.
12. When speaking to a Black person, it’s important to me that he/she not think I’m prejudiced.
13. It bothers me a great deal when I think I’ve offended someone, so I’m always careful to consider other people’s feelings.
14. If I have a prejudiced thought or feeling, I keep it to myself.

15. I would never tell jokes that might offend others.

16. I’m not afraid to tell others what I think, even when I know they disagree with me.*

17. If someone who made me uncomfortable sat next to me on a bus, I would not hesitate to move to another seat.*

*Items are reverse coded.
### Appendix G: Correlations Matrix

Table 2

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Note. PAX = Player-Avatar Interaction; EI = Emotional Involvement, AA = Anthropomorphic Autonomy, SoD = Suspension of Disbelief, SoC = Sense of Control. AMP = Affective Misattribution Procedure. MRS = Modern Racism Scale. ETM = Experience-Taking Measure. MCPR = Motivation to Control Prejudice Reactions. \(^{PR}\) = Measures taken during Virtual Experience. \(^{PO}\) = Measures taken after Virtual Experience. \(*p < .05. \)**p < .01. \( ***p < .001.\)