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AVATAR IDENTIFICATION: HOW SIMILARITY IN
APPEARANCE INFLUENCES AGGRESSIVE RESPONSES

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AVATAR IDENTIFICATION: HOW SIMILARITY IN APPEARANCE INFLUENCES AGGRESSIVE RESPONSES

By

Ashley Organ

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ABSTRACT

AVATAR IDENTIFICATION: HOW SIMILARITY IN APPEARANCE INFLUENCES
AGGRESSIVE RESPONSES

By

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Researchers argue that identification with violent video game characters heightens

exposure's influence on aggression. Recently, scholars have argued that attributes of

gaming technology make character identification in video games stronger than in other

media. One notable attribute said to heighten character identification is the technology's

ability to increase perceived similarity, or player perceptions that they are similar to a

game character. Social Cognitive Theory suggests that individuals are more likely to

identify with and imitate behavior from others they see as similar to the self. This study

tested the proposition that avatar similarity can increase identification with characters in a

first person shooter video game, and that the resulting identification will increase

subsequent imitative behavior in the form of aggressive response. In an experiment,

avatar similarity in a FPS game was manipulated by customizing characters' facial

appearance to emulate/deviate from the players' appearance using face mapping and

morphing software. Identification and state aggression were measured after game play.

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On April 16, 2007, a massacre occurred on the Virginia Tech campus in Blacksburg, Virginia. The massacre took the lives of 32 people and injured many more, making it the deadliest school shooting in U.S. history. Violent acts such as this reflect the violent culture in which we live. For the past several years, the literature on violence has developed out of growing concern about the potential causes of such catastrophes. Many scholars, non-violent activists, and media watchdogs (e.g., National Coalition on Television Violence) claim that the media, specifically the violent video game industry, is much to blame for the rise in violence and aggressive behavior. Though not unchallenged (Aguilera & Mendiz, 2003; Sherry, 2001), the concerns over the medium's harmful effects may be warranted. Several studies have empirically confirmed that there exists a relationship between violent video game play and aggression (Bushman & Anderson, 2002; Gentile, Lynch, Linder & Walsh, 2004; Tamborini, Eastin, Skalski, Lachlan, Fediuk & Brady, 2004). Several meta-analysis, such as the 2004 piece by Anderson, note increases in aggressive behavior, cognition, affect, and physiological arousal as a result of violent video game play.

With the growing concern about the medium's aggressive effects, many scholars have been interested in how identification with violent video game characters relates to the influence play has on aggression. Previous research efforts have speculated on attributes of video games thought to heighten identification with violent video game characters, and the increased aggression expected to result (Anderson & Bushman, 2001; Sherry, 2001; Anderson, 2004; Eastin, Appiah, & Cicchirillo, 2007; Schneider, Lang, Shin & Bradley, 2004; Barlett, Harris & Baldassaro, 2007; Tamborini, 2004; Eastin &

Griffiths, 2006). Much of this research has focused on study of the first-person shooter video games.

Most scholars who study first-person shooter (FPS) video games suggest that the user perspective technology found in these games heightens identification with players' violent game characters by allowing the players to move through the violent video game world through the eyes of violent game characters (Schneider *et al.*, 2004; Barlett *et al.*, 2007; Tamborini, 2004; Eastin & Griffiths, 2006). Yet, user perspective technology may not be the only attribute of game technology that can heighten identification. One notable attribute that might heighten character identification is the game's ability to increase perceived similarity, or player perceptions that they are similar to a game character. This study tested the proposition that game technology capable of heightening avatar similarity can increase character identification. In the realm of violent FPS video games, character identification is ultimately expected to increase negative imitative behavior. To date, these effects have not been widely studied.

The logic underlying this study is based on beliefs that video game technology has recently added features to game play with the ability to heighten identification between video gamers and their avatars, ultimately increasing imitative behavior expected to result from playing the game. Game designers have acquired the capacities to create avatars which adeptly resemble the gamers that control them in both appearance and behavioral representation. More importantly, avatars can be made to resemble game players' appearance with nearly photographic realism (Bailenson & Blasccovich, 2004). New gaming technologies allow players to create their own avatars by matching various

physical features. Face mapping technologies grant even more realism by providing gamers with the ability to create avatars from digital pictures of their heads and faces.

Social Cognitive Theory (SCT) explains the process of identification and imitation of aggressive thought and behavior from game characters with which players' identify (Anderson & Bushman, 2002). Applied to video game play, SCT would suggest that through observational learning processes, players can directly learn aggressive responses from the violent characters with which they identify. Moreover, SCT reasons that individuals are more likely to identify with and imitate behaviors from others they see as similar to the self. If true, we might expect that avatar similarity should increase perceived character similarity and identification with the gamers' avatars.

Previous research speculates on attributes of avatars which increase perceived similarity with video game players. Some studies suggest that gamers more strongly identify with physical characteristics of video game characters such as sex and ethnicity (Eastin, 2006; Eastin *et al.*, 2007). Other research shows that individuals identify more strongly with facially similar others. In other words, facial similarity is suggested to heighten individuals' identification with others (Bailenson, Iyengar, Yee & Collins, 2007).

The present study attempted to extend the literature on technological game features thought to heighten identification by varying the similarity of player and character facial appearance through the customization of players' avatars. The proposed study will offer a new approach to testing the prediction that identification with the characters in violent video games increases aggressive reactions resulting from violent

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game play. More specifically, a more advanced understanding of how character similarity influences the identification process will be granted.

Identification and Aggression

Identification during game play is a process that can influence the way players experience and interpret the video game medium as well as the characters in the game (Cohen, 2001). The literature on identification is fraught with challenges stemming from conceptual confusion surrounding use of the construct in social science. However, in simple terms for use in the present study, identification with a fictional video game character can be thought of as the extent to which a person embodies the character by adopting some dissimilar aspects of the characters' identity (Hefner, Klimmt, & Vorderer, 2007). In this sense, to embody the character can be thought of as the extent to which the player feels almost as if s/he were actually the character. For example, during a battle or fight, players who normally do not think of themselves as powerful may feel as though they are more physically adept or courageous than they would feel outside of game play. In this sense, video games that enable avatars to resemble their game player's identity should allow for a more complete embodiment of game characters. An avatar that adeptly resembles its game player in physical appearance, for example, may allow the player to feel as though he or she is the avatar in physical form and is maneuvering the avatar's behaviors in the three-dimensional game world. When players look like their game characters, they can then make active decisions to perform aggressive behavior as an embodiment of their violent character.

Many scholars suggest that empathy is an important dimension of identification with media characters (Zillmann, 1994; Tamborini, 1996). Zillmann (1994) defines

empathy as "a response (a) to information about circumstances presumed to cause acute emotions in another individual and/or (b) to the bodily, facial, paralinguistic, and linguistic expression of emotional experiences by another individual and/or (c) to another individual's actions that are presumed to be precipitated by acute emotional experiences, this response being (d) associated with an appreciable increase in excitation and (e) construed by respondents as feeling with or feeling for another individual." In line with Zillmann's definition, empathic reactions to media characters are concordant reflexive or reflective emotional reactions in response to the witnessing of characters' emotional reactions. Tamborini (1996) suggests that empathy consists of many dimensions such as perspective-taking, emotional contagion, fictional involvement, and others. Consequently, the empathetic reactions a player may have with their game character may depend largely on their capabilities of these dimensions. In other words, a player may have stronger empathetic reactions with their game character, and ultimately stronger identification, if the player is able to adapt the perspective of another or become highly involved with a narrative or fictional piece. Players should be expected to empathize with their game characters when witnessing the emotional reactions of those characters (e.g., celebrating after completing a mission, distressing after being injured or killed), and may display concordant physical and emotional expressions to that of their avatar. For example, upon witnessing their avatar celebrating after completion of a difficult level in the game, players may similarly jump up and down in happiness.

Though most discussion is consistent with the notion that identification with violent video game characters can heighten aggressive effects (Anderson, 2004; Anderson & Bushman, 2001; Anderson & Bushman, 2002; Lindsay & Anderson, 2000),

there remains a considerable need for empirical research examining the influence of identification with violent video game characters on heightened aggression. Aggressive responses resulting from play are thought to be a direct consequence of the aggression displayed in violent video games. In research on violent media, aggression has been defined as behavior that has the intention of harming and is directed toward a target known to not want the behavior (Anderson & Bushman, 2002). In violent video games, players move characters with which they identify through the game world committing aggressive acts of virtual violence (e.g., striking another character, killing another character). In most cases players purposefully harm targets in the gaming world to advance their rank in the game.

SCT explains how video game players can learn aggressive responses from the violent characters with which they identify. SCT suggests that people identify more strongly with and are more likely to imitate behavior from characters that are seen as similar, and if these characters act aggressively, aggressive outcomes are likely to occur (Anderson & Bushman, 2002). Though research on identification with violent video game characters is sparse, this logic is consistent with research on other media use demonstrating that identification with violent characters can increase aggressive responses. The sizable body of research on film and televised violence shows a convincing relationship between exposure and increased levels of aggression (Anderson, 2001). Particularly relevant in this regard is research by Berkowitz and others showing the relevance of similarity cues to aggressive response. Though most of this research demonstrated that aggression aimed at a real life target was increased by the extent to which the real life target was similar to the target of violence in media portrayals

(Berkowitz, 1965; Berkowitz & Geen, 1966; 1967), a study by Rosekrans (1967) showed that the depicted similarity between a viewer and an aggressive model increased the likelihood of aggressive response, and that this effect remained regardless of the consequences associated with the observed violent behavior. Scholars of violent media effects use SCT to reason that this type of aggression can be attributed to identification between the television viewer and the violent television characters (Huesman, Moise-Titus, Podolski, & Eron, 2003; Bushman & Huesmann, 2006; Anderson & Bushman, 2002).

Much like the research on television violence suggests that identification with violent media characters can lead to aggression in viewers, it can be reasoned that video game players exhibit similar effects after play as a result of identification with violent video game characters. During game play, players are thought to make similarity judgments between themselves and the game characters. Upon an initial assumption about a similarity with a game character, the player is thought to make other inferences about similarity with the avatar, leading to greater identification with that character (Eastin *et al.*, 2007). Notably, attributes of technology afford new media, such as the video game medium, the ability to simulate, and therefore create, greater identification with characters.

Avatar Similarity and Identification

In the gaming world, an avatar is a digitally represented video game character that performs a player's executed behaviors in real time (Bailenson & Blasccovich, 2004). Today, game designers can create avatars which adeptly resemble the players that control the avatar in both appearance and behavioral representation. In fact, advanced gaming

technologies allow players to create avatars that match various physical features, allowing the avatars to resemble the game players' appearance (Bailenson & Blasccovich, 2004). The *Nintendo Wii* allows players to create a *"Mii"* avatar by choosing from similar body sizes, facial structures, hair colors, and other additional accessories such as sunglasses and hats. With even more realism, face mapping technologies give gamers the ability to construct avatars from digital pictures of their heads and faces. In this way, avatars can be used to establish perceived character similarity with gamers.

Based on the logic of SCT, gamers' perceived similarity with their characters should increase the players' identification with those avatars. Under this understanding, a player will more strongly identify with a video game character that is believed to look and behave in a manner similar to the player than with a character that is dissimilar in appearance and behavior (Bandura, 1992). Therefore, video game players who use the aforementioned technologies to enhance the perceived similarity of their game avatars should be expected to more strongly identify with and be more strongly influenced by those avatars during play.

Character identification in games has been shown to be strongly influenced by physical characteristics of video game characters such as sex and ethnicity (Eastin, 2006; Eastin *et al.*, 2007). Eastin (2006) found that females elicited more post game play aggression when their character was female and not male. These findings are consistent with previous SCT research showing that identification may be influenced by shared demographic characteristics such as sex and ethnicity (Appiah, 2001; Jose & Brewer, 1984; Bandura, 1986; Bandura, Ross & Ross, 1963). Eastin, Appiah & Cicchirillo (2007)

found an interaction between character and participant race on aggressive thoughts. The authors predicted that black participants would more strongly identify with black versus white game characters and white participants would not show a significant effect on avatar identification. It was also predicted that white participants would have more aggression after playing with black versus white game characters due to primed racial stereotypes; the authors predicted that black participants would not show this effect. However, their data did not demonstrate the predicted patterns of identification with the game characters expected to result from different combinations of participant and avatar race. Black players did not differ in post game play aggression between black and white characters. However, white game players displayed greater post game play aggression after playing with a black compared to a white character.

If physical characteristics such as sex and ethnicity can influence identification with video game characters, we might expect characteristics of facial similarity to have similar or even greater influence on identification. Facial similarity should not only provide cues of sex and ethnic similarity, but should go beyond this to provide other similarity cues. Though little is known about facial similarity in video games, research by Bailenson, Iyengar, Yee, and Collins (2007) shows the influence of facial similarity on perception and its potential to heighten identification with others. In research on political perception, Bailenson *et al.* morphed photographs of political candidates with photographs of potential voters to produce photographs of various faces. When the photographs were presented to the potential voters, the results suggested a strong preference for candidates high in facial similarity. In other words, voters showed a greater preference for the photographs of candidates who were morphed with their own

faces. The same results were found for both familiar and unfamiliar candidates. Additionally, after asking the participants to name one person whom the candidate resembled, only two out of the 36 participants detected their own face from the morphed photographs.

SCT logic explaining the influence of perceived similarity and empirical evidence from research by Bailenson *et al.* (2007) can be combined to reason that identification with video game characters should be enhanced by face mapping technology that allows players to construct avatars from digital pictures of their heads and faces. When used in violent FPS video games, identification with violent game characters produced by avatar similarity should result in heightened aggression. Based on the above logic, the following hypotheses were tested:

H1: Video game players assigned to conditions in which player and avatar facial similarity is higher will score higher on the state aggression scale than players in other conditions where player and avatar facial similarity is lower.

H2: Video game players assigned to conditions in which player and avatar facial similarity is higher will score higher on scales measuring identification with their avatar than players in other conditions where player and avatar facial similarity is lower.

H3: The effect of assignment to player/avatar facial similarity conditions on state aggression scale scores will be mediated by player scores on identification with their avatar.

Method

Overview

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Participants were randomly assigned to play *Tom Clancy's Rainbow Six Vegas 2* video game in one of three conditions designed to vary player/avatar facial similarity (low, medium, and high) with a video game character. After playing individually for 20 minutes, participants completed questionnaires measuring identification with their avatar and state aggression, along with several psychographic and demographic characteristics.

Participants

A sample of thirty undergraduate students (13 male and 17 female) in introductory communication classes from a large Midwestern university was recruited to participate in this study. Of these students, 27 were Caucasian and 3 were African American. The average age of the students was 19.13 (*SD* = 1.43). The students who chose to participate in this study received class credit for their involvement.

Procedure

Photographs of all participants were gathered prior to the study. In total, two photographs (one frontal picture of the face and one profile picture) were obtained for each of four people varying by sex (male/female) and race (black/white). These photographs were used to create versions of the game avatar (differing by sex and race) that vary player/avatar similarity according to the experimental conditions. In all conditions, only pictures showing neutral facial expressions were used to create versions of the game avatar; there were no pictures showing clear emotions (i.e., smiling to suggest happiness).

Upon arrival to the laboratory, participants trained with *Tom Clancy's Rainbow Six Vegas 2* until they were comfortable manipulating the game's controls; participants were not given longer than ten minutes to train. The training allowed participants to

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develop the necessary skills for game play, permitting them to focus on the content and responsibilities of the game (as suggested by Tamborini *et al.*, 2004). After the training was complete, participants were randomly assigned to play the video game individually for 20 minutes under one of the three experimental conditions. After the time had expired, participants completed questionnaires measuring identification with their avatar (Hefner *et al.*,2007; Cohen, 2001), state aggression (Farrar & Krcmar, 2006), psychoticism (Zillmann & Weaver, 1997), empathy (Tamborini, unpublished) and demographics. Participants were then debriefed and dismissed.

Stimulus Materials

The *Tom Clancy's Rainbow Six Vegas 2* game is the ninth video game in the Rainbow Six video game series. The game is the first-person shooter sequel to *Tom Clancy's Rainbow Six: Vegas* involving a counter-terrorist unit called Rainbow. Rainbow is run by its own intelligence service, with other intelligence contacts around the globe. All players performed the role of the lead soldier, Logan Keller, carrying out violent missions in an attempt to stop the brutality and terrorism in the city of Las Vegas. For each mission set in the Las Vegas Strip, only the lead soldier made up the unit, Team Rainbow. The main Team Rainbow mission involves battling terrorists who are holding the innocent people of Las Vegas hostage. The game is set in the present tense and the task force battle various terrorists, depending on the specific missions set forth for Team Rainbow.

The game allows players to customize their avatars as seen from a first-person shooter perspective. Players can alter their clothing, weapons, and facial structures. The game's *Xbox Live* face mapping technology also allows players to take digital pictures of

their faces and transpose those images on their avatars to create game character lookalikes. Visualizations of the avatar's face were able to be seen when ducking, hiding, and spying on enemies during play, allowing the shooting and violent acts to be viewed from a first-person perspective. Due to the difficulty of the game, all participants played the videogame in God mode and with unlimited ammo, making the players invulnerable to damage and death.

In the low player/avatar facial similarity condition, participants played the game with an avatar depicting an unknown person's head and face of a different sex and race. Therefore, when a white male participant who is randomly assigned to this condition arrived at the laboratory, he was assigned to use a previously created black female avatar. Avatars created in this condition used characters already provided with the game's software.

In the medium player/avatar facial similarity condition, participants played the game with an avatar depicting profile pictures (i.e. the head of the avatar) of the participant and a morphed face of the participant and an unknown person of the same sex and race. Morphed pictures were created using *Magic Morph* software. Therefore, when a white male participant who was randomly assigned to this condition arrived at the laboratory, he was assigned to use a previously created white male avatar depicting a morphed head shot that combined his face with that of an unknown white male.

FIGURE 1
MORPHED IMAGE IN MODERATE SIMILARITY CONDITION

*The pictures on the left and right seen above are of two participants in this study.
The picture between them represents the morphed head-shot of the two.

In the high player/avatar facial similarity condition, participants played the game

with an avatar depicting their own face. Thus, upon arrival to the laboratory, participants

assigned to this condition were given a previously created avatar featuring a head-shot

and profile pictures of their face and head on the character.

Measures

Identification. Identification with the game character was assessed using an eight-

item scale adapted from Hefner, Klimmt, and Vorderer (2007). Responses were measured

on a seven-point Likert-type scale ranging from "Strongly disagree" to "Strongly agree,"

with items such as "I forgot myself during the game," "I felt like I was the game

character," and "The goals of the character became my own goals." Cohen's ten item

scale (2001) was revised to apply to video games and also used to assess participant

identification. Responses were measured on a seven-item Likert scale ranging from

"Strongly disagree" to "Strongly agree," with items such as "While playing the game, I

forgot myself and was fully absorbed," and "While playing the game, I could feel the

emotions of Logan Keller."

State Aggression. Participants' state aggression was measured using a modified

version of the Buss and Perry (1992) trait scale developed by Farrar and Krcmar (2006).

The original scale by Buss and Perry measured four dimensions of state aggression: verbal aggression, physical aggression, anger, and hostility. Farrar and Krcmar's modified version measured the first two dimensions: state verbal aggression, and state physical aggression. In development of this scale, the authors first created two scenarios thought to prime high and low aggression. For the present study, only the high aggression scenario was used, as it produced the strongest effect in previous research. The measure asked participants to imagine that they have completed the survey and are leaving the study. The scenario continued with "…someone bumps into you, spilling your drink and the contents of your bag. They then begin to curse and step toward you aggressively." After given this scenario, participants completed the modified state aggression scale. The scale contains 11 items such as "If this person hit me, I'd hit back," "Given the provocation, I may hit this person," and "When this person annoyed me, I would tell them what I thought of them."

Control Measures. Several additional scales were included to provide control measures. These scales included measures of psychoticism, empathy, demographics (sex, ethnicity, age), and face recognition. Psychotocism was measured using Zillmann and Weaver's (1997) modified version of Eysenck psychoticism scale (Eysenck *et al.,* 1985). Participants answered "Yes" or "No" to 12 items such as "Would you like other people to be afraid of you," and reversed items such as "Is it better to follow society's rules than go your own way?" Empathy was measured using Tamborini's (unpublished) scale that includes four items measuring emotional contagion (e.g., "I cannot continue to feel okay if others around me are feeling depressed"), five items measuring perspective taking (e.g., "Before criticizing someone, I try to imagine how I would feel in their place"), seven

items measuring empathetic concern (e.g., "I am the type of person who is concerned when other people are unhappy"), five items measuring communicative responsiveness (e.g., "I am the type of person who can say the right thing at the right time"), and five items measuring fictional involvement (e.g., "I really get involved with the feelings and characters in a novel or film"). Sex, ethnicity and age were standard single items measures used to assess these demographic characteristics. Face recognition was a single item used to determine if the respondent recognized their face on the avatar in the game (coded not recognize = 2 and recognize = 1). All scales appear in Appendix A.

Results

Analysis began with an inspection of the measurement model to test the quality of the composite scales used in the study, and a report of related descriptive statistics. Following this, ANCOVA was used to test the first two hypotheses predicting that (H1) Higher avatar facial similarity conditions will result in higher scores on state aggression, and (H2) Higher avatar facial similarity conditions will result in higher scores on identification with the avatar. The failure to support H1 and H2 made moot testing of the third hypothesis predicting that (H3) the effect of avatar facial similarity conditions on state aggression will be mediated by identification.

Inspection of the measurement model began by conducting principle component factor analyses on all scale items for measures of identification, aggression and empathy. The results of factor analyses were used to determine the items included in composite scales for these measures by applying the following decision rule. In order to be included, an item must load above .6 on one of the factors and below .4 on all other factors. The factor loadings for all scales can be found in Appendix B.

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Measurement Model

Factor analysis on items used to measure empathy showed two factors could be extracted. Items three, nine and 22 met the decision rule for inclusion in the first factor which was labeled empathic caring. The second factor included items five, 10 and 15 and was labeled fictional involvement. Because of the nature of the dichotomous psychoticism scale, no items needed to be excluded from analysis.

Factor analysis on the state aggression measure revealed that two factors could be extracted. Based on the four components of the state aggression scale, measures of state verbal and physical aggression were computed. Items one and two met the criteria for inclusion in the first factor and were averaged to comprise a variable labeled state verbal aggression. Items three, five, six, seven, nine and 10 met the criteria for inclusion in the second factor. However, item three was excluded based on poor face validity. The other five items were averaged to comprise a variable labeled state physical aggression. Factor analysis on the combined items from both identification measures determined that two factors could be extracted. The first factor included items two through five, and seven and eight of the Hefner measure along with items one through three, and six and seven of the Cohen measure. These items were averaged in a composite scale labeled identification. Only one item met the criteria for inclusion in the second factor. Because of concern regarding the reliability of single item measures, it was excluded from analysis.

Descriptive Statistics

Table 1 shows descriptive statistics for key variables in this study. Measures of state physical aggression (α = .89) and state verbal aggression (α = .70) were fairly

reliable. From this table we notice the sample was generally low on state physical

aggression (*M*=3.37, *SD*=1.41) and relatively high on state verbal aggression (*M*=5.50,

SD=1.22). The sample tended to have a wide range from a minimum of 2 to7 on state

verbal aggression and 1 to 6 on state physical aggression. The identification measure was

very reliable (α = .96). Participant character identification was relatively moderate

(*M*=4.31, *SD*=1.45) with a range of 1.55 to 6.64. Measures of empathetic caring (α = .69)

and fictional involvement (α = .82) were moderate. The sample tended to be relatively

high on measures of empathetic caring (*M*=4.06, *SD*=0.68) and fictional involvement

(*M*=5.19, *SD*=1.19) with a minimum of 3.00 on empathetic caring and 2.67 on fictional

involvement. The sample showed little psychotic tendency (*M*=0.12, *SD*=0.09) with a

maximum of 0.33. Lastly, few people recognized their face in the game. Only 10% of the

sample or 3 of the 10 participants in the high participant/avatar similarity condition

recognized their face on their avatar in the game.

TABLE 1
Descriptive Statistics for Key Variables in Study

	Mean	SD	Minimum	Maximum
State verbal aggression	5.50	1.22	2.00	7.00
State physical aggression	3.37	1.41	1.00	6.00
Character identification	4.31	1.45	1.55	6.64
Empathic caring	4.06	0.68	3.00	5.67
Fictional involvement	5.19	1.19	2.67	7.00
Psychoticism	0.12	0.09	0.00	0.33
Face recognition*	0.10	0.31	0.00	1.00

*Coded as a dichotomous variable with 0 = did not recognize and 1 = did recognize.

Table 2 shows the associations among key variables in this study. From this table we notice a positive correlation of character identification with state verbal but not physical aggression. We also note that fictional involvement is not correlated with the similarity conditions. Notably, fictional involvement is not correlated with empathetic caring. Finally, we note that, though not significant, fictional involvement is negatively related to measures of aggression while empathetic caring is not negatively related to measures of aggression.

Table 2
<u>Zero-order Correlations among</u> Key Variables in Study

	1	2	3	4	5	6
1. Similarity condition	*1.00*					
2. State verbal aggression	.05	*1.00*				
3. State physical aggression	.21	.38*	*1.00*			
4. Character identification	-.08	.47**	.32	*1.00*		
5. Empathic caring	.16	.27	.15	.27	*1.00*	
6. Fictional involvement	.00	-.23	-.35	.11	.09	*1.00*

Note. Similarity condition was coded such that 1 = low, 2 = moderate, and 3 = high.
*indicates $p < .05$, two-tailed.

Hypothesis Testing

The first hypothesis predicted that participants assigned to conditions in which similarity was high would score higher on measures of state aggression. ANCOVA was conducted on both state aggression outcome variables controlling for identification, empathetic concern, fictional involvement, sex, ethnicity, age, psychoticism and face recognition. The results of ANCOVA did not reveal a significant main effect for participant/character similarity on measures of state physical aggression, $F(2, 27) = .73$,

p= .50, n^2= .07. Participants in the low similarity condition scored lower on state physical aggression (M= 2.84, SD= 1.72) in comparison to participants in the moderate condition (M= 3.70, SD= 1.32) and the high condition (M= 3.56, SD= 1.41). However, sex was found to have a significant effect on state physical aggression, $F(1, 28) = 4.90$, p<.05 , n^2= .21. Females scored significantly lower on measures of state physical aggression (M= 2.75, SD= .30) in comparison males (M= 4.17, SD= .34). The results of ANCOVA also failed to show a significant effect on the state verbal aggression measure, $F(2, 27) = .33$, p= .72, n^2= .03. Participants in the low similarity condition (M= 5.45, SD= 1.07) and moderate similarity condition (M= 5.45, SD= 1.67) scored lower on state aggression in comparison to participants in the high condition (M= 5.60, SD= .99). Thus, it can be concluded that the data was not consistent with the hypothesis. Notably, identification was found to have a significant effect on verbal aggression, $F(2, 27) = 5.30$, p<.05, n^2= .22. This is consistent with the results of descriptive analyses showing that identification had a significant positive correlation with verbal aggression.

The second hypothesis predicted that participants assigned to conditions in which similarity was high would score higher on measures of identification. An ANCOVA was conducted on the outcome variable controlling for empathetic concern, fictional involvement, sex, ethnicity, age, psychoticism and face recognition. Analysis did not reveal a significant main effect for participant/character similarity on identification $F(2, 27) = .30$, p= .74, $n^2 = .03$. Moreover, in contrast to predictions, participants in the low similarity condition scored higher (M= 4.55, SD= 1.53) on the measure of identification than participants in the moderate condition (M= 4.11, SD= 1.72) and the high condition (M= 4.27, SD= 1.17). Thus, it can be concluded that the data was not consistent with the

hypothesis. Based on the findings mentioned above, an analysis of mediation was not conducted on the third hypothesis which suggested a mediation of aggression scores with player/avatar similarity by identification scores.

Discussion

The hypothesis suggested that identification with game characters would mediate the effect predicted for similarity in physical appearance between game players and their game characters on heightened state aggressive responses. The results failed to support the hypothesized model. The first two hypotheses predicted that similarity between game players and game characters would heighten identification and that those with stronger identification would show stronger state aggression. These two hypotheses failed to be supported, and consequently, no hypothesized mediation was shown.

Although the proposed model was not supported in this study, there are some results worth mentioning. Specifically, identification had a notable effect on the outcome measure in this study. In this study, identification had a significant positive correlation with state verbal aggression, and approached significance with state physical aggression. Thus, although avatar similarity did not increase identification as expected, identification did predict increased aggression. In view of that, we are left to determine what aspects of game experience predict identification. In part, the answer to this question may depend on how identification is defined.

Also of interest in these findings is the fact that state verbal and physical aggression were unrelated to measures of empathetic caring and fictional involvement. Though not quite significant, empathetic caring was positively related to measures of aggression and fictional involvement was negatively related to measures of aggression. If

identification enhances aggression, this may suggest that identification has an association with state aggression that is distinct from some aspects of empathy.

Limitations and Future Research

The limitations to this study begin with the inherent qualities of the video game used during participants' play, *Tom Clancy's Rainbow Six Vegas: 2.* While the capability to use morphing technology to vary game character similarity allowed for an interesting test of the predicted model of similarity's influence on identification with game characters and subsequent aggressive outcomes, there were other procedural problems that occurred as a result of the use of the game that may have affected the results in this study. First, *Tom Clancy's Rainbow Six Vegas: 2* is a very difficult game for inexperienced users to play. As such, in an attempt to overcome game difficulty barriers for study participants, God mode was enabled, allowing for less difficult play. An unanticipated consequence of using God mode was that participants modified their game play to adjust to the low level of difficulty (e.g., playing less defensively). When playing the game on God mode, players had little need to engage in defensive positions such as hiding, ducking and taking cover. These positions would have allowed the players to see their own face on the screen. Without taking these defensive positions, players rarely saw their own images. Ultimately, this limited the study's ability to test the overall hypothesized model.

While the gaming environment in which the participants played was the biggest limitation to this study, there are other factors that might have contributed to the unreliability of this study's results. First, the number of participants used in this study was particularly low. Furthermore, although attempts were made to balance gender,

failure of participants to show up for scheduled appointments resulted in a situation where gender was not evenly distributed across similarity conditions. The low similarity condition included 7 females and 3 males, the moderate similarity condition included 6 females and 4 males and the high similarity condition included 4 females and 6 males. Although an attempt was made to control statistically for this imbalance, the likelihood that gender influenced the relationships of similarity condition with identification and aggression cannot be overlooked.

Conclusion

If the results of this study are a valid test of avatar and game player similarity and its influence on the manner in which violent game play influences aggressive responses in game players, the findings should be interpreted to suggest that avatar similarity does not increase identification and subsequent aggressive outcomes. In this study, identification did not predict aggressive outcomes, and similarity did not predict identification or aggression. At the same time, procedural issues leave open the possibility that this study did not provide a valid test of avatar similarity's influence on aggressive responses.

Future research should more closely consider features of the game environment which may hinder the ability to see the influence of avatar similarity on player identification with their game character. The game software and technology used to create character similarity should provide players with greater opportunity to see their similarity to the game character in order to better examine the influence of similarity on identification with their game characters. Future research should also consider additional game software and technology attributes which may lead to or contribute to identification

with video game characters.

Appendix A

State Aggression Measure

Image that after you are done completing the survey, you leave the building and someone bumps into you, spilling your drink and the contents of your bag. They then begin to curse and step toward you aggressively. Please respond to the following questions by writing the number next to each question that most closely co I neither agree nor disagree responds with your answer.

Disagree Strongly	Disagree Moderately	Disagree Slightly	Undecided	Agree Slightly	Agree Moderately	Agree Strongly
1	2	3	4	5	6	7

1. _____ I would tell this person openly that I disagreed with him.

2. _____ I would find myself disagreeing with this person.

3. _____ When this person annoyed me, I would tell them what I thought of them.

4. _____ This person would say I'm somewhat argumentative.

5. _____ I could not control my urge to strike this person.

6. _____ Given the provocation, I may hit this person.

7. _____ If this person hit me, I'd hit back.

8. _____ I'd get into a fight with this person a little more than the average person.

9. _____ If I had to resort to violence to protect my rights, I would.

10. ___ This person would have pushed me so far that we came to blows.

11. ___ I can think of no good reason for ever hitting this person.

Empathy Measure

Please respond to the following questions by writing the number next to each question that most closely corresponds with your answer.

Disagree Strongly	Disagree Moderately	Disagree Slightly	Undecided	Agree Slightly	Agree Moderately	Agree Strongly
1	2	3	4	5	6	7

1. ____ I cannot continue to feel okay if others around me are feeling depressed.

2. ____ Before criticizing someone, I try to imagine how I would feel in their place.

3. ____ I am the type of person who is concerned when other people are unhappy.

4. ____ I am the type of person who can say the right thing at the right time.

5. ____ I really get involved with the feelings and characters in a novel or film.

6. ____ I don't become upset just because a friend is acting upset.

7. ____ I sometimes try to understand my friends better by imaging things from their perspective.

8. ____ When I see someone being taken advantage of, I feel kind of protective toward them.

9. ____ Even though I often try to console someone who is feeling bad, I never seem to be able to say the right thing.

10. ___ When I am reading an interesting story or novel, I imagine how I would feel if the events were to happen to me.

11. ___ I become nervous if others around me seem nervous.

12. ___ I sometimes find it difficult to see things from another's perspective.

13. ___ I often have tender, concerned feelings for people less fortunate than myself.

14. ___ I usually respond appropriately to the feelings of others.

15. ___ After acting in a play or seeing a play or a movie, I have felt partly as though I were one of the characters.

16. ___ The people around me have a great influence on my moods.

17. ___ I try to look at everyone's side of a disagreement before I make a decision.

18. ___ I would describe myself as a pretty soft-hearted person.

19. ___ Others think of me as an empathetic person.

20. ___ When I watch a good movie, I can easily put myself I the place of the lead character.

21. ___ When I am upset, I usually try to put myself in his or her shoes for awhile.

22. ___ I sometimes don't feel very sorry for people when they are having problems.

23. ___ My friends come to me with their problems because I am a good listener.

24. ___ I become very involved when I watch a movie.

25. ___ Other people's misfortunes do not usually disturb me a great deal.

26. ___ I am often touched by the things that I see happen.

Scale Item Scoring ('R' indicates reverse scored-items): Emotional Contagion: 1, 6R, 11, 16; Perspective Taking: 2, 7, 12R, 17, 21; Empathetic Concern: 3, 8, 13, 18, 22R, 25R, 26; Communicative Response: 4, 9R, 14, 19, 23; Fictional Involvement: 5, 10, 15, 20, 24.

Identification Measure (1)

Please respond to the following questions by writing the number next to each question that most closely corresponds with your answer.

Disagree Strongly	Disagree Moderately	Disagree Slightly	Undecided	Agree Slightly	Agree Moderately	Agree Strongly
1	2	3	4	5	6	7

1. ____ While I was playing the game, I forgot everything around me.

2. ____ I had the feeling I was literally in the character's skin.

3. ____ I forgot myself because I was focusing so much on the game character's actions.

4. ____ I had the feeling I was the game character more so than myself.

5. ____ The game character's goals became my goals.

6. ____ While I was playing the game, the game world was more real to me than my "actual reality."

7. ____ I felt as if I was really participating in the shown/depicted happenings.

8. ____ I almost had the feeling of actually being the character.

Identification Measure (2)

Please respond to the following questions by writing the number next to each question that most closely corresponds with your answer.

Disagree Strongly	Disagree Moderately	Disagree Slightly	Undecided	Agree Slightly	Agree Moderately	Agree Strongly
1	2	3	4	5	6	7

1. _____ While I was playing the game, I felt as if I was part of the action.

2. _____ While playing the game, I forgot myself and was fully absorbed.

3. _____ I was able to understand the events in the game in a manner similar to that in which Logan Keller understood them.

4. _____ I think I have a good understanding of Logan Keller.

5. _____ I tend to understand the reasons why Logan Keller does what s/he does.

6. _____ During playing the game, I felt I could really get inside Logan Keller's head.

7. _____ At key moments in the game, I felt I knew exactly what Logan Keller was going through.

8. _____ While playing the game, I wanted Logan Keller to succeed in achieving his/her goals.

9. _____ While playing the game, I could feel the emotions of Logan Keller.

10. _____ When Logan Keller succeeded I felt joy, but when Logan Keller failed, I was sad.

Psychoticism Measure

Please respond to the following questions by circling the word next to each question that most closely corresponds with your answer.

1) Do you take much notice of what people think?..Yes No
2) Would being in debt worry you? ....Yes No
3) Would you take drugs which may have strange or dangerous effects? ....Yes No
4) Do you prefer to go your own way rather than act by the rules? ....Yes No
5) Do good manners and cleanliness matter much to you? ....Yes No
6) Do you think marriage is old-fashioned and should be done away with? ...Yes No
7) Do you enjoy co-operating with others? ....Yes No
8) Does it worry you if you know there are mistakes in your work? ....Yes No
9) Do you think people spend too much time safeguarding their future with savings and insurances? ....Yes No
10) Do you try not to be rude to people? ....Yes No
11) Would you like other people to be afraid of you? ....Yes No
12) Is it better to follow society's rules than go your own way? ....Yes No

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Scale Item Scoring: YES: 3, 4, 6, 9, 11; NO: 1, 2, 5, 7, 8, 10, 12

Appendix B

TABLE 3
STATE AGGRESSION COMPONENT MATRIX

	Component			
	1	2	3	4
State Aggression	.096	.754	.356	.247
State Aggression	.348	.635	.271	-.245
State Aggression	.666	.273	-.392	.392
State Aggression	.563	.420	-.491	-.100
State Aggression	.836	-.126	.195	-.149
State Aggression	.859	.042	.228	.075
State Aggression	.791	-.231	-.025	.341
State Aggression	.634	.057	-.109	-.680
State Aggression	.725	-.236	.265	.332
State Aggression	.735	-.358	.297	-.214
State Aggression	-.542	.114	.500	.009

TABLE 4
IDENTICATION COMPONENT MATRIX

	1	2	3	4
Identification(1) 1	.333	-.268	-.208	.797
Identification(1) 2	.782	-.166	-.234	-.253
Identification(1) 3	.883	-.131	-.011	.134
Identification(1) 4	.821	-.076	-.322	-.136
Identification(1) 5	.880	.141	.060	.192
Identification(1) 6	.824	.184	-.425	-.095
Identification(1) 7	.881	-.031	-.373	-.088
Identification(1) 8	.814	-.048	-.362	-.266
Identification(2) 1	.735	-.094	-.229	.253
Identification(2) 2	.880	-.022	-.008	.255
Identification(2) 3	.734	-.317	.234	-.067
Identification(2) 4	.698	-.375	.486	.029
Identification(2) 5	.703	-.278	.579	-.014
Identification(2) 6	.820	-.036	.391	-.201
Identification(2) 7	.813	-.201	.128	-.135
Identification(2) 8	.452	.743	.200	.249
Identification(2) 9	.751	.542	.062	-.129
Identification(2) 10	.586	.709	.245	.027

TABLE 5
EMPATHY COMPONENT MATRIX

	Component					
	1	2	3	4	5	6
Empathy	.059	.684	.470	-.034	.168	.044
Empathy	.507	.235	-.413	-.337	.081	.196
Empathy	.155	.742	-.140	-.476	.114	.046
Empathy	.018	.458	.285	-.256	-.595	.053
Empathy	-.050	.031	.740	-.419	.304	.087
Empathy	-.174	-.338	-.292	-.247	.545	-.302
Empathy	.927	-.128	-.093	-.101	-.004	-.038
Empathy	.884	-.095	-.020	.142	-.105	.011
Empathy	.492	-.746	.033	.278	.103	.075
Empathy	.850	-.174	.282	-.099	-.111	-.102
Empathy	.801	.015	-.035	.012	.026	-.051
Empathy	.620	-.366	-.065	.327	.253	.438
Empathy	.911	-.003	-.008	-.226	-.126	-.021
Empathy	.923	-.015	-.081	.002	-.030	.160
Empathy	.724	-.119	.445	-.269	-.125	-.200
Empathy	.878	-.190	.050	-.201	.056	-.077
Empathy	.846	.058	-.098	.130	-.113	-.363
Empathy	.632	.231	.158	.346	.390	.068
Empathy	.216	.610	.102	.613	-.058	.038
Empathy	-.039	-.009	.784	.325	.019	-.376
Empathy	.163	.570	-.382	.180	.452	-.054
Empathy	-.227	-.703	.305	-.328	-.055	.209
Empathy	.155	.575	-.101	.530	-.257	.125
Empathy	-.087	.204	.651	.194	.296	-.209
Empathy	-.183	-.519	.422	.395	-.033	.399
Empathy	.216	.530	.408	-.358	.169	.477

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