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Mass Communication and Society

ISSN: 1520-5436 (Print) 1532-7825 (Online) Journal homepage: http://www.tandfonline.com/loi/hmcs20

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To cite this article: Kirstie M. Farrar , Marina Krcmar & Rory P. McGloin (2013) The Perception of Human Appearance in Video Games: Toward an Understanding of the Effects of Player Perceptions of Game Features, Mass Communication and Society, 16:3, 299-324, DOI: 10.1080/15205436.2012.714440

To link to this article: https://doi.org/10.1080/15205436.2012.714440

Mass Communication and Society, 16:299–324, 2013

ISSN: 1520-5436 print/1532-7825 online
DOI: 10.1080/15205436.2012.714440

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The Perception of Human Appearance in Video Games: Toward an Understanding of the Effects of Player Perceptions of Game Features

Kirstie M. Farrar
Department of Communication Sciences
University of Connecticut

Marina Krcmar
Department of Communication
Wake Forest University

Rory P. McGloin
Department of Communication Sciences
University of Connecticut

Kirstie M. Farrar (Ph.D., University of California, Santa Barbara, 2001) is an Associate Professor in the Communication Department at the University of Connecticut. Her research interests include effects of violent video games and media effects on adolescent socialization.

Marina Krcmar (Ph.D., University of Wisconsin–Madison, 1995) is an Associate Professor at Wake Forest University and a visiting Associate Professor at Vriej Universitiet Amsterdam. Her research interests include children, adolescents, and the media as well as selective exposure to violent media.

Rory P. McGloin (Ph.D., University of Connecticut, 2011) is an Assistant Professor in residence in the Communication Department at the University of Connecticut. His research interests include the effects of motion capturing controllers on perceptions of realism and immersion along with the effects they have on enjoyment and aggression.

Correspondence should be addressed to Kirstie M. Farrar, Department of Communication Sciences, University of Connecticut, 850 Bolton Road, U-1085, Storrs, CT 06269-1085. E-mail: kirstie.farrar@gmail.com

In this posttest-only experimental design, participants played one of two versions of the video game *Quake* with either a human-looking target or a non-human-looking target. Dependent measures included perceived human appearance of the target, perceived violence in the game, immersive presence, physically and verbally aggressive intentions, and aggressive cognitions. Of specific interest was the relative effect of the manipulation compared to the effect of the players' *perceptions* (humanness of the target, experienced immersive presence) on aggressive outcomes. We utilize schema theory to argue that game perceptions, including those of the manipulation, and other perceptual variables partially mediate the relationship between game features and aggressive outcomes. First, we found that the manipulation was successful and less human-looking targets were perceived as less human. In addition, the more experience someone had playing violent games, the less violent they perceived the stimulus game to be. Second, men were more physically aggressive than women. Third, the manipulation of humanness had no direct effects on aggression. Last, the more human players perceived the aggressive targets to be, the more verbally aggressive they were and the more violent words they generated. Thus, perceptions of the manipulation were more important than the experimental manipulation itself in predicting outcomes.

INTRODUCTION

A growing body of research has found a link between violent video game play and increases in various aggressive outcomes (see Anderson, 2004; Anderson & Bushman, 2001; and Sherry, 2006, for meta-analyses). These include increases in aggressive cognitions (Anderson et al., 2004; Anderson & Dill, 2000; Tamborini et al., 2004); aggressive affect, (Anderson & Dill, 2000; Farrar, Krcmar, & Nowak, 2006); and aggressive and delinquent behavior, even after controlling for aggressive personality (Anderson & Dill, 2000). Much of the research just cited has been tested using the generalized aggression model (Anderson & Bushman, 2002), which provides an integrative framework designed to combine what the authors refer to as "existing mini-theories of aggression" (Anderson & Bushman, 2002, p. 32). Focusing on the affective, cognitive, and physiological aspects of aggression, the generalized aggression model emphasizes that the person in the episode is influenced by personological factors, environmental factors, and situational factors, among others. Thus, exposure to violent video games may offer one environmental causal factor in the subset of those leading to an aggressive outcome. However, more recent research has begun to explore the contextual features that may influence outcomes. For example, Carnagey and Anderson (2005) found that violent video games

that reward violent behaviors led to increases in hostile emotions, aggressive thinking, and aggressive behavior. Barlett, Harris, and Baldassaro (2007) discovered that playing a violent video game using a light gun as opposed to a traditional controller led to more aggressive outcomes. Williams (2011) found that playing a violent game with a character skinned to look like the player led to the greatest levels of hostility. Similarly, Eastin (2006) reported that a gender match between self and game character increased aggressive thoughts in female game players. Furthermore, work by Farrar and colleagues (2006) found that video game play that featured blood increased aggression, and other research has shown that games with greater graphical realism also increases some aggressive outcomes (Krcmar & Farrar, 2007). Thus, specific video game features can serve to heighten aggressive effects.

In considering these various game manipulations, however, an interesting pattern of results emerges. Effect sizes for these contextual features are somewhat small, ranging from an effect of .05 for the presence of blood in a game (vs. no blood) on aggression (Farrar et al., 2006) to .09 for the effect of reward in a video game on aggressive outcomes (Carnagey & Anderson, 2005). On the other hand, *perceptual* variables, such as experiencing presence while playing a video game, sometimes account for a larger proportion of variance in aggression and other outcomes relative to game manipulations. For example, Nowak, Krcmar, and Farrar (2008) found that the amount of violence that players *perceived* in a video game was positively linked to how much presence they felt in the game (.60), whereas the effect of the actual violence manipulation on presence was only half that. Furthermore, the effect of *experienced* presence in the game was positively linked to aggressive outcomes ranging from .09 for physical aggression to .27 for hostility, whereas effects for the experimental manipulation of violence on aggression were considerably smaller. Although there is some dispute concerning the effects of presence on behavioral outcomes (e.g., Tamborini et al., 2004), the argument that game *experiences* are relevant to outcomes is supported by research (e.g., Potter, Pashupati, Pekurny, Hoffman, & Davis, 2002). Therefore, it is important to explore both manipulations, because they are methodologically clean, and perceptions, because they are theoretically sensitive. Thus, in the present study, we utilize an experimental design in which we manipulate a contextual feature of a video game (human appearance of the target of aggression) while also considering the role of player *perceptions* of the target's human appearance. We do this by testing the effect of the manipulation *and* of the perceptual variables on game experiential (e.g., immersive presence, involvement) and aggressive outcomes. We utilize schema theory to argue that game perceptions, including those of the manipulation, and other

perceptual variables, mediate the relationship between game features and aggressive outcomes.

THEORETICAL OVERVIEW

Schema theory argues that knowledge is organized as an elaborate network of abstract mental structures, which represent one's understanding of the world. Specifically, a schema is a cognitive structure that includes knowledge about a concept, person, or event (Fiske & Taylor, 1991). Schemata are thought to perform four primary functions: guide attention and information storage so that information may be later retrieved, assist in the evaluation of new information in order to organize information at point of initial contact, serve an inference function by helping people fill in the gaps when there is incomplete information, and assist in problem solving by providing a template for other similar situations. Therefore, new conceptual domains need not be established for each piece of information. Schemata serve a deductive function. When information is incomplete, schemata are used in problem solving by applying existing similar schemas to new problems. Therefore, schemata can simultaneously guide incoming information and fill in the gaps of missing information while being malleable themselves to environmental cues (Shrum, Wyer, & O'Guinn, 1998). In the case of video game play, players may develop schema for violence, through exposure to aggression during play. In addition, particular schema may be activated or affected by the characteristics of specific games being played. This process of comparing and contrasting existing schema with game information, and game information with new incoming information from sources other than game play, is best described in the literature as the process of model matching (Boyan, 2009). These schemas or models can have important real-life consequences as potentially aggressive situations in the media or real life may activate those violent schema through the same process of matching.

Schema theory also places emphasis on the role of individual experiences as well as perceptions. The theory suggests that individuals are likely to have a general and abstract understanding of events, people, relationships, and anything they have encountered, including both real and mediated experiences. These experiences, which differ from person to person, act to generate different schema for individuals, thus resulting in different interpretations of information for different people and possibly, different resulting behavioral outcomes. Potter et al. (2002) went on to show that aspects of a violent portrayal (e.g., rewarded violence, graphical detail) may indeed differ from stimulus to stimulus, but a given stimulus is also

interpreted and judged quite differently from individual to individual based on their schema for violence. During video game play, then, several factors are worth noting. First, those who have more experience with violent video games are likely to have more elaborated video game schema. As a result, game cues (i.e., appearance of characters, violent actions) are likely to be interpreted through the lens of existing violent video game schema. Second, because schema are sensitive to the environment and are established through it, video game play is likely to help establish, alter, or reinforce schema, including person schema, event schema, and behavioral schema. Thus, schemata are relevant in our understanding of both interpretations or perceptions of video game violence and the outcome or effect of this violence.

For example, Potter and colleagues (2002) reiterated the importance of schema theory in their understanding of media violence when they suggested that interpretations or perceptions of violence account for more variance in aggressive outcomes than manipulations of aggressive depictions. In other words, they claimed that individuals' existing schema for violence can effect interpretations of violence, and in turn it is those interpretations, and not the stimulus itself, that influence outcomes. In this way, schemata play a vital role in the connection between media violence exposure and aggressive outcomes. Of course, previous media exposure may have helped generate the initial violence schema, but the schema then exist as an interpretive lens. Two key differences in schema regarding violence may come from experience with violent video games and gender. In terms of experience with violent games Harris (2000) found that those with more frequent exposure to violent media consider it less severe. Due to greater exposure to media violence, heavy video game players are likely to have more well-developed schemata for violence. These well-established schemata are likely to make new violent stimuli appear more familiar and more consistent with existing schema. In contrast, schema theory would suggest that light gamers would perceive a given violent video game as more violent because no or little match would exist between the game and their own schema regarding violent video games.

In terms of gender, Gunter (1985) found that women were likely to rate all kinds of violence (except cartoons) as less suitable for children, and Bartholow and Anderson (2002) found that young men were more aggressive after playing a violent video game than young women. Consider, too, that male adolescents play video games with greater frequency and duration than their female counterparts (Roberts, Foehr, & Rideout, 2005) and enjoy violent games more than females (Funk & Buchman, 1996). It stands to reason, then, that male individuals may have more elaborate and easily accessible violent schemata due to a combination of

factors including more frequent violent game play and greater enjoyment of those games.

Overall, then, schema theory offers an explanation for these findings because differences in life experience between various subgroups influence specific contents and structure of schemata, thus supporting a notion of individual differences in interpretation and effects of various stimuli.

As a result, we predict the following:

H1a: There will be an effect of overall frequency of violent video game play on game interpretations such that more frequent players, with more frequently activated schema, will perceive the violence as less severe than less frequent players.

H1b: There will be an effect of gender on game interpretations such that male players will perceive less violence in the video game than female players.

HUMAN APPEARANCE OF THE TARGET

In addition to these variables, schema theory would suggest that contextual features of game play might influence game perceptions (Nowak, Krcmar, & Farrar, 2008). Recall that in the present study, we manipulated the degree of humanness of the target. In a given game, a character's degree of "humanness" might vary based on a number of characteristics (e.g., physical movement, relative size, vocal quality, and/or graphical detail). Regardless of the particulars of those variables (e.g., physical movement) we argue that a character who "looks" and "acts" like a human will be perceived as more human than a character who "looks" and "acts" like a monster. Therefore,

H2: There will be an effect of condition on perceptions such that those playing against the more human looking target perceive that target as appearing more human.

Perceptions of the target of aggression are also likely to be affected by previous violent game play as well as by experimental condition. Repeated play is likely to affect not only perceptions of violence but also perceptions of the victim. For example, one well-documented phenomenon is that those who use violence in real life tend to perceive their victims as less than human (Moller & Deci, 2010). It stands to reason then that those who use violence more regularly, albeit in a video game, may have schema for violence that lead to similar outcomes. Unlike Konijn, Nije Bijvank, and Bushman (2007), who found that more experience with video game play was associated with more identification

with the *main character* or protaganist, we argue that more experience with violent video games will lead to perceptions of the *target* as less human.

Therefore, based on the preceding arguments, we expect the following:

H3a: There will be an effect of frequent violent video game play on perceptions of human appearance such that more frequent players will perceive the target as appearing less human.

On the other hand, the *more* human one perceives the target to be, the more violent they will perceive the game to be. That is, perceiving a target as more human is likely to go hand in hand with thinking of the violence as more severe. Players are likely to think of violence against more human characters as more violent than violence against a nonhuman. After all, Eastin (2006) found that real-life standards concerning aggression, such as prohibitions against aggression toward women, seem to also apply in gaming environments. It stands to reason, therefore, that aggression against less human targets, such as monsters, may be perceived as less violent, whereas violence against more human-looking targets in a video game would be perceived as more violent. Thus:

H3b: There will be a positive relationship between perceived human appearance of the target and perceived violence in the game.

PRESENCE AND HUMAN APPEARANCE OF THE TARGET

Schema theory may also help establish predictions regarding such perceptual experiences as presence. Although an extensive debate exists in the presence literature on the exact definition of the term, we argue here, in line with Lombard and Ditton (1997), that presence can be thought of as a suspension of awareness that an experience is mediated. Lombard and Ditton argued that presence is made up of six dimensions: social richness, realism, transportation, immersion, interactivity, and control and perceptions of the medium as a social actor.

In the present study, we focus only on immersive presence. Although it is clear that immersion doesn't always lead to overall presence, there is evidence that it is a necessary requirement for spatial presence (Tamborini & Skalski, 2006). For example, research on presence finds that those with a greater sense of presence may actually feel as if they are there in the game world, present in the action (Tamborini & Skalski, 2006), or experiencing it firsthand (Heeter, 1992; Kim & Biocca, 1997; Lombard & Ditton, 1997; Steuer, 1992). Researchers have concluded that several game features are capable of increasing feelings of presence such as realistic graphics and

sound (Tamborini & Skalski, 2006), increased technological advancement (Ivory & Kalyanaraman, 2007), or an increase in perceived controller naturalness (McGloin, Farrar, & Krcmar, 2011). Although not all of these game features influence each dimension of presence, we argue here that immersive presence is likely related to the manipulated game features of interest because human-looking characters allow for a suspension of disbelief necessary for feeling immersed or that one is present in the game.

There is also evidence that certain individual differences can increase feelings of presence. As mentioned, individuals with greater exposure to media violence are more likely to have well-established and elaborate violent schema (Shrum, Wyer, & O'Guinn, 1998). Exposure to media violence, whether in the form of film, television, or video games, is likely to help establish a violent schema, complete with those cues present in the initial stimulus. Weapons, blood, and fighting may all become part of the initial schema. With each repeated presentation, the schemata become strengthened, adding detail and becoming more accessible. After all, each exposure activates the schema, thus strengthening the neural connections between relevant nodes, and making the schema more accessible. In fact, very heavy users of a violent stimulus may have chronically accessible violent schema (Shrum, 2009). Once a given schema is more accessible, it seems likely that immersive presence would be easier to achieve because the match between the schema and the game happens more readily, simply because the relevant schema can be easily and quickly activated. In sum, playing violent games leads to not only more detailed schema but also schema that are more readily and easily activated. This brief reaction time allows the player to become immersed in the game without the need for too much conscious processing (Shrum, 2009). Thus, participants are more likely to experience greater immersive presence in a violent video game due to their more developed schema, a greater match between that schema and the violent game and less need to devote processing capacity to game interpretation. Thus:

H4: Those who play violent games more frequently will report experiencing greater immersive presence when playing the violent game.

In addition to individual difference variables, both the experimental manipulation and the *perceptions* of target human appearance are likely to influence presence. For example, research surrounding the types of controllers used in video games has found a strong relationship between more natural controllers and increases in reported presence (McGloin et al., 2011). In addition, a study by Barlett and colleagues (2007) found that using a controller that resembled a gun resulted in greater aggression than using a standard controller. Although the study by Barlett and colleagues does not address presence, per se,

perhaps the greater realism and involvement resulting from the gunlike controller mediated aggressive responses. Thus, game features may influence feelings of being in the game. To the extent that the game features human characters, players may feel more immersed due to a greater sense of realism. For similar reasons, their *perception* that the target is more human is likely to be positively related to feelings of immersive presence. Therefore, we predict:

H5a: There will be an effect of the humanness manipulation on immersive presence such that those playing against a more human-looking target will experience greater feelings of immersive presence.

H5b: There will be an effect of *perceived* human appearance of the target on immersive presence such that those who *perceive* the target as more human will experience greater feelings of immersive presence.

EXPLORING AGGRESSIVE OUTCOMES

In terms of violent game exposure, there are two ways in which schema theory would suggest that aggression might result. Initially, exposure to media violence, whether in the form of film, television, or video game violence, is likely to help establish a violent schema, complete with those cues present in the initial stimulus. Weapons, blood, fighting may all become part of the initial schema. With each repeated presentation, the schemata become strengthened, adding detail and becoming more accessible. After all, each exposure activates the schema, thus strengthening the neural connections between relevant nodes, and making the schema more accessible. In fact, very heavy users of a given stimulus (e.g., violence) may have chronically accessible violent schema (Shrum, 2009). Once a given schema is more accessible, it seems likely that immersion into the video game play experience also becomes more likely simply due to the ease with which the schema can be activated and utilized. Thus, frequent violent game players are more likely to experience greater presence in a violent video game due to their more developed schema, and presence has also been linked with aggression in previous research (Nowak et al., 2008). As a result, those who consume violent media are likely to be more aggressive overall because they are more likely to draw on aggressive schema (Shrum et al., 1998) and to experience more presence. In fact, meta-analytic findings support a link between long-term video game play and increases in both physical and verbal aggression (Sherry, 2006). Therefore,

H6a: There will be a positive effect of long-term violent video game play on verbally aggressive intentions.

H6b: There will be a positive effect of long-term violent video game play on physically aggressive intentions.

However, there is reason to believe that a different theoretical mechanism may be at work for cognitive aggression (e.g., aggressive thoughts indicated by responding to a word completion task with more aggressive words). Specifically, Krcmar and Lachlan (2009) found that length of game play (e.g., 5 minutes vs. 20 minutes) affected aggressive outcomes with aggression peaking after 10 minutes of game play. However, this finding held true for only verbal and physical aggression and not for cognitive aggression. The authors argued that cognitive aggression results from priming, a process that is quick and less than conscious. Thus, it stands to reason that exposure to violent video games would also be related to increases in aggressive cognitions but that the process would occur due to priming, not due to the more interpretive processes elaborated in schema theory. Furthermore, repeated game play over time would result not only in short-term cognitive outcomes but in more chronically activated schema. Thus, playing frequently over time would result in general cognitive aggression as well. Therefore, we predict the following:

H7: There will be a positive effect of overall exposure to violent video games on cognitive aggression.

However, these direct links between long-term violent game play and aggression are not likely to be mirrored in single-exposure designs. Instead, in the short term, interpretations and perceptions may come into play. Variations in the violent depiction (e.g., whether the violent game is more or less technologically advanced) are likely to affect player experiences of the game (Ivory & Kalyanaraman, 2007). These in turn are likely to influence aggressive outcomes (Nowak et al., 2008). In other words, schema theory would suggest that because games can differ in their contextual features and because there are individual differences in schema that may result (Potter et al., 2002), the effect of game features, in this case the human appearance of the target, would be mediated by perceptions of the target as human. Specifically, there is reason to believe that aggression against another whom is perceived to be more alien than human (i.e., perceived as less human) may encourage aggressive outcomes. Baron (1971) found that humans are generally more willing to aggress against targets that look less like them than targets that phenotypically resemble them. Although this finding refers to aggression against that target, additional research finds that perceptions of targets in a game can influence aggression after game play. For example, Eastin (2006) found that female

players were more aggressive after game play across three different studies when they had played against male opponents inside the video game. Eastin suggested that social norms prohibiting aggression against female individuals may be salient even in a video game. Thus, because nonhuman targets are less realistic and less likely to be associated with social sanctions regarding aggression toward them, it is possible that the game manipulation showing less human *targets* may result in greater aggression. Note that although Konijn and colleagues (2007) found that realistic characters increased aggression, this occurred for more realistic player characters, not for their targets. Therefore,

H8a: There will be a negative relationship between perceived human appearance of the target and verbally aggressive intentions.
H8b: There will be a negative relationship between perceived human appearance of the target and physically aggressive intentions.

However, as argued earlier, the process of priming is both faster and less conscious than those processes at work according to schema theory. Thus, although the hypotheses regarding verbal and physical aggression may apply to the game characteristics through schema theory, some deliberation is likely to occur. That is, violent schemata are activated; however, the less human looking the target appears, the more aggressive participants may be because they have fewer inhibitions against aggression toward nonhumans. On the other hand, the results for cognitive aggression are likely to be different. Instead, the greater realism of a human target would prime more cognitive aggression in the same way that early research on the effects of television violence has shown that the more realistic the violent presentation, the more likely aggressive outcomes are to occur (Geen, 1975; Geen & Rakosky, 1973). Whereas schema theory would suggest a slower, more conscious processing, where there are prohibitions against aggression toward human targets, priming would predict a positive relationship. After all, aggressive cognitive networks are likely to include human beings to a greater extent than they are to include aliens simply because the latter are not encountered. Therefore, from a priming perspective, a human appearing target would simply activate aggressive thoughts and cognitions.

H9: There will be a positive relationship between perceived human appearance of the target and cognitive aggression.

Finally, our arguments regarding the importance of interpretations suggest that increased presence would result in greater aggression. In fact, this suggestion is consistent with schema theory. More elaborate aggressive

schemata are likely to result when players experience greater presence and are more involved in a violent game. In addition, research has found a link between playing violent games, presence, and aggressive outcomes (Nowak et al., 2008). Thus, in concluding our arguments regarding schema theory, the role of interpretations in *establishing* and *enhancing* aggressive schema and the importance of these schemata in encouraging aggressive outcomes leads us to predict:

H10a: There will be a positive influence of experienced immersive presence on verbally aggressive outcomes.
H10b: There will be a positive influence of experienced immersive presence on physically aggressive outcomes.

METHOD

Design

In this posttest-only experimental design, participants were randomly assigned to one of two conditions: most human-looking and least human-looking opponents. Dependent measures included perceived human appearance of the target, perceived violence in the game, immersive presence, physically and verbally aggressive intentions, and aggressive cognitions.

Participants

A total of 148 participants were recruited from communication courses at a large northeastern university. Participants' mean age was 19.1 ($SD = 1.26$) and most were male (56.1%).

Procedure

After random assignment, participants received game play instructions, and then played a 15-minute practice session. Next, participants completed demographic and game play experience measures (time spent playing games and genre preferences). Participants then played the game for 20 minutes and afterward completed the instrument. Participants played in an individual cubical wearing headphones, which prevented them from seeing or hearing other participants. Each cubical contained a 15-inch Panasonic color television, a PlayStation 2 gaming unit, one PlayStation 2 controller, and a controller layout guide. Although a 15-inch monitor may not provide an ideal environment for immersive presence, previous research from this lab has found effects on presence utilizing this screen size (Nowak et al., 2008).

Following all experimental activities, participants were debriefed, instructed not to discuss the study with their classmates, and thanked for their time.

Materials and Stimulus

The violent stimulus game used for this study was *Quake 3 Revolution*. The opponents in *Quake 3 Revolution* vary in realism and human appearance (from very human-looking soldiers to completely unhuman-looking floating eyeballs). Furthermore, *Quake 3 Revolution* allowed us to easily manipulate the presence of different opponents in the virtual environment. *Quake 3 Revolution* is a first-person shooter that features a death-match mode. The goal in death-match mode is to destroy all of your enemies using the weapons you find in the gaming arena in the allotted amount of time given.

To determine which characters would be used, a pretest was conducted where participants (different from those used in the primary experiment; $N = 49$) rated pictures of every game character on their realism and "humanness." A color slideshow of pictures was presented and participants were instructed to evaluate the pictures using a seven-item scale ($M = 3.48$, $SD = 1.45$, $\alpha = .88$), which included items such as "this character looks very human/not at all human" and "this character has very human features." The order in which characters were presented during the slideshow was counterbalanced across two separate data collection sessions to avoid order effects. Based on the results from the pretest, characters with the highest ($M = 4.76$, $SD = 1.45$) and lowest ($M = 1.28$, $SD = .53$) scores were used in the high and low human appearance condition. These two conditions were rated significantly different from one another in terms of human appearance, $t(48) = 16.79$, $p < .01$.

Each of the manipulated conditions took place in the same physical arena in the game, and the difficulty level was set at medium for both conditions. The death-match arena is capable of holding five opponent "bots" or targets, along with the one game player. For each condition the opponent that was selected to represent that condition (e.g., "most" human) was entered so that each of the five opponent targets was the exact same character. As the game is a first-person shooter, the character being played by the participant was at no point visible or recognizable to the participant, as the only visible feature of the player was the weapon they were holding which was consistent across conditions.

Measures

Previous experience with Quake. Of our sample, 5% reported that they had played *Quake 3 Revolution* before, and 14.6% had previously played at least one of the *Quake* franchise games.

Violent game play. Participants responded to questions assessing how often, from 1 (*never*) to 7 (*frequently*), they played each of eight genres of video games. First-person shooter games, other shooters, action games, role-playing games, and fighting games were averaged in a single index of frequency of violent video game play ($\alpha = .77$, $M = 2.15$, $SD = 1.11$). Although these genres do not capture every single violent video game one could play, these are genres that are overwhelmingly violent as demonstrated by content ratings. In addition, this measure has been proven both reliable and predictive of aggression in similar research (e.g., Nowak et al., 2008).

Aggressive cognitions. Accessibility of aggressive cognitions was assessed using a measure of aggressive cognition developed by Bushman (1998). This measure includes 50 incomplete words, and participants are asked to fill in letters—as quickly as they can, in a 2-minute time frame. For example, ki_ _ can be completed as *kiss*, *kick*, or *kill*. Participants with more readily accessible aggressive cognitions are expected to complete the words with more aggressive terms.

A research assistant characterized each response as either violent (e.g., "kill, kick") or nonviolent (e.g., "kiss"). A second coder evaluated another random set of responses equal to approximately 10% of the completed instruments. The observed unweighted Kappa reliability was .87.

State aggressiveness. Aggressiveness was measured by using a modified version of the Buss–Perry aggression questionnaire (Buss & Perry, 1992). This scale, which was originally designed to measure stable, trait aggression, has since been reformulated to measure state aggression (Farrar & Krcmar, 2006). The construct of state aggressiveness corresponds to the well-known construct of behavioral intention in the attitude literature (Ajzen & Fishbein, 1980). Before responding to these items, participants are instructed: "Imagine that you leave this building when you're done completing this survey. Someone bumps into you, spilling your drink and the contents of your backpack." They are then asked to indicate their response to each potential reaction by circling a number from 0 (*extremely uncharacteristic of me*) to 6 (*extremely characteristic of me*). This reworded version of the Buss–Perry aggression scale was tested in a previous study and was found to be both valid and reliable (see Farrar & Krcmar, 2006). Two dimensions of the aggression scale were used: physically aggressive intentions, which had six items such as "I wouldn't be able to control my urge to strike this person" ($\alpha = .87$, $M = 1.99$, $SD = 1.34$) and verbally aggressive intentions, which had six items such as "I would tell this person openly that I disagree with him or her" ($\alpha = .89$, $M = 2.32$, $SD = 1.31$).

Presence. A modified version of Lombard and Ditton's (1997) scale was used to measure feelings of immersive presence in this study. Participants were asked to indicate their responses on a 7-point scale, with each item having a unique response set such as "*always* to *never*" or "*not well* to *very well*." A principal components factor analysis was used to identify underlying factors. A two-factor solution was identified using a Varimax rotation with the first factor explaining 45% of the variance and the second factor explaining 15% of the variance. Items with less than .60 primary factor loading scores, or that had secondary loading scores of .40 or greater, were eliminated from the analysis. Eventually, a single factor solution was identified that retained the theoretical underpinnings of the concept. This final factor could be more specifically labeled as immersion and is used in the model analysis ($\alpha = .83$, $M = 2.76$, $SD = 1.13$). This factor included the following items: "How involving was this video game?" "How intense was this video game?" "To what extent did you feel like you were inside the video game you played?" "To what extent did you feel immersed in the video game you played?" "How much did you feel like the events you saw/heard in the game were happening to you?"

Perceived human appearance of the aggressive target. A seven-item scale assessed the player's perceptions of how human looking the opponent was in the gaming environment. This was the same scale used in the previously mentioned pretest. The three most reliable items were retained for analysis. The three statements were as follows: "The opponents in the game I just played looked: not at all human – very human"; "The opponents in the game I just played had human features: not at all – very much"; "The opponents in the game I just played had human-like expressions: not at all very much." This scale proved to be a reliable measure ($\alpha = .85$; $M = 2.27$, $SD = .98$).

Perceived level of violence in the game. A three-item scale was used to assess this variable. Participants responded to statements (e.g., "The video game I just played: had no violent content – had very violent content") on a 7-point scale ($\alpha = .89$; $M = 6.16$, $SD = 1.06$).

RESULTS

Manipulation Check

An independent samples t test returned a significant difference between the participant's perceptions of human appearance in the two conditions,

$t(146) = -3.97$, $p < .01$. Participants in the high human appearance condition did perceive the targets as more human ($M = 2.48$, $SD = 1.05$) compared to those in the low human appearance condition ($M = 1.83$, $SD = .66$). Thus, our manipulation of target human appearance was successful, and H2 was supported.

Test of the Causal Model

A path analysis was conducted to examine the causal effects as hypothesized among the aforementioned variables. The three exogenous variables in the predicted model were the biological sex of participants (male participants were coded as 1 and female participants as 2) as well as the frequency of violent game play and the experimental condition. The low human appearance experimental condition was coded as 1, and the high human appearance experimental condition was coded as 2. Prior to analysis, two missing data points were replaced with the mean for that scale, which did not influence effect sizes.

The proposed model in Figure 1 predicts three different types of direct effects. First, there should be an effect of the exogenous variables on

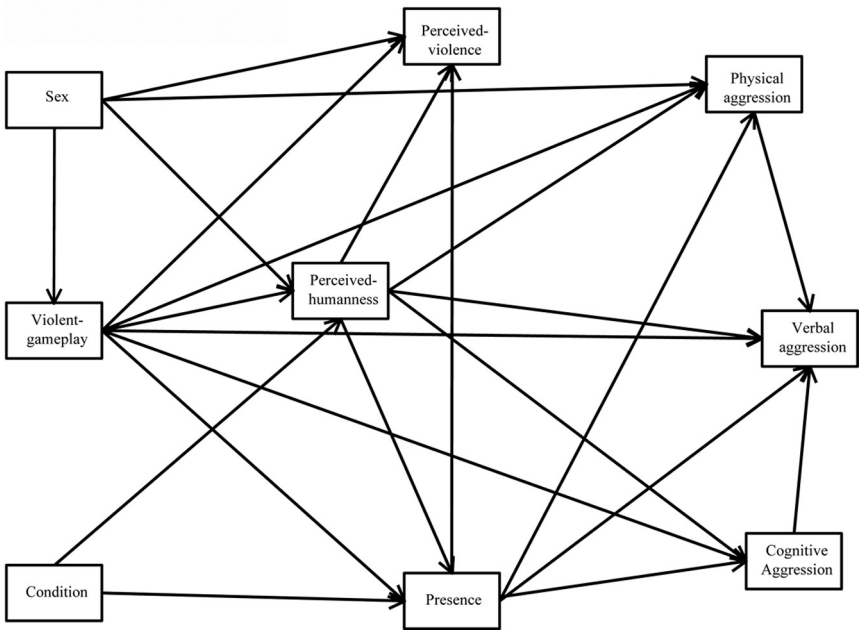

FIGURE 1 Hypothesized model.

perceptions of the game (perceived level of violence, perceived human appearance of the aggressive target, and immersive presence experienced). Second, there should be an effect of the exogenous variables on the aggression outcome variables (violent cognitions, verbal and physically aggressive intentions). Finally, the perception variables should affect the aggression outcome variables. The specified model (see Figure 2) was a good fit (RMSEA = .000), $\chi^2(12) = 7.245$, $p = .826$ (comparative fit index = 1.000). The experimental manipulation of human appearance was effective as indicated by both the t test just mentioned and in the model by the path from condition to perceived human appearance ($b = .31$, $p < .01$).

Our first hypothesis, that participants who play violent video games more frequently would perceive the violence in the game as less severe, was supported in the model. The primary determinant of perceived violence within the game was experience with violent game play ($b = -.18$, $p < .05$). The more experience participants had playing violent video games, the less violence they perceived in this game. H3a proposed that more frequent players of violent games would perceive the targets of aggression as less human. There was a direct path in the predicted direction from violent game play

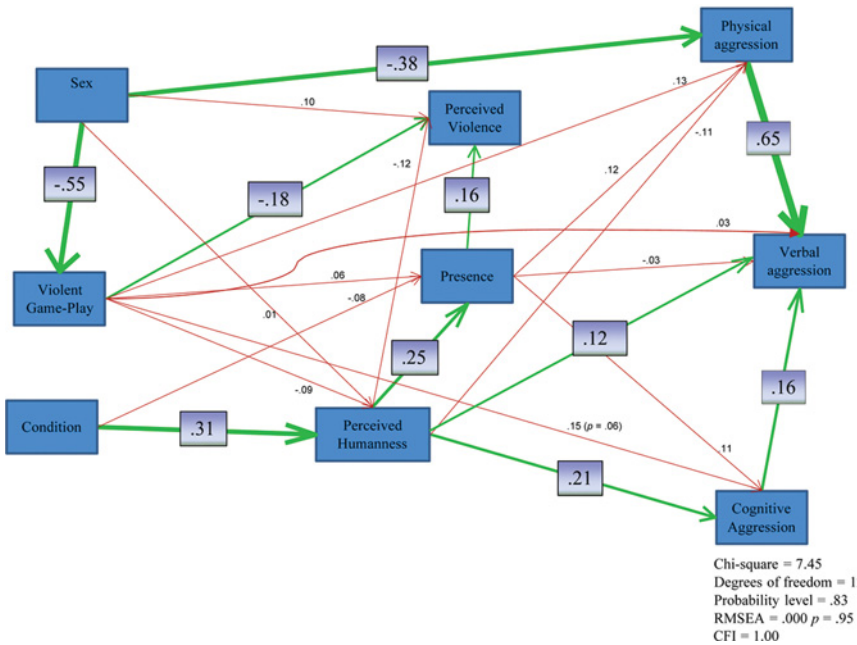

FIGURE 2 Tested model with path coefficients (Lines with boxed coefficients = $p < .05$). (Color figure available online.)

to perceived human appearance, and this path was retained in the model; however, it was not significant ($b = -.093$).

H3b dealt with the relationship between perceived human appearance of the aggressive target and perceptions of the level of violence in the game. The direct path from perceived human appearance to perceived violence ($b = .12$) was not significant. H4 predicted that those who play violent video games more frequently would experience greater feelings of immersive presence. In the model, the path was in the hypothesized direction but was not significant ($b = .06$). The next two hypotheses dealt with the human appearance of the target of aggression and its impact on feelings of immersive presence. H5a predicted that there would be an effect of experimental condition on immersive presence such that those playing against the more human target would experience greater feelings of immersive presence. This hypothesis was not supported ($b = -.08$). However, H5b predicted that the player's perceptions of the human appearance of the target would impact their feelings of immersive presence such that those who perceived the targets as more human would experience greater immersive presence. This hypothesis was supported by the data ($b = .25$, $p < .01$). Overall, the model explained 12% of the variance in the presence variable.

Our next three hypotheses examined the relationship between long-term violent video game play and our measures of aggression. We predicted a positive relationship between long-term violent game play and verbally aggressive intentions, physically aggressive intentions, and cognitive aggression. No significant relationship was found between experience playing violent video games and verbally aggressive intentions ($b = .03$) or physically aggressive intentions ($b = .13$) although these relationships were both in the predicted direction. The relationship between long-term violent game play and aggressive cognitions was also not significant but was again in the predicted direction ($b = .15$, $p = .06$).

Next, we examined the relationship between perceptions of the human appearance of the target and our measures of aggression. First, H8a predicted a negative relationship between perceived human appearance and verbally aggressive intentions. There was a direct relationship between these two variables; however, it was in the opposite direction as predicted ($b = .13$, $p < .05$). The more human players perceived the target to be, the more verbally aggressive they were after play. Next, we predicted a negative relationship between perceived human appearance and physically aggressive intentions. This was not supported. H9 predicted a negative relationship between perceived human appearance and cognitive aggression. Similar to verbally aggressive intentions, this path was significant but in the opposite direction of our prediction ($b = .21$, $p < .05$). The more human the aggressive target was perceived to be, the more aggressive thoughts they generated after

game play. Thus, when differences did exist, more human targets generated more aggression, not less, as we predicted. Overall, the model explained 24% of the variance in physically aggressive intentions, 47% of the variance in verbally aggressive intentions, and 8% in cognitive aggression.

Finally, to test H10a and H10b, we examined the effect of immersive presence on physically and verbally aggressive intentions. There were no significant paths from immersive presence to physically aggressive intentions ($b = .12$), verbally aggressive intentions ($b = -.04$), or aggressive cognitions ($b = .12$).

Some other paths in the specified model were implied by our literature review and are worth discussing. The path from sex to violent game play was significant ($b = -.55$, $p < .01$), indicating that men have more experience playing violent video games than the women in this sample. The only significant indicator of physically aggressive intentions as indicated by a direct causal effect was gender ($b = -.38$, $p < .01$). However, sex was not significantly related to perceived human appearance ($b = .01$) or to perceptions of the amount of violence in the game ($b = .11$).

Deleted paths in the specified model were tested and none of them were found to be significant at the $p < .05$ levels. Figure 3 displays the trimmed version of the specified model showing only significant paths. A test of this

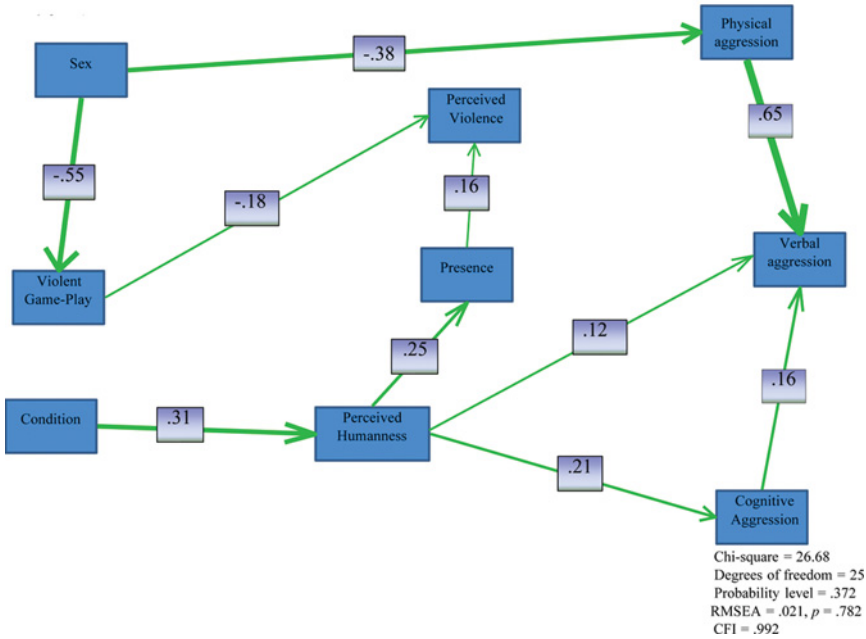

FIGURE 3 Significant paths only ($p < .05$). (Color figure available online.)

model returns a good fit with the data (root mean square error = .021), $\chi^2(25) = 26.686$, $p = .372$, comparative fit index = .992; however, this trimmed model does not have as good of fit with the data as the specified model although it does provide a parsimonious look at the significant paths.

Of note, the path from perceived human appearance to physically aggressive intentions is significant in the specified model ($p = .049$) but not significant in the trimmed model. The path from perceived human appearance to verbally aggressive intentions is approaching significance ($p = .062$) and was included in the trimmed model as it helps explain the theoretical process.

DISCUSSION

Summary

In sum, the proposed model fit the data fairly well. Although not all of the proposed paths were significant, we discuss them here because, taken as a whole, the proposed model was a good fit for the data. Specifically, our proposed model predicted three types of direct effects. First, we predicted that our exogenous variables (gender, experimental condition, and experience with violent games) would affect player perceptions of the game (perceived level of violence, perceived human appearance of the target, and immersive presence). We found that the more experience someone had playing violent games, the less violent he or she perceived the stimulus game to be. In addition, participants assigned to the more "human" experimental condition did perceive the targets of aggression to be more human in appearance than subjects in the less "human" experimental condition.

Next, we predicted effects of the exogenous variables on the aggression outcome variables. These are the more traditional types of effects examined in much of video game research. The only significant predictor of physically aggressive intentions as indicated by direct causal effects was sex. Men were more physically aggressive than women. In terms of verbal and cognitive aggression, none of the three exogenous variables were significant predictors.

The third set of predictions hypothesized that perceptual variables would have effects on the aggression outcome variables. Here, we hoped to tease out the role of individual differences in interpretations of violent media in resultant aggressive outcomes. Although the experimental manipulation of human appearance of the targets did not impact aggression as just mentioned, participants' subjective perceptions of the human appearance of the aggressive targets did play an important role in aggressive outcomes, however, not in the direction predicted. Perceived human appearance of the aggressive targets was directly related to both verbally aggressive

intentions and violent cognitions. The more human players perceived the aggressive targets to be, the more verbally aggressive they were and the more violent words they generated. Although we predicted that less human targets would result in more aggression, players seemed to be more aggressive after perceiving more human targets.

Our perceptual variables were linked to each other in some interesting ways that bear mentioning here as well. The more "human" participants perceived the targets to be, the more presence they felt while playing the game.

The Importance of Perception

Our results speak to the importance of acknowledging individual perceptions in interpretations of media violence. Whereas a clean experimental manipulation can and does test for causal relationships between variables, perceptions can be measured with more sensitivity. This sensitivity allows us to make more detailed and nuanced theoretical arguments about how a variable, in this case, human appearance of the target, might influence an outcome measure. Schema theory argues that perceptions of game play in the moment can vary from person to person and generate important experiential differences for the player. Although it is possible that some confound, say aggressive personality, may influence both perceptions of the humanness of the target and the aggression of the player, it is worth considering that in fact perceptions *may* influence aggressive outcomes and that this link may be causal. We see several of these relationships in the present study.

Those who played more violent games overall perceived the stimulus game to be less violent, which is consistent with previous research surrounding other violent media such as television (Harris, 2000). Frequent violent game players may have better developed schemata for media violence. Therefore, the violence in the game may have appeared more familiar and more consistent with their existing schema. Another finding that argues for the importance of examining perceptual variables is that of the relationship between experimental condition, perceived human appearance, and aggression. Had we relied solely on our manipulation of condition, it would seem that differing levels of humanness were unrelated to aggression. However, the relationship between our experimental manipulation and aggression is mediated by *perceptions* of human appearance. Subjects in the "more human condition" perceived the targets as more human than those in the "less human" condition, which stands to reason. However, more important, those who perceived the targets as more human, on a continuous scale measure, exhibited more verbal and cognitive aggression after play, but no effects were found for physical aggression. Why would perceiving aggressive targets as human lead to more verbal and cognitive aggressive

but have no effect on physically aggressive intentions? The answer may lie in real-life standards pertaining to aggression. Recall that Eastin (2006) found that such real-life standards (e.g., prohibitions against aggression toward women) can also apply in gaming environments. Targets perceived as more "human" might not elicit physical aggression as it has been found previously that we are less likely to aggress against targets that resemble us (Baron, 1971). On the other hand, it may be that verbal aggression is seen as more socially acceptable and less harmful than physical aggression. Thus, when we experience mediated aggression through video game play, our aggressive schema are activated and verbal aggression is the result. However, these findings regarding verbal aggression actually ran counter to our schema theory-based predictions.

As mentioned, we argued that less human targets would generate more aggression because players would feel more free to aggress. Instead it appears that more human-like targets—perhaps because they were schema consistent, that is, demonstrated a schema match—actually increased aggression, but only in the socially sanctioned way of verbal aggression. Thus, schemata influence how we interpret violence, but schema-consistent violence may actually increase aggression more than schema-inconsistent violence. It appears then, that we may use real-life schema when making sense of video game play. Thus, schema consistency may be a relevant factor in our understanding of the effects of video game play.

In terms of cognitive aggression, we based our hypotheses on priming theory. Priming is a process that is both faster and less conscious than the processes at work according to schema theory. Therefore, it makes sense to utilize priming theory when considering cognitive outcomes. As a result we predicted that the more human-looking target would prime cognitive aggression. In retrospect, however, it seems possible that schema consistency is also at work here. In short, the more consistent the stimulus was with existing schema, the more cognitive aggression was activated as well.

Another perceptual variable examined in this study is the feeling of immersive presence during game play. Previous research has found that the feeling of presence is positively linked to aggressive outcomes. Here we found that increases in immersive presence were linked to increases in both physically aggressive intentions and cognitive aggression, although the paths were not significant. Of interest, the strongest predictor of immersive presence in our data was perceived human appearance. Participants who perceived the aggressive targets to be more human experienced greater immersive presence during the game play experience. The realism of a game's graphics and sound have also been found as predictors of presence in previous research (McGloin et al., 2011; Tamborini & Skalski, 2006), and it may be that the increased realism of human targets allowed players

to feel more a part of the game world and, thus, experience a greater sense of immersion. Again, it is interesting to note that experimental condition does not have a significant direct impact on immersive presence in the model. The effect of target human appearance appears to be driven entirely by the player's own subjective interpretation of humanness, again arguing for the importance of perceptual variables. In addition, increased feelings of immersive presence led to perceptions of greater violence. Perhaps the increased sense of being present in the action led players to notice the violence in the game more.

Limitations and Future Research Directions

Although this study contributes to the growing literature on video games and aggressive outcomes, there are some limitations that should be noted. First, this was an experimental study utilizing college students that took place in a research lab. All of the normal concerns about nonrandom samples and external validity apply. Second, although the two experimental conditions did differ significantly from one another in terms of perceived levels of human appearance, the aggressive targets were not perceived to be very human overall. However, this does not seem like a major concern given that there was a significant difference in perceptions of human appearance between the two experimental conditions.

Third, by measuring perceptions of the manipulation we harm the purity of an experimental design. We can no longer claim absolute causality because some third variable may influence both perceptions and outcomes. For example, it's possible that aggressive individuals may be more prone to seeing their victims as less human, and this may account for the relationship between perceived human appearance and physically aggressive intentions. However, we argue that the potential value of thinking about statistical relationships in a more sensitive way outweighs the potential problems in the design.

This is one of the first studies to examine the role of both the context of a violent game and player perceptions of violent video games on aggressive outcomes. Future research should examine what other contextual features of video games are important and lead to differing perceptual outcomes. For example, many games today allow players a tremendous amount of control in customizing both their individual player characters and their opponents. In some games, one can even upload their own pictures or those of other people to use in the game. How would this increased level of familiarity and realism impact aggressive outcomes? It would also be interesting to explore which specific features of video games contribute to differing player perceptions of realism or humanness. Also, individuals more experienced with violent video games likely have much more elaborate schema for violent game play. Future research should examine

in more detail the differences in how experienced gamers perceive violent games relative to people with less experience playing these types of games.

CONCLUSION

This study examined the role of both exogenous variables and player perceptions on aggressive outcomes of violent video game play. Player perceptions of the human appearance of the aggressive targets proved to have more of an impact on aggressive outcomes than did our experimental manipulation of human appearance. Gaming research that focuses solely on experimental manipulations and ignores the importance of individual differences in game perceptions may thus be losing the opportunity to explain much of the variance in aggressive outcomes. Future research should continue to explore the role of individual differences in game perceptions and how these subjective experiences may be influencing aggression.

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