Retaliatory Aggression and the Effects of Point of View and Blood in Violent Video Games

Marina Krcmar
Department of Communication
Wake Forest University

Kirstie Farrar
Department of Communication Studies
University of Connecticut

In this study, an experimental design was utilized to test, first, the effect of a violent game versus a no game control on physical and verbal aggression and retaliatory aggression against a confederate. In addition, the effects of two internal video game manipulations were explored. Overall, those in the violent game condition were more verbally and physically aggressive than those in the no game condition. In terms of internal game features, third-person play with the blood on, especially when combined with aggressive cognitions and to some extent, hostile affect, encouraged more aggressive outcomes.

Marina Krcmar (Ph.D., University of Wisconsin-Madison, 1995) is Associate Professor in the Communication Department at Wake Forest University. Her research focuses on children, adolescents, and the media.

Kirstie Farrar (Ph.D., University of California-Santa Barbara, 2001) is Assistant Professor in the Department of Communication Studies at the University of Connecticut. Her research interests include effects of the mass media on individuals, specifically the effects of the mass media on adolescent socialization.

Correspondence should be addressed to Marina Krcmar, Department of Communication, Wake Forest University, 1834 Wake Forest Road, Winston-Salem, NC 27106. E-mail: krcmarm@wfu.edu
INTRODUCTION

There is now substantial evidence that, like exposure to television violence, exposure to violent video games increases aggression (see Anderson & Bushman, 2001, for a meta-analysis). However, unlike television, game technology allows for internal game manipulations (e.g., playing in first or third person; manipulating the presence of blood and gore). Not much research to date (see Eastin, 2007, and Farrar, Krcmar, & Nowak, 2006, for examples) has examined the effect of contextual game features on aggressive outcomes. In our study, an experimental design is utilized, manipulating two internal game features—point of view (POV; first vs. third person) and blood (on or off)—to explore first the mechanisms by which video game exposure effects aggression and second the role that internal game features may play in moderating effects.

Game Play and Aggressive Outcomes

Compared to research on television violence, effects research on video game violence is still in its infancy and has only been accumulating since the mid-1980s. However, most of the research that has been done is consistent with the notion that video game violence does affect players in numerous ways. It should be noted a recent meta-analysis found the effect of video game play on aggression to be smaller than that typically reported for television (Anderson & Bushman, 2001; Sherry, 2001), suggesting that perhaps the process of effects from game play may be somewhat different from the process involved in television exposure and effects. Nevertheless, video game play does seem to result in increases in aggression, and there are several important theoretical reasons that this may be the case. First, when playing a violent video game, the individual assumes an active role in the storyline. Instead of simply watching a television or movie character act violently, video game players actually choose to aggress themselves and carry out these actions. Anderson and Dill (2000), in their general aggression model (GAM), argue that this combination of choice and action in the video game environment may lead to the construction of a more complete aggressive script than would be formed by passively viewing television.

Second, violent video games present a more complete learning environment for aggression than does television. In violent video games, players are rewarded for acting out aggressive scripts by earning more points or advancing to new levels. In this way, aggressive players receive direct reinforcement, which is arguably a stronger and more vivid reward than the types of vicarious rewards one might get from watching a television character rewarded for behaving in an aggressive manner.
Finally, violent video games present increased chances for identification with the aggressor. Identification with a media character is known to enhance the potential for media effects (e.g., Leyens & Picus, 1973). When playing a game, participants assume the role of the “hero,” and they control the actions of that character as they navigate the gaming environment. In addition, players can now choose to play many games with characters that resemble them on many key features such as gender, race, style of clothing, and physical appearance. This should enhance identification with the game character. Identification with the hero of the game is expected to be particularly enhanced in the types of games known as “first-person shooters” (Anderson & Dill, 2000). In these games, the player literally sees the game world through the character’s eyes.

In part because of these reasons, substantial evidence now exists that violent game play is associated with aggressive effects. For example, violent game play can influence aggressive cognitions, or thoughts (Anderson & Dill, 2000; Tamborini et al., 2004); can influence aggressive affect, leading to feelings of hostility (Anderson & Dill, 2000; Ballard & Wiest, 1996; Farrar et al., 2006, Tamborini et al., 2004); and has been found in survey research to be associated with aggressive delinquent behavior, even after controlling for aggressive personality (Anderson & Dill, 2000). Experimental work using more up-to-date games has also found exposure to violent video games to be linked to aggressive behavior (Anderson & Dill, 2000; Cicchirillo & Chory-Assad, 2005; Farrar et al., 2006). Meta-analyses conducted on the research on violent video games to date have also supported an effect of game play on aggression (Anderson, 2004; Anderson & Bushman, 2004; Sherry, 2001).

The GAM and Violent Games

The GAM, which comprehensively integrates central elements from several earlier aggression theories including social cognitive theory (Bandura, 1994), script theory (Huesmann, 1986), cognitive-neoassociation theory (Berkowitz, 1989), Geen’s (1990) affective aggression model, and Zillmann’s (1983) excitement transfer model, attempts to integrate existing knowledge and research on the learning, development, instigation, and expression of aggression (Carnagey & Anderson, 2003). The GAM seeks to explain the development of aggression across many contexts. Because it simultaneously considers personalogical factors and the environmental cues that may contribute to the learning of aggression, it can appropriately be applied to the study of video game violence.

The GAM is based on the premise that aggression results from knowledge structures that develop out of personal experience and can influence perception from basic visual patterns to complex behavioral sequences. Over
time and with repeated use, these knowledge structures can become automatized. Furthermore, they become linked to affective states, behavioral programs, and beliefs such that a particular affect, perhaps frustration, may become associated with aggression over time, thus guiding individuals' behavioral responses to their social environment. Consider the game play environment: Players actively engage in game play; receive points for acting aggressively; attempt and learn various aggressive roles, actions, and strategies; and through repeated play may learn to play the game quite skillfully. Through this exposure to the stimulus, repeated interaction with the violence, and repeated game play, it is likely that players can establish similarly aggressive knowledge structures or scripts, enhance them through practice, and activate them when faced with a real, albeit tamer potentially aggressive situation. Thus, playing violent games, both in the short term and over time, can lead to aggressive behavior.

GAM focuses on the person in the situation, or the “episode.” A single social interaction, or episode, contains the person and situation inputs (such as environmental cues); cognitive, affective, and arousal routes through which these input variables are interpreted and have their impact; and outcomes of the underlying appraisal and decision processes. In sum, any given situation includes personalological variables such as aggressive disposition; the cognitive, affective, or arousal factors of the person in the situation; and the decision to act. Specifically, then, GAM proposes that aggression results from the person in the situation; however, the interpretation of that situation and the ultimate outcome of that situation is mediated by cognitive appraisal, affective response, and arousal resulting from the situation.

In the short term, video game violence is likely to affect aggression because it may temporarily influence cognitive responses, affective outcomes, and arousal, making the decision to behave aggressively, more likely. In the long term, each exposure to violent stimuli (whether game violence or aggressive interactions) is like another learning trial. Over time, these aggressive scripts that are activated become more ingrained and more readily accessible. These scripts then color the person’s expectations and intentions involving social behavior and their perceptions of the actions of others in their environment. The creation of these aggressive knowledge structures can change the individual’s personality, making them more aggressive and hostile in outlook (Anderson & Dill, 2000).

Arousal Routes to Aggression

Although other theories (e.g., Excitation Transfer; Zillmann, 1983) have emphasized the importance of arousal as a mechanism in aggressive behavior, GAM cites arousal as only one of three primary routes. Whether
because of a particular arousing situation or a repeated tendency of an individual to respond with arousal to a frustrating or upsetting situation, aggression itself is mediated by it. According to GAM, with heightened arousal, the likelihood to respond with aggression is increased.

Cognitive Routes to Aggression

The GAM would predict that the effects of violent video games can be mediated in a second way: cognitive responses. Research on television violence has found that merely seeing a picture of a gun or a weapon can prime aggressive thoughts (e.g., Anderson, Benjamin, & Bartholow, 1998). Furthermore, research on video games suggests that exposure to violent video games can increase the accessibility of aggressive thoughts (Anderson & Bushman, 2001). The GAM argues that these aggressive cognitions or thoughts are the mechanism by which exposure to media violence impacts aggressive outcomes and, therefore, cognition mediates aggression. Therefore, for our study, the following is hypothesized:

H1: Participants who play a violent video game will become more aggressive compared to those in the control group; however, this effect will be mediated by aggressive cognitions.

Despite the findings that video game violence can increase aggression, and theory that predicts that cognition can mediate aggressive outcomes, it is unclear how various game features (such as POV) may affect outcomes. In fact, little published research has manipulated any of the contextual features commonly found in today’s games to assess their impact on aggressive outcomes. Why might game features make a difference? Consider the research on television violence. Overall, the context of a television portrayal of violence (e.g., showing pain cues, or rewarding the perpetrator) plays a very important part in the effects process (Comstock & Paik, 1991; Gunter, 1994; Wilson, Linz, & Randall, 1990). Historically, most video games were designed so that the player viewed the environment from the more traditional third person POV (the player sees their entire character on the screen). More recently, however, games designed in the first person POV (the player sees the environment as if looking through the eyes of the character) have become increasingly popular, particularly a genre of violent games known as first-person shooters (e.g., Doom, Halo). In fact, recent video game sales data places Bioshock, a first-person shooter game, in the top three bestsellers for video games in August 2007 (“‘Madden’ Fuels,” 2007), and the release of Halo 3, another first-person shooter, led to sales of more than $300 million in just over 1 week (Rooney, 2007). Also, in many video games,
players can choose to view the environment from the more traditional third-person POV or can select the first-person POV. Clearly, many of today’s gamers are exposed to a first-person mode of play. It is possible that players identify more strongly with an aggressive character and feel more involved in the action when they are playing in first-person mode (Tamborini et al., 2004). However, Farrar et al. (2006) found that playing in third person, not in first person, tended to increase a sense of involvement. Therefore, it remains somewhat unclear how POV can affect involvement in video game play.

Furthermore, Farrar et al. (2006) found that there was no main effect for POV on aggressive outcomes. However, in their study, players were not provoked after playing the game. Previous research on television violence has found that provocation coupled with exposure to violent media, rather than either variable alone, is more likely to result in aggressive outcomes (Zillmann, 1983). Therefore, it is still unclear how POV might affect aggressive thoughts and the subsequent aggressive outcomes associated with aggressive cognitions.

In addition to switching the POV, many modern games allow the user to deactivate the blood and gore present in a violent game or to change the color of the blood from red to green, for example. This is a feature that is very appealing to parents who are concerned with the level of gore in the games their kids play. However, traditional research based on television and film stimuli would suggest that the presence of blood would serve to lessen the probability that the player would become more aggressive as a result of exposure (Wilson et al., 1997). On the other hand, it may be the case that in a video game environment, blood could serve as a reward, showing the player that she or he did well, or succeeded in achieving a goal. Blood may serve as reinforcement, thus strengthening the risk of aggressive thoughts and consequently, aggressive behavior on the part of the player (Smith, Lachlan, & Tamborini, 2003). It is also possible that the presence of blood in repeated aggressive encounters could serve to desensitize the player and thus lead to increased aggression. In fact, in Farrar et al.'s (2006) study, those who played the game in the blood on condition had more physically aggressive intentions. Ballard and Wiest (1996) found that participants were significantly more hostile and exhibited more systolic blood pressure reactivity after playing Mortal Kombat with the blood and gore present compared to those participants who played the same game without the gore. These findings lend initial support to the notion that blood in a video game environment may operate differently from blood in a television environment.

Therefore, contextual features of the game itself may well be linked to the outcome of game. However, sex of the player has also been demonstrated to play a role in video game play. Specifically, although previous research has
not consistently found any gender differences in aggression after playing violent video games (see the meta-analysis by Anderson & Bushman, 2001), differences have been found in the way that men and women play video games. For example, playing in first person appears to reduce a sense of presence and involvement for women but not for men (Farrar et al., 2006; Tamborini et al., 2001). Therefore, given that POV is an important variable in this study and that men and women may, in fact, have very different mental models for video games (Farrar et al., 2006), gender differences are examined in this research.

In the GAM, aggressive cognitions are thought to mediate aggressive outcomes. However, when the focus is on asking what outcomes might be expected under various game features, the nature of the relationship differs. It seems unlikely that the effect of POV or blood on aggression, for example, would be mediated by aggressive cognitions. After all, aggression is present in both conditions (blood on vs. off and first vs. third person). Instead, it seems more likely that when the blood cue acts as a reinforcement, or when POV influences aggression, cognitions would moderate the relationship. That is, if a cue generates violent thoughts, aggression may occur. In the absence of violent thoughts, no aggression would occur. Although the GAM stresses the importance of mediating factors between exposure and aggression, it is likely that moderators are important as well. Game features that increase the likelihood of aggressive cognitions, for example, by definition increase the likelihood of that cognitive function ultimately acting as a mediator. According to GAM, the mediator is a necessary condition for aggression. Therefore, our first research question asks the following:

RQ1: Will the impact of the (a) blood and gore manipulation and (b) POV manipulation on participants’ aggression be moderated by aggressive cognition?

Affective Routes to Aggression

The second route through which violent video games can influence aggression according to the GAM is affective. Playing a violent video game can increase feelings of hostility in some situations (Anderson & Bushman, 2001). According to the GAM, these feelings of hostility might also lead to aggressive outcomes. Specifically, the experience of hostility as a result of game play is another mechanism by which aggressive outcomes occur. Therefore, our second hypothesis states the following:

H2: Hostile affect will mediate the effect of the violent video game on aggression.
It is also not known how different contextual features of video games will impact player’s levels of aggressive affect and how this will, in turn, impact aggression. Similar to the argument made earlier, although GAM predicts that cognition and affect mediate the relationship between media exposure and aggression, it is unclear how various game features affect aggressive outcomes. It seems likely that if a particular game feature (e.g., first-person POV) does result in hostile affect, then aggressive outcomes may occur. Once again, it is important to understand the moderating role of game features to ultimately predict aggressive outcomes. Therefore, the following research question is posed:

RQ2: Will the impact of the (a) blood and gore manipulation and (b) POV manipulation on participants’ aggression be moderated by hostile affect?

METHODOLOGY

Overview

This study uses a 2 (violent game vs. no game) × 2 (gender) × 2 (first vs. third person) × 2 (blood on vs. blood off) nested experimental design. Participants were first randomly assigned to play a violent game or to a no game control group. Those in the violent game condition were further randomly assigned to play the game for 12 min in first or third person and with the blood feature on or off. Finally, all participants were insulted by an experimental confederate prior to responding to a questionnaire.

Participants

Participants in this study were 186 undergraduate students (97 female, 89 male) enrolled in an introductory communication course at a large East Coast university. Although it is possible that communication students may have some exposure to the subject of video games and violence in their communication courses, these data were collected at the very beginning of the semester long before any lectures on media effects, and as this course is a prerequisite for upper division courses in the major the students would not have taken any other courses on this topic. In addition, the vast majority of students in this course were taking it to meet general education requirements and were not even communication majors. Students received course credit for participating. Participants mean age was 19.67 (range = 18–22). The racial composition of the sample was 88% White, 2% Asian, 4% African American, 3% Latino/a, and 3% Other.
Stimulus Materials

The violent game used for this study was Hitman II, Silent Assassin. This game was selected for its violent content as well as the ability to manipulate the two internal game features of interest (POV, third vs. first person, and blood on or off). This game received an “M” rating for Mature according to the Entertainment Software Rating Board. Content descriptors for Hitman include blood, sexual content, and violence.

For the purposes of this research, violence is defined using the operational definition from the National Television Violence Study: “Any overt depiction of a credible threat of physical force or the actual use of such force intended to physically harm an animate being or group of beings” (Smith et al., 1998, p. 30). The purpose of Hitman II is to maneuver a hitman through several missions, assassinating enemies, while attempting to rescue a friend. This clearly meets the definition of violence for the purposes of this study.

Procedure

Male and female undergraduates were randomly assigned to the no game control group or to one of the four violent game conditions. Prior to playing the assigned game, those in the game conditions reviewed an instruction sheet detailing how to play and were instructed to play the game for 12 min. Games were played by each individual in a separate cubicle so that players could not see each other. Participants were also instructed to wear headphones during game play so that players could not hear anything other than their own game. All games were played on a Sony PlayStation II gaming console hooked up to a 13-in. color television monitor.

Experimental conditions were created by randomly assigning players to the violent game or no game control group. The violent game players were further assigned to one of four violent game conditions, varying their perspective (first-person POV vs. third-person POV) and blood (present or absent). In the first-person POV, the player literally looks through the eyes of the character experiencing the game environment from the hitman’s perspective. He or she sees nothing of their character other than his arm extended outward clutching a gun. In contrast, in the third-person POV the game player sees the entire body of the character on the screen, as if he or she were standing a few feet behind the hitman character. To ensure that all participants playing the violent game would have the same experience regardless of their skill level, game play was set to “god mode” so that players could not be killed during play. Participants also filled out a posttest with several measures regarding the game they just played and an additional “current events” questionnaire (designed with very difficult current events questions with the assumption that most students would answer at least
several of them incorrectly), immediately after playing. Those in the no
game condition were asked to simply fill out the instrument with the game
related items removed.

After filling out the questionnaire, an experimental confederate, whom
they had not yet encountered, immediately led the participants (one by
one) to another room down the hall. The student was a senior-level drama
student to capitalize on her acting experience and to help ensure that none
of the study participants were likely to be familiar with her. They were told
that they had “one last thing to do before we’re all done.” En route, the con-
federate casually glanced at their current events answers and insulted their
performance by commenting that their performance on the task was really
terrible compared to other students. After this, the confederate did not
engage in any discussion with the participants until, upon reaching their des-
tination, the confederate told participants that they would be filling out a
form that evaluated her as well as the research assistant who helped them
with the video game. She concluded by telling participants that their answers
would remain confidential but would help determine if she would get fund-
ing in the following year. This was done to provoke participants, a protocol
used in many studies (e.g., Berkowitz & Powers, 1979) to provide them with
a target for any aggression that might result from the stimulus of interest
(e.g., video game play). However, because all participants are provoked in
the same way, any resulting differences in aggression are likely due to the
manipulation and not to this constant. Once this was done, the confederate
returned after several minutes, handed participants a debriefing form, and
thanked them for their participation.

Measures

Video game ratings. After playing the violent video game, participants
completed a nine-item scale rating how easy the game was to play, how
enjoyable the game was, how frustrating they found it to play, how violent
the game content was, how violent the graphics were, how much blood and
gore was present in the game, whether the game was fast or slow in pace,
how engaging the game was, and how well it maintained their attention.

Demographic variables. Participants indicated their gender, age, year
in school, and race.

Video game exposure. Participants were asked to first indicate whether
they had ever played the video game (17% of the participants had played
Hitman prior to exposure). It is possible that participants with prior
exposure to the game would react differently to the stimulus. However, random assignment to conditions should alleviate this concern. Next, they were asked to indicate how often they play a range of different types of video games: action, adventure, three-dimensional shooter games, arcade type games, role-playing or interactive fantasy games, simulation or strategic planning games, sports games, or massive multiplayer online role-playing games. Each game type contains an example game title from that category and participants indicated on a 7-point scale from never to frequently how often they played each type of game. These reliably (α = .85) measured frequency of game play and were therefore averaged (M = 2.56, SD = 1.91).

**Dependent variables.** Aggressive behavioral intentions and aggressive behavior were measured in two different ways. First, aggressive behavioral intentions were measured by using a modified version of the Buss–Perry aggression questionnaire (Buss & Perry, 1992). As originally conceived this measure taps stable, trait aggression. However, because using a trait, rather than a state, measure of aggression attenuates the effects of short-term exposure to video game violence (Farrar & Krcmar, 2006), a slightly reworded version of the scale reflecting state rather than trait aggression was utilized. This instrument has been validated in previous research (see Farrar & Krcmar, 2006). This construct corresponds to the well-known construct of behavioral intention in the attitude literature (Ajzen & Fishbein, 1980).

The revised measure is identical to the original with two minor modifications. First, before responding to the aggression items, participants read an ambiguous story that states, “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 then step towards you.” Second, participants respond to the Buss–Perry items (Buss & Perry, 1992), however, instead of being worded as traits (e.g., “Given enough provocation, I would hit someone”) they are worded to reflect state aggression (e.g., “Given enough provocation, I would hit this person”). Responses range from 0 (extremely uncharacteristic of me) to 6 (extremely characteristic of me). The four dimensions of the scale: physically aggressive intentions (M = 2.69, SD = 1.41), verbally aggressive intentions (M = 2.69, SD = 1.61), temper (M = 2.01, SD = 1.47), and resentment (M = 2.72, SD = 1.44) were each reliable (α > .80). An examination of the face validity of the items led us to use physically aggressive intentions and verbal aggression as indicators of behavioral aggression.

Behavioral aggression was measured through participants’ rating of a confederate research assistant. Participants in fact rated the two research assistants, one who was an actual, nonconfederate assistant and one who was also an experimental confederate. Comparison between the two ratings
was used as a manipulation check of the provocation by the confederate. The confederate insulted the participants during the study because previous research has found that aggressive outcomes are likely when media violence is present and when the participant has a target against whom to aggress (Zillmann, 1983). The scale was made up of two types of questions. The first five questions asked participants to rate each assistant’s efficiency, organization, and kindness on a 10-point scale ($a = .93$). The insulting confederate was rated generally lower ($M = 7.62$, $SD = 2.02$) than the nonconfederate assistant ($M = 8.92$, $SD = 1.51$), indicating that the manipulation was effective ($t = 5.63$, $n = 220$, $p < .05$). The next two questions were asked to give participants a chance to aggress against the confederate. Specifically, they were asked to judge if the assistant should be funded in the following year and if she should be given full-time funding. Responses ranged from 0 (definitely not) to 10 (definitely yes). These two items were strongly correlated ($r = .95$) so they were collapsed into a single score with higher numbers indicating higher funding recommendations and therefore less harm.

**Moderators/mediators.** Accessibility of aggressive cognitions was measured using the “speed-of-association test” which has been previously validated as a measure of aggressive cognitions (Bushman, 1998). Participants are told they are completing a test to see how quickly they can think. The sheet of paper has 50 words, each with a blank space next to it. In the space after each word, participants are told to write—as quickly as they can—the first word or phrase that comes to mind. In total, 25 of the words were homonyms with a potentially aggressive interpretation (such as *boot*). These could elicit either neutral words (i.e., *shoe*) or aggressive terms (i.e., *kick*). The remaining 25 were neutral words with no aggressive meaning (e.g., *note*). Upon completion, each participant had generated 50 words. Responses were then coded as an aggressive word (e.g., *hit*) or a nonaggressive one. Participants with more readily accessible aggressive thoughts are expected to list more aggressive terms.

Aggressive affect was measured using the 15-item State Hostility scale (Anderson, Deuser, & DeNeve, 1995). This 4-point scale ranges from not at all to very much so. The scale proved reliable ($z = .91$) and included items such as “I feel angry,” “I am burned up,” “I feel aggravated,” and “I am annoyed.” The overall mean for this scale was 1.25 ($SD = .35$).

**RESULTS**

By utilizing the GAM, two different kinds of relationships would be expected. First, the effect of the violent game itself should be mediated by
both cognitive and affective processes. Second, it is expected that any effects of the internal game features (such as point of view) would be moderated by aggressive cognitions and affective hostility because one game feature (such as first person) may result in increased hostility and subsequent aggression, whereas another feature (such as third person) may not increase hostility and subsequent aggression. Therefore, in our analyses, when examining the effect of the violent game versus no game, all participants were included in the analyses \( N = 186 \) and tested for aggressive effects that were mediated by cognitive and affective processes using strategies developed by Baron and Kenny (1986). When looking further at the impact of the two manipulations (blood and POV), only those participants in the violent game conditions were included \( n = 148 \) and tested for aggressive effects that were moderated by cognitive and affective processes. To test moderation four product terms were created. Each product term was made up of one manipulation (i.e., POV or blood) multiplied by one moderator (i.e., aggressive cognition or hostile affect). For each analysis, the relevant product term was used (e.g., the POV manipulation times hostile affect) as the independent variable. Verbal and physically aggressive intentions, as well as funding recommendations for the insulting research assistant confederate were tested as the dependent variables in each case. Individual group means in these analyses were tested using post hoc procedures because of the lack of prior research that would help us form concrete hypotheses about the nature of specific group differences.

**Cognitive Routes to Aggression**

**H1.** The first hypothesis predicted that those in the violent game condition would be more aggressive than those assigned to the control group and that this effect would be mediated by aggressive cognition. To understand the main effect of condition on verbal and physically aggressive intentions and on ratings of the confederate, an analysis of variance was utilized. There was a main effect of condition on verbally aggressive intentions, \( F(1, 185) = 10.72, p < .05 \). Those in the violent game condition were significantly more verbally aggressive than those in the no game condition. There was also a main effect for condition on physically aggressive intentions, \( F(1, 185) = 10.96, p < .05 \). Those in the violent game condition were significantly more physically aggressive than those in the no game condition. Last, there was a main effect on funding recommendations for the confederate, \( F(1, 184) = 19.92, p < .05 \). Those in the no game condition gave the confederate significantly lower funding scores than those in the violent game condition (see Table 1).
Next, possible mediation effects were examined. To do this, only those in the violent game condition and those in the no game condition were included in the analyses \((n = 186)\). Consistent with multiple regression procedures for testing mediation, verbally aggressive intentions was first used as the criterion and game play (violent vs. no game) as the predictor. This regression was significant \((R = .24), F(1, 183) = 10.72, p < .05\). Next, a second regression was run, using aggressive cognitions (the mediator) as the criterion variable and game play as the predictor. This regression was not significant \((R = .12), F(1, 183) = 2.34, p > .05\). Therefore, aggressive cognitions do not mediate the relationship between game play and verbally aggressive intentions.

To test if aggressive cognition mediates the link between game play and physically aggressive intentions, the same procedure was used to test for mediation. First, physically aggressive intention was used as the criterion and game play as the predictor. This regression was significant \((R = .24), F(1, 184) = 10.96, p < .05\). Next, using aggressive cognition (the mediator) as the criterion and game play as the predictor, the equation was not significant \((R = .12), F(1, 183) = 2.34, p > .05\). Therefore, aggressive cognitions do not mediate the relationship between game play and verbally aggressive intentions. Rather, there is a direct effect of game play on the aggression measures.

**RQ1a and 1b.** To address RQ1, which asked if the effect of (a) the POV manipulation and (b) the gore manipulation on verbally aggressive intentions, physically aggressive intentions, and the confederate’s funding score was moderated by aggressive cognitions, only those in the violent game conditions were examined. Gender was controlled for on the first step, on the second step each of the individual variables of interest was entered. On the third step the product terms of those variables of interest were entered (i.e., POV multiplied by aggressive cognition; gore multiplied by aggressive cognition; Aiken &

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**TABLE 1**

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<thead>
<tr>
<th>Verbal aggression</th>
<th>Physical aggression</th>
<th>Retaliation</th>
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<tbody>
<tr>
<td>(M)</td>
<td>(SD)</td>
<td>(M)</td>
</tr>
<tr>
<td>Violent game</td>
<td>2.56</td>
<td>1.39</td>
</tr>
<tr>
<td>No game</td>
<td>1.79</td>
<td>0.81</td>
</tr>
</tbody>
</table>

*Note.* \(N = 217\). Higher numbers indicate more aggression and are significant at \(p < .05\) for differences between the game and no game conditions. For retaliation, higher numbers indicate a more positive evaluation.
Three regressions were run for the (a) POV interaction: one for verbally aggressive intentions, one for physically aggressive intentions, and one for funding recommendations. In addition, three regressions were run for the gore manipulation. In total, six analyses were run to test RQ1.

To test RQ1a, asking about the possible moderating effect of POV, the first POV regression was run using verbally aggressive intentions as the dependent variable. This revealed that there was no effect of gender on the first step. On the second step, there was no significant change in $R^2$ for the POV manipulation or the aggressive cognition variable. On the third step, the interaction between POV and aggressive cognition did have a significant effect on verbally aggressive intentions (see Table 2). Those who played the violent game in third person and who had more violent cognitions were significantly more verbally aggressive than those in the other three conditions (see Table 3 for means and standard deviation).

The second POV regression was run using physically aggressive intentions as the dependent variable. There was an effect of gender on the first step. On the second step, there was no significant change in $R^2$ for the POV manipulation or the aggressive cognition variable. On the third step, the interaction between POV and aggressive cognition did have a significant effect on physically aggressive intentions (see Table 2). Post hoc contrasts revealed that those who played the violent game in third person and who had more violent cognitions had significantly more physically aggressive intentions than those in the other three conditions. (See Table 3 for means and standard deviations.)

### TABLE 2
Interaction Effects for Aggressive Cognitions and Game Features (POV and Blood) on Verbal, Physical, and Retaliatory Aggression

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<tr>
<th></th>
<th>Verbal agg.</th>
<th>Physical agg.</th>
<th>Retaliation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>POV (Blood)</td>
<td>POV (Blood)</td>
<td>POV (Blood)</td>
</tr>
<tr>
<td><strong>Step 1 (Controls)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender (0 = male; 1 = female)</td>
<td>.00</td>
<td>.00</td>
<td>.13*</td>
</tr>
<tr>
<td><strong>Step 2 (Main effects)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>POV, aggressive cognition</td>
<td>.01</td>
<td>—</td>
<td>.00</td>
</tr>
<tr>
<td>Blood, aggressive cognition</td>
<td>—</td>
<td>.01</td>
<td>—</td>
</tr>
<tr>
<td><strong>Step 3 (interactions)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction between POV and cognition or blood and cognition</td>
<td>.05*</td>
<td>—</td>
<td>.02</td>
</tr>
<tr>
<td>Interaction between blood and cognition</td>
<td>.04*</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

Note. $N = 186$. Each column represents a single regression analysis, which indicates that the variables were not used in this equation. **POV** = point of view; **agg** = aggression.

*Significant ($p < .05$) change at that step.
The third POV regression was run using the confederate’s funding recommendation as the dependent variable. There was an effect of gender on Step 1. On Step 2, there was no significant change in $R^2$ for the POV manipulation or the aggressive cognition variable. On Step 3, the interaction between POV and aggressive cognition had a significant effect on funding recommendations for the confederate. Those who played in third person and who experienced fewer aggressive cognitions provided the confederate with significantly higher ratings than those in the other three conditions. (See Table 3 for means and standard deviation.) Therefore, significantly less aggression occurred among those players in third person with fewer aggressive cognitions.

To test RQ1b, we tested the possible moderating effect of the presence of blood and gore. For verbally aggressive intentions, there was no effect of gender on step one. On Step 2, there was no significant main effect either the blood manipulation or for aggressive cognitions. On Step 3, the change in $R^2$ was significant (see Table 2). That is, there was a significant interaction between the blood manipulation and aggressive cognitions. Post hoc contrasts showed that those in the blood on condition with higher aggressive cognitions were more verbally aggressive ($M = 2.81, SD = 1.41$) than those with the blood on and low aggressive cognitions ($M = 2.28, SD = 1.52$), those with blood off and high aggressive cognitions ($M = 2.50, SD = 1.36$) and those with blood off and low aggressive cognitions ($M = 2.45, SD = 1.27$).

With physically aggressive intentions as the dependent variable, there was an effect for gender (see Table 2) but no main effects on Step 2 or interaction effects on Step 3 for the blood manipulation and aggressive cognitions. For recommendations for the confederate there was an effect for gender but no main or interaction effects for the blood manipulation and aggressive cognitions. Therefore, for verbally aggressive intentions and physically aggressive intentions, aggressive cognitions moderate the effect of the

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**TABLE 3**

Interaction Effect of Aggressive Cognitions and Game Features (First vs. Third Person) on Aggression

<table>
<thead>
<tr>
<th></th>
<th>Verbal aggression</th>
<th>Physical aggression</th>
<th>Retaliation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First person</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fewer violent cognitions</td>
<td>2.58 (1.36)$_{a}$</td>
<td>2.64 (1.54)$_{a}$</td>
<td>7.63 (2.12)$_{a}$</td>
</tr>
<tr>
<td>More violent cognitions</td>
<td>2.36 (1.32)$_{a}$</td>
<td>2.43 (1.30)$_{a}$</td>
<td>7.81 (1.97)$_{a}$</td>
</tr>
<tr>
<td><strong>Third person</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fewer violent cognitions</td>
<td>2.29 (1.43)$_{a}$</td>
<td>2.32 (1.45)$_{a}$</td>
<td>8.83 (2.14)$_{b}$</td>
</tr>
<tr>
<td>More violent cognitions</td>
<td>3.19 (1.26)$_{b}$</td>
<td>3.11 (1.55)$_{a}$</td>
<td>8.02 (1.42)$_{a}$</td>
</tr>
</tbody>
</table>

*Note. N = 186. Higher numbers for the confederate indicate higher recommendations. Range = 1–10. Means with different subscripts significantly different at $p < .05$. 

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blood manipulation. In this case, those who experienced aggressive cognitions after playing in the blood on condition were most verbally aggressive.

Affective Routes to Aggression

**H2.** H2 predicted that hostile affect would mediate the effect of the violent video game on aggressive outcomes. To test this, only those in the violent game condition and those in the no game condition were analyzed (n = 186). Consistent with multiple regression procedures for testing mediation, verbally aggressive intentions was used as the criterion and game play (violent vs. no game) as the predictor. This regression was significant (R = .24), F(1, 183) = 10.72, p < .05. The second regression, using hostile affect (the mediator) as the criterion variable and game play as the predictor was also significant (R = .20), F(1, 183) = 7.28, p > .05. Third, with hostile affect as the criterion and verbally aggressive intentions as the outcome, this regression was not significant (R = .01), F(1, 183) = 13, p > .05. Therefore, in this study hostility does not mediate the link between violent game play and verbally aggressive intentions.

To test the effect on physically aggressive intentions, physically aggressive intentions was used as the criterion and game play (violent vs. no game) as the predictor. This regression was significant (R = .23), F(1, 183) = 10.97, p < .05. Next, using hostile affect (the mediator) as the criterion variable and game play as the predictor, this regression was also significant (R = .20), F(1, 183) = 7.28, p < .05. Next, we examined if the mediator affects the outcome. This regression was not significant. Therefore, in our study, hostility does not mediate the link between violent game play and physically aggressive intentions.

Last, funding for the confederate was used as the dependent variable. The first regression was significant (R = .18), F(1, 183) = 6.37, p < .05. The second regression, using hostility, demonstrated that it also affects funding recommendations (R = .19), F(1, 183) = 6.43, p < .05. Last, the mediator was controlled for the effect of game play on funding recommendations was tested. This regression was significant at the final step (R = .24), F(3, 180) = 4.22, p < .05, and the beta for game play was still significant (B = −.15, p < .05) after controlling for hostility. When hostility, the potential mediator, was not used as a control variable, the effect of game play was somewhat larger (B = −.19, p < .05). Therefore, hostility partially mediates the effect of game play on the funding recommendations. H2 is partially supported.

**RQ2.** RQ2 asked if the effects of POV manipulation and the blood and gore manipulation on aggression would be moderated by hostile affect. To test this only those in the violent game conditions were included in the
analysis and we controlled for gender on the first step. On Step 2 each of the individual variables of interest was entered. On the third step the product term of the two variables of interest was used (Aiken & West, 1991). Three regressions were run for each of the internal game manipulations (POV and gore), one for verbally aggressive intentions, one for physically aggressive intentions, and one for funding recommendations. First, the results for POV are presented followed by the results for the blood/gore manipulation.

For POV with verbally aggressive intentions as the dependent variable, there was no effect for gender. On Step 2, there was no effect of either hostility or POV on verbally aggressive intentions, and there was not an interaction between hostility and POV. Therefore, hostility does not moderate the effect of POV on verbally aggressive intentions. With physically aggressive intentions as the dependent variable, gender had a significant effect ($R^2 = .42$), $F(1, 145) = 31.36$, $p < .05$, but neither the main effects nor the interaction effects were significant. Last, the confederate recommendations were examined. Again, there was a main effect for gender ($R = .27$), $F(1, 145) = 11.41$, $p < .05$, but there were no main or interaction effects for hostility and POV.

Next, the effect of the blood manipulation was examined. With verbally aggressive intentions as the dependent variable, there was no main effect for gender, there was no main effect for hostility or blood, but there was a significant interaction ($R = .21$), $F(1, 142) = 3.92$, $p < .05$. Post hoc contrasts revealed that those who were high in hostility and played the game with the blood feature turned on ($M = 3.38$, $SD = 1.35$) were significantly more verbally aggressive than those high in hostility with no blood ($M = 2.88$, $SD = 1.59$) or low in hostility with blood on ($M = 2.82$, $SD = 1.29$). Those who were low in hostility and played the game with no blood or gore ($M = 2.34$, $SD = 1.45$) were significantly less verbally aggressive than those in the other groups. For physically aggressive intentions, gender had a significant effect on Step 1, Steps 2 and 3 were not significant. For funding recommendations, there was a main effect for gender but no main or interaction effects. Overall, for the blood manipulation, only verbally aggressive intention was affected by the manipulation and that effect was moderated by hostility.

**DISCUSSION**

**Summary of Findings**

Overall, those in the violent game condition were more verbally and physically aggressive than those in the no game condition. In addition, aggressive cognitions and affective hostility did not mediate the effects of game play as predicted by the GAM.
In terms of the internal game manipulations, those who played the violent game in third person and who had more violent cognitions had significantly more verbally aggressive intentions, had more physically aggressive intentions and, to some extent, were more punitive toward the confederate than other participants. Furthermore, those in the blood/gore on condition with more aggressive cognitions were more verbally aggressive. Therefore, aggressive cognitions do moderate the effects of internal game manipulations. For hostile affect, those who were high in hostility and played the game with blood on were significantly more aggressive than other players. Therefore, hostility has some moderating effect but only for the blood manipulation, whereas aggressive cognitions moderated the effect of both manipulations. Overall, it can be said that aggressive cognitions had a more consistent moderating effect than aggressive affect. In addition, third-person play with the blood on, especially when combined with aggressive cognitions and to a lesser extent, hostile affect, encouraged the more aggressive outcomes.

Role of Internal Game Features

One increasingly prevalent game feature is the ability to play in the more traditional third-person point of view or to play in first person. It has been suggested that playing in the first person, which involves looking through the characters’ eyes as if they were your own, could enhance identification with the game character. Theoretically, increased identification should lead to increased aggression. This study, however, found the most aggressive outcomes occurred in third-person play. Although this finding may seem somewhat counterintuitive, it is consistent with the work of Farrar et al. (2006). It is possible that to identify with the video game character, it is necessary to see that character. Recall that in first-person play, gamers see an outstretched arm but no character. Perhaps, rather than encouraging identification, first person feels more akin to “no-person” play. Counter to their expectations, Eastin and Griffiths (2006) found that participants experienced more presence when playing standard console video games as opposed to virtual reality. They suggested that comfort level with the interface may have played a role in the level of presence experienced. Therefore, to further illuminate our findings, future research might pit experienced players against novice players to see if perhaps first-person play becomes more comfortable, and thus engaging, as players gain experience in the environment.

As previously mentioned, another common game feature is the ability to turn “off” the blood and gore that may result from violence in the game. Unlike television research where the presence of blood lessens the likelihood of imitation, this study found that the presence of blood within the game
increased verbally aggressive intentions when it was accompanied by an increase in aggressive cognitions. This offers some support for GAM, which argues that it is through aggressive cognitions, initially generated by violent depictions, that aggressive outcomes occur. In a video game environment, blood seems to act as a reward. These results are consistent with both past television research and with social cognitive theory.

Theoretical Implications

This study offers partial support for the generalized affective model of aggression and those theories (e.g., cognitive priming and, to a lesser extent, the affective aggression model) that are incorporated into it. First, GAM was supported by the findings that suggested that cognitions moderate the effects of the internal game features. Recall that GAM proposes that there are two routes to aggression—affective and cognitive—and that these two routes can work either separately or in consort to increase aggression. However, in our study, cognition moderated outcomes more consistently than affect did. Why might this be the case? Consider the findings of a recent meta-analysis conducted by Sherry (2007). Sherry found that aggressive outcomes resulting from video game play seemed to occur after short-term play (e.g., 10 min) but not after longer term play. In our study, we also found negative effects after short-term play, especially as they related to cognition. It is possible that cognitive priming occurs in the short term but that the effects wear off relatively quickly. If this is the case, then short-term video game play and experimental designs that test for immediate outcomes would favor cognitive explanations such as those offered by priming theories and GAM, which incorporates notions of priming. Longer term effects, such as affective hostility, may take longer to occur and may in fact have longer term effects, making a research design such as the one used in this study, unable to detect them. Therefore, our design supports cognitive aspects of GAM to a greater extent because cognition and affect may have different response times that can not both be detected at the same time.

Second, it is important to note that for the main game manipulation, neither aggressive cognitions nor hostile affect were found to mediate effects. Rather, the effects for the main manipulation were direct. Therefore, it appears that the effects of game manipulations can not be explained by GAM, necessarily. Instead, game features seem to effect outcomes in much the same way that contextual features of television violence affect aggression: rewards (i.e., the appearance of blood in a video game) increase aggressive outcomes and seeing the perpetrator (i.e., playing in third person in a video game) increase aggressive outcomes. From a theoretical perspective, social cognitive theory (Bandura, 1994) can explain these findings because
it argues that learning and imitation will most likely occur if (a) there is a close identification between the observer and the model as might occur in third-person play when the game character can be seen clearly, and (b) if the character is rewarded for his or her behavior, as is the case when blood the blood feature is activated in the game. Although aggressive cognitions might occur when these features occur in the game, aggressive cognitions may not be necessary for aggressive outcomes to ensue.

Ultimately, from the data presented here, it may be that GAM offers a solid and broad-based explanation for aggressive outcomes. However, it may in fact be too broad an explanation to deal with the details and intricacies of game features. When Sherry (2007) stated that “theories designed to explain and predict the social influences of television are not adequate to account for video game effects” (p. 257), he may well offer the clearest explanations for the current findings. If different theories (i.e., GAM, social cognitive theory and priming) must be called upon to explain different types of game effects (e.g., main effects of game play, interaction effects for internal features) then clearly we do not have a coherent and cogent theory. In fact, additional research must be conducted to develop likely theoretical explanations that parsimoniously explain all aspects and levels of game play effects or perhaps to incorporate the media type (e.g., television, video game) into the theory.

Limitations and Future Research

Although the findings of this study offer insight into the role of internal game features in the effects process, there are some limitations that should be taken into consideration. In this study the presence of blood and POV was manipulated, but feelings of reward in the former instance and identification with the violent character in the latter were not measured. It is therefore not entirely clear why blood on and, more interesting, third person encouraged aggressive outcomes. Although it is speculated here that third-person play offers more opportunity to see, and thus identify with, the character, more research is needed to specify the mechanism at work here. As previously mentioned, it is possible that identification with the character occurs somewhat differently for players depending on their level of skill. For example, third-person play may be easier and less confusing, and therefore more absorbing for novice players, whereas first person play feels more realistic and natural to expert players. It may also be relevant that the main character in the game was male. Recent research by Eastin (2006) suggests that for female game players, matching gender of the main character increases both presence and aggression. Therefore, aggressive outcomes for female game players in our study may have been attenuated by the male gender of the main game character.
Another possible limitation concerns the female gender of the confederate. Research suggests that research participants are more likely to aggress against males than females (Eagly & Steffen, 1986). It is possible that participants would have been more likely to aggress against a male confederate in this situation, and this may have affected our results. Also, we found that participants in the no game condition gave the confederate significantly lower ratings than those in the violent condition. A very likely explanation for this finding is that participants in the no game condition were irritated that they did not get to play the game and thus took out their irritation on the confederate as she seemed to be closely associated with the running of the study.

Finally, it should be recognized that although setting the game to “god mode” ensured that all players of varying skill levels would be able to play for the allotted time without being killed, it may not have achieved the goal of ensuring that all players experienced the game in the same way. It is possible that this setting actually removed the game play element from the experience and this may have affected participants’ cognitions toward the game. This issue in particular may account for the relatively small effects sizes: Without the external validity of real, competitive play with the possibility to lose the game, effects may have been attenuated. In addition, this issue may partly explain the somewhat low levels of hostility and aggression overall. Again, without a sense of real competition, both aggression levels and effects sizes may have been smaller than they might be if true competition had occurred.

Overall, future research should recognize that because of the unique characteristics of video game play, direct parallels between television and video games might not be possible. For example, blood as a result of seeing a film character injured appears to operate differently from blood that occurs after a successful “hit” in a video game. This finding has been similar in several studies (see Farrar et al., 2006) and seems to suggest that blood in a video game is a reward, and not a consequence, as it is in many television programs and films. Therefore, although an understanding of the overall effects of game play in general continues to grow (Anderson & Bushman, 2001) as video games become ever more sophisticated, with more game features and options for play, more research is needed to understand how these features function to affect aggressive outcomes.

REFERENCES


