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Video Game Violence and Confederate Gender: Effects on Reward and Punishment Given by College Males

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We examined reward and punishment behavior among male college students ($N = 119$) following video game play. Most participants ($N = 96$) were White, the remainder ($N = 23$) were African American; most were from middle- to upper-middle-class backgrounds. The participants played either a nonviolent (NBA Jam™) or one of three levels of a violent (Mortal Kombat™) video game. After playing the video game for 15 minutes participants rewarded and punished a male or female confederate in a teacher/learner paradigm. Participants rewarded male (but not female) confederates with significantly more jellybeans under the basketball condition than under any of the martial arts conditions. Participants rewarded confederates more under the NBA Jam condition than any of the Mortal Kombat conditions, but the Mortal Kombat conditions did not differ significantly from one another. Participants punished confederates significantly more after playing Mortal Kombat II than after playing NBA Jam. While participants were punished more harshly under the Mortal Kombat II condition than the Mortal Kombat conditions, these differences were not significant. Post hoc analyses showed that females were punished significantly more stringently as game violence increased, but this finding should be interpreted with caution.

Media violence has been of concern to social scientists, parents, and educators for over 30 years. As media violence continues to escalate, so do concerns over the impact of such violence on the behavior of adolescents and youth. In terms of video games, there has been an increase in the violence and brutality of the games and increasingly realistic graphics and sound that yield blood-gushing, bone-crunching special effects. Newer

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games are often played from a "first person shooter" perspective; players kill video characters directly rather than via another character. With the advent of the Sony PlayStation™, analogue controllers and "reality vests" allow the player to *feel* the victim's death struggle. During game play these analogue devices vibrate and twitch when, for example, the player's character chokes or shoots an opponent or is shot by an opponent. This tactile stimulation enhances the sensory experience of video game play, further differentiating it from more passive audiovisual media, such as TV.

Despite recent media claims that video games may be one of the factors that contribute to youth violence (e.g., Grossman, 1999; Howe, 1999; Ingall, 1998; Leo, 1999), there is inconsistent evidence regarding the impact of violent video game play on feelings of hostility, and aggressive behavior. Some researchers (e.g., Anderson & Ford, 1986; Ballard & Wiest, 1996; Irwin & Gross, 1995) have found that participants display more aggression, hostility, and anger after playing more violent video games. Irwin and Gross (1995) found a martial arts game to elicit greater levels of aggression among boys than an exciting, arousing (motorcycle racing) control game. Their results provide evidence for increased object, physical, and verbal aggression following violent video game play. Ballard and Wiest (1996) examined the effect of the *level* of video game violence. They found that male college students displayed more hostility and greater cardiovascular reactivity after playing a violent game (Mortal Combat™) than after playing a nonviolent control game. Further, they found that players displayed significantly greater hostility and cardiovascular reactivity after playing a more violent version of Mortal Combat (the special effect of gushing blood was added to the basic fighting game) than after playing the same game without the added special effect. This indicates that *level* of game violence, and not simply game violence *per se*, is important to examine.

Conversely, Scott (1995) failed to find an increase in hostile or aggressive affect as an effect of level of video game violence. However, rather than using one violent video game with increasing levels of violence, Scott (1995) employed two conceptually different video games that were assumed to represent varying degrees of violence. The loss of control in game type, graphics, and sound that was created by using more than one game to examine the effect of level of violence may have influenced the results of that study.

The results of other studies are also inconsistent in regard to whether or not violent video game play affects overt aggressive behavior. Some studies indicate that violent video game play increases children's overt aggressive behavior (Chambers & Ascione, 1987; Irwin & Gross, 1995; Silvern & Williamson, 1987) as compared to nonviolent video game play. Silvern and Williamson (1987) found both increases in aggressive behavior

and decreases in children's prosocial behavior following violent game play. Yet, several studies (e.g., Cooper & Mackie, 1986; Schutte, Malouff, Post-Gordon, and Rodasta, 1988; Winkel, Novak, & Hopson, 1987) failed to find evidence that playing violent video games increases *serious aggression* toward others.

A few of the studies cited above suggest that *aggressive play*, but not physically aggressive behavior, increases following violent video game play (aggressive play and serious aggression are generally considered different constructs, with different intent, sequelae, etc.; see Pellegrini & Smith, 1998, for a review). Cooper and Mackie (1986) found that girls, but not boys, were more likely to play with aggressive toys following violent video game play. Similarly, in a study by Schutte et al. (1988), children who played a jungle-themed game were more likely to play with a jungle toy, while those who had played a karate game displayed more mock aggression (e.g., modeling karate techniques) in their play. These children did not display increases in serious aggression.

Scott (1995) suggests that the inconsistent findings relative to the impact of video game violence on aggressive behavior may be due to a lack of consistency and validity in the independent and dependent measures used. We further suggest that lack of control over game content has been a weakness in previous studies. In this study we tried to overcome these weaknesses through control of game content and by providing an opportunity for participants to aggress against a competitor in the game. Since there is evidence (e.g., Donnerstein, 1980a, 1980b; Huesmann & Malamuth, 1986) that gender of victim may interact with violent media content to affect aggression, we also examined the effect of gender of confederate on aggressive behavior following video game play.

MEDIA VIOLENCE AND GENDER

The association between television violence and aggressive behavior in children is well documented (see Parke & Slaby, 1983, for a review). In addition, several studies support the contention that adult aggression and attitudes about violence are affected by exposure to violent or sexually violent media, specifically film. While such research has not been performed with video games, there are sexual components to many games. Most of the male and female characters in fighting and action/adventure video games have idealized bodies and wear tight and/or scanty clothing that accentuates their bodies. In a content analysis, Deitz (1998) found that most females portrayed in video games were either large-breasted or very thin and wore low-cut tops and short skirts or pants. In addition, she found

that the most common role for female video game characters is that of the clichéd "Damsel in Distress." This female victim is often in need of rescue from barbarous, ill-mannered men. Most (79%) of the games analyzed by Deitz had violent content; in 21% of the games, violence, such as physical attack and abduction, was directed toward female characters. Further, once a player completes a game through all levels or the end of an adventure, he or she might be "rewarded" with a video that plays spontaneously upon completion of the game. These videos, which are not always related to game content, often include sexualized scenes and hints of male dominance or violence (Funk, Flores, Buchman, & Germann, 1997). Deitz (1998) argues that video game representations of women may cause children to (1) internalize stereotypes of women as being weak and easily victimized and (2) view violence and victimization as a normal, and perhaps enjoyable, part of life.

It is such a mixture of sex and violence that has been found to have the most compelling impact on aggressive behavior. Huesmann and Malamuth (1986) suggest that exposure to sexually violent media interacts with gender of the victim to affect overt aggression and attitudes toward women. Donnerstein's work consistently demonstrates that men exposed to violent or sexually violent films report or demonstrate more aggressive behavior toward women than those exposed to neutral films or nonviolent erotic films (e.g., Linz, Donnerstein, & Penrod, 1984). Further, exposure to sexually violent media increases aggression more markedly against female confederates than male confederates and this effect holds true regardless of whether or not men are angered by the confederate beforehand (Donnerstein, 1980a, 1980b). The strongest aggressive responses are elicited from men who have been (1) angered by a female confederate, (2) exposed to a sexually violent film, and (3) allowed to aggress against the female confederate (Donnerstein, 1980b).

Although sexually violent films elicit the most aggression against female victims, films that are violent, but have no sexual content also produce significantly more aggression against females than do neutral or erotic films (Donnerstein, 1983). Malamuth and Check (1981) also found that men who were exposed to sexually violent films displayed increased acceptance of violence against women. Women exposed to the same films displayed decreased acceptance of violence against women (acceptance of violence against men was not assessed).

There are two primary caveats that one must consider before applying the line of research summarized above to the question at hand. First, the line of research performed by Donnerstein, Malamuth, and their colleagues has been questioned on methodological and analytical grounds (e.g., Mould, 1988a, 1988b; see Mould, 1990, for a review). Donnerstein and Linz (1988)

contend that Mould's critique is inaccurate and outdated. Malamuth (1988) and O'Grady (1988) defend the line of research on violent erotica, citing that the strengths of the research, reliability in results across studies, and the import of the findings outweigh methodological weaknesses. Second, video games are a very different medium from television or film. However, whereas watching violent television or films is a relatively passive pastime, those who play violent video games actively mete out and become the victims of violence and death (Cooper & Mackie, 1986). Subsequently, an increased potential for hostile or aggressive behavior following arousing, violent video game play seems likely (Ballard & Wiest, 1996).

Hypotheses

This study examined the interactive effects of *level* of video game violence with gender of competitor/confederate. Neither of these questions has been addressed adequately in the literature, which has primarily compared violent to nonviolent games and has not examined the effect of gender of competitor. In this study, participants played one of four *increasingly violent* video games against either a male or female competitor and then engaged in a memory task in which rewards (jellybeans) and punishment (immersion in cold pressor device) were administered. We expected an interaction between level of game violence and confederate gender; the male participants were expected to reward female confederates less and punish them more as the level of video game violence increased. We expected a similar pattern of results for male-to-male aggression, but we expected it to be less marked. We expected main effects for the level of video game violence for reward and punishment behavior. Specifically, we expected a decrease in reward and an increase in punishment as violence increased. We did not anticipate main effects for gender of confederate.

METHOD

Participants

Participants included 119 male college students (M age = 21 years). Females were not included since college females seldom play video games (M. E. Ballard, unpublished data). Most of the participants ($N = 96$) were White, the remainder ($N = 23$) were African American. The cells were relatively well balanced for ethnic background. Most of the participants were from middle- to upper-middle-class backgrounds and included a vari-

ety of majors. The participants received either \$5.00 or a 1-hour extra credit slip for their participation.

Materials

Video Games

Mortal Kombat™ (described below) was chosen as the violent video game, as it allowed us to vary the level of violence within the game context, thus retaining control of graphics, sound, controller use, etc. When the study was conducted, Mortal Kombat was the top-selling violent video game and was considered to be the most violent video game at the time. After choosing the violent game, we sought an equivalent nonviolent game. Since a majority of video games, including sports (e.g., football, hockey) and action/adventure games, have violent content (e.g., Deitz, 1998) and many nonviolent adventure games are slow-paced, our options for a nonviolent, yet fast-paced and exciting game were limited to basketball and car racing games. Racing games were eliminated as potential control games because (1) controller movement differs substantively from that in Mortal Kombat and (2) challengers are cars, rather than human figures. A small, informal focus group of undergraduate males, similar to the participants, found NBA Jam T. E.™ (described below) to be the most exciting and challenging of the basketball games and the most similar to Mortal Kombat in terms of pace, difficulty, controller movement, and special effects graphics.

Participants were assigned, in a counterbalanced fashion, to play one of four video games on a SEGA Genesis™ game system. The games (NBA Jam, Mortal Kombat I—no blood, Mortal Kombat I—blood, or Mortal Kombat II) had increasing levels of violence. NBA Jam, the nonviolent control, is an active, arousing game that requires fast reflexes. NBA Jam contains special moves (several buttons are pushed in sequence to complete special moves in NBA Jam and Mortal Kombat) that reward players with flamboyant graphics (e.g., spinning slam dunks, trails of fire, and setting the ball on fire).

Mortal Kombat is a martial arts fighting game in which players attempt to kill one another. The versions of Mortal Kombat used have similar graphics and sound, but differ in level of violence. Mortal Kombat I (MK1) can be played with or without a "blood code." Entering the blood code (MK1-BC) adds the special effect of gushing blood to accompany each act of violence and enables finishing moves such as electrocution, decapitation, and impaling. Mortal Kombat II (MK2) is a more violent version of the

game; gushing blood is always present when a strike occurs and each character uses a weapon (e.g., blades, fireballs, swords, edged fans, bladed hats, acid). MK2 includes more finishing moves, such as breaking the spine, exploding the torso, cannibalism, dismemberment, and soul-stealing. In MK1 and MK1-BC the confederate used the character Scorpion and the participant used the character Kano. In MK2 the confederate used the character Mileena and the participant used the character Kung Lao. The teams in NBA Jam are indistinguishable, so no specific teams were assigned. Several group training sessions were held where the confederates were trained to play the games well and to play them similarly.

Laboratory Setup

The lab was a plain room with a one-way mirror set in one wall. Furnishings included a TV and game device, chairs, and a table. The cold pressor device (a large metal bowl of ice water chilled to 0–2°C), a towel, jellybeans, and a 'reward jar' were on the table. Word lists, with 20 noun pairs drawn from the Peabody Picture Vocabulary Test-Revised, were provided to the confederate and participant. On 5 of the word pairs the response word on the competitor's list (memorized ahead of time) differed from that on the participant's list, so that the competitor automatically "missed" 5 of the 20 word pairs.

Dependent Measures

After playing the video game, the participant ostensibly tested their competitor on his or her recall of the 20 word pairs. The participant's reward and punishment behavior was measured. Reward behavior was

The undergraduate research assistants, who were unaware of the hypotheses, assigned Mileena, a female character, for confederate use in the MK2 condition. The authors did not discover the error in time to change the character without revealing the hypotheses to the research assistants and sacrificing a number of participants, thus all the participants in this condition were run using Mileena. We used post hoc analyses to see if gender of character influenced punishment or reward behavior. Separate analyses were run for two of the game conditions, MK1-BC (male character) and MK2 (female character). If gender of character systematically affected reward and punishment behavior toward the confederates, one gender would be punished more stringently and rewarded less after playing MK1-BC, whereas the opposite would be true for MK2. Male and female confederates were punished similarly in MK1-BC, $F(1, 31) = .31, p = .58$, and MK2, $F(1, 25) = 2.6, p = .12$. Females were rewarded more than males in both the MK1-BC, $F(1, 31) = 3.6, p < .05$, and MK2, $F(1, 25) = 5.5, p < .05$, conditions, suggesting that gender of character did not systematically affect reward behavior toward male and female confederates. However, results involving the MK2 condition should be interpreted with caution.

quantified by counting the *total* number of jellybeans the participant used to reward the confederate for the 15 correct responses. Punishment behavior was quantified as the amount of time that the participant held the confederate's hand in the cold pressor device after each incorrect response. Research assistants, who were unaware of the purpose of the study, stood behind a one-way mirror and measured the length of time from the first ripple on the surface of the water upon immersion of the hand until the first drip into the water upon removal of the hand. Timers were trained to time reliably while running pilot participants. However, to ensure reliability, two timers were used for a subsample of the participants ($N = 15$) and interrater reliability was excellent ($\alpha = .99$).

Procedure

The experimenter met each participant in the lobby adjacent to the lab suite and escorted him to the lab along with a confederate posing as a competitor. (All research assistants were unaware of the hypotheses of the study.) Both the participant and the competitor signed consent forms. The experimenter told the "participants" that they would (1) study a list of 20 word pairs for 3 minutes for a memory experiment, (2) play a video game for 15 minutes, (3) draw slips of paper that would assign "teacher" or "learner" roles, and (4) test or be tested on the word pair list. The participants quietly studied the word lists. They were then asked if they had played the game before (while more of the subjects were familiar with the violent than the nonviolent game, most subjects in each condition had played the games before, specifically: NBA Jam, 69%; MK1, 86%; MK1-BC, 89%; and MK2 [the newest game], 55%) and were given instructions based on their level of competence. Since the competitors were well trained in playing each of the games, they almost invariably won the games. Confederates were instructed to display appropriate, but not exaggerated, pleasure and disappointment during game play. After playing the game, the participant and competitor drew slips of paper to assign roles. The participant always drew the "teacher" role. The participant was instructed to reward the "learner" (their competitor) with jellybeans for a correct answer and to punish him/her, using the cold pressor device, for an incorrect answer. Participants were told to use their discretion in rewarding and punishing the "learner." (Confederates were instructed to display high levels of concentration during this "task," to be stoic during cold pressor immersion, and not to respond verbally or physically to rewards.) Each participant's hand was placed in the cold pressor device as a demonstration. They were instructed to physically place the "learner's" hand into the cold pressor,

release the arm, wait, and ask the "learner" to remove his/her hand from the device. According to the script, each "learner" missed 5 of the 20 word pairs. Trained research assistants timed immersion in the cold pressor device after each incorrect answer. The experimenter took notes regarding the participant's behavior during the testing phase, but this was a ruse to aid in obfuscating the hypotheses. Research assistants and participants were debriefed by one of the two authors after their role in the experiment was complete.

RESULTS

Data Reduction and Transformation

Rewards (jellybeans) were divided by 15 (the correct number of responses) for use in the analysis. The five data points for the cold pressor device were tallied and averaged for use in the analysis. Individual differences in how participants approached rewarding and punishing the learners yielded large variances and standard deviations (*SDs*). Some participants picked up jellybeans with their fingertips, collecting a few each time, whereas other participants grabbed a handful of jellybeans, collecting many each time. Likewise, some participants seemed unfazed by placing their competitor's hand in the ice water, while others appeared less at ease in causing discomfort to the confederate.

As a result of these large variances and *SDs*, and positively skewed distributions, the data violate the assumptions of ANOVA. Since reward behavior was measured as a count (number of jellybeans), square-root transformation was used for reward behavior (Howell, 1987; Kirk, 1982). As punishment behavior was measured in terms of time, logarithmic transformation was used for punishment behavior (Howell, 1987; Kirk, 1982). These transformed variables were used in the analyses; nontransformed means and *SDs* are reported below. A level of significance of $p < .05$ was set for the primary analyses and of $p < .01$ for post hoc analyses.

Analyses

First, a between-subjects 4 (game) by 2 (gender of confederate) MANOVA was used to examine the dependent variables of reward and punishment behavior. The game-by-confederate interaction was significant, Hotelling's $F(6, 210) = 2.35, p < .05$. The main effect for game was also

significant, Hotelling's $F(6, 214) = 3.51, p < .01$. The main effect gender of confederate was not significant.

Reward Behavior

Univariate follow-up tests for reward behavior [a between-subjects 4 (game) by 2 (gender of confederate) ANOVA] yielded a significant game-by-gender of confederate interaction, $F(3, 111) = 3.08, p < .05$, and a significant main effect for game, $F(3, 111) = 4.42, p < .01$ (see Figs. 1 and 2, respectively). There was no main effect of gender. To examine the game by confederate interaction, simple main effects tests (Tukeys) were performed holding gender of confederate constant to examine level of game violence. These simple effects tests indicate that reward of male confederates was affected by level of game violence, $F(3, 52) = 4.86, p < .01$. Female confederates were rewarded similarly regardless of the game played. The participants rewarded male confederates with significantly more jellybeans under the NBA Jam condition than any of the Mortal Kombat conditions; MK conditions did not differ significantly from one another (see Table 1 for means and SDs).

Punishment Behavior

Univariate follow-up tests (described above) examining punishment behavior yielded a main effect for game, $F(3, 111) = 3.19, p < .05$. Tukey

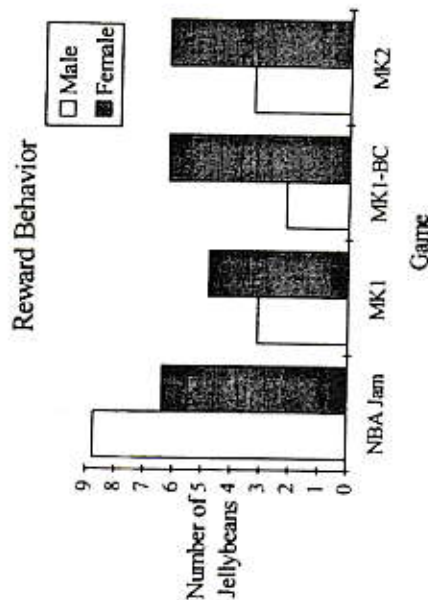


Fig. 1. Reward behavior (number of jellybeans) as a function of game condition for male and female competitors.

Main Effect - Reward

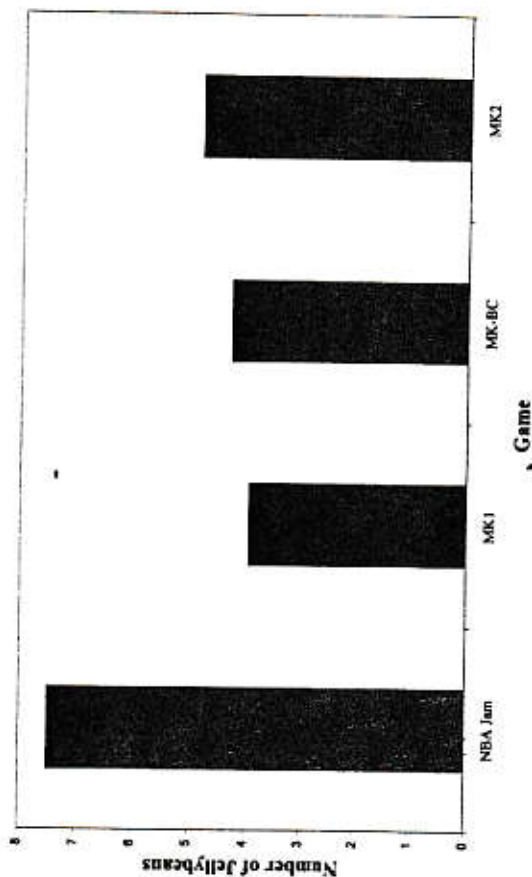


Fig. 2. Reward behavior (number of jellybeans) as a function of game condition.

tests were used to examine mean differences and to control for familywise error. Overall, confederates were punished significantly more aggressively under the MK2 condition than the NBA Jam condition (see Table 1 for means and SDs). Participants punished confederates more harshly after playing MK2 than MK1 or MK1-BC (see Fig. 3), but these differences were not significant.

Neither the main effect of gender nor the game-by-confederate interaction was significant. However, based on the hypothesis and, arguably, justified by the significant MANOVA (Bray & Maxwell, 1982; Haase & Ellis, 1987), post hoc analyses (one-way ANOVAs holding gender constant; p set at $< .01$) were used to explore differences in punishment based on the gender of the confederate. These analyses indicated that level of game

Table 1. Means and Standard Deviations for Reward and Punishment Behavior

	Game			
	NBA Jam	MK1	MK1-BC	MK2
Reward (male confederate)	8.76 (8.34)	3.10 (2.00)	2.15 (1.47)	3.30 (2.41)
Punishment (main effect)	4.62 (6.12)	5.10 (2.87)	3.94 (1.89)	5.62 (3.16)
Punishment (female confederate)	3.26 (1.43)	4.52 (1.81)	4.47 (2.14)	5.77 (2.77)

Note: Standard deviations are in parentheses.

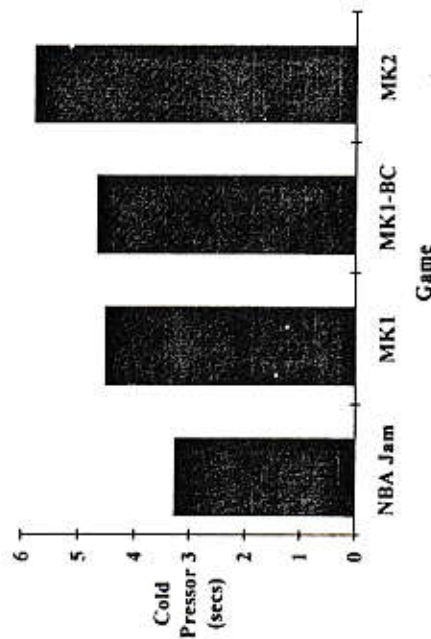
Punishment Behavior
(Main Effect)

Fig. 3. Punishment behavior (seconds of cold pressor) as a function of game condition.

violence did not significantly affect punishment of male confederates. Punishment of female confederates was influenced by the level of game violence $F(3, 55) = 4.41, p < .01$. Sheffé tests indicated that the participants held female confederates' hands in the ice water significantly longer in the MK2 condition than in the NBA Jam condition ($p > .01$; see Table 1 for means and SDs).¹ Mean punishment for MK1 and MK1-BC lay between the scores for NBA Jam and MK2, and did not differ significantly. The linear trend across the four conditions was significant, $F(57) = 10.12, p < .01$, indicating that punishment increased in a linear fashion as level of game violence increased (see Fig. 4).

DISCUSSION

We examined the impact of violent video game play and gender of competitor on reward and punishment behavior. The hypotheses were partially supported. There was a game-by-gender of confederate interaction and main effect of level of game violence for reward behavior and a main effect of game for punishment behavior. In addition, post hoc analyses

¹To assure that this effect was not moderated by sex of character, we also performed this post hoc analysis with sex of character as a covariate (one-way between-subjects ANOVCA with game as the IV, holding gender constant). The effect of game remained significant, $F(3, 55) = 3.41, p < .05$, but the covariate was not significant.

Punishment Behavior

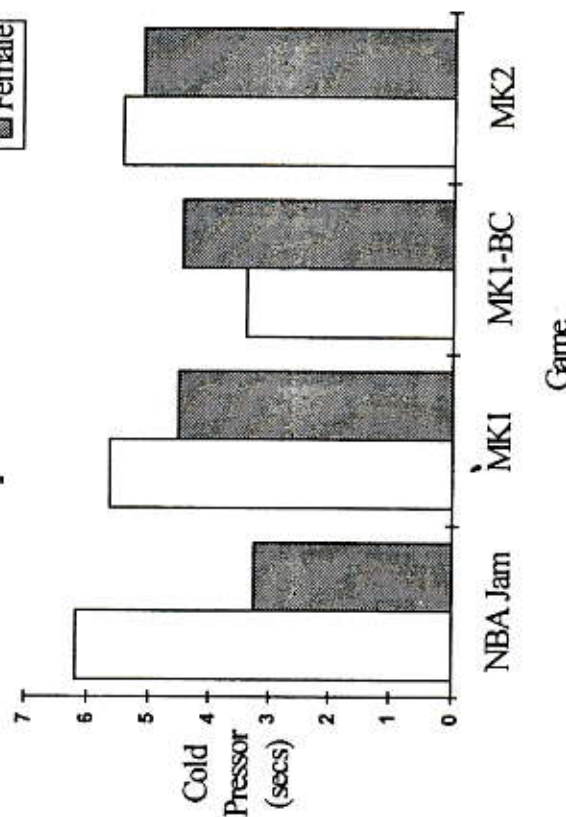


Fig. 4. Punishment behavior (seconds of cold pressor) as a function of game condition for male and female competitors.

suggest that punishment increased significantly for females as level of video game violence increased.

The most compelling results involve the significant interaction between level of game violence and gender of confederate for reward behavior. The male participants rewarded other males significantly less under the violent game conditions, while females were rewarded similarly across conditions. Few studies have examined the impact of video game violence on reward behavior. However, Silvern and Williamson (1987) found that prosocial behavior decreased after children played a violent video game. The results of the current study are consistent with those findings. However, men differed in reward behavior only toward other men and between only the nonviolent and violent games. Thus, it may be that reward behavior toward other men is affected more by video game violence per se than the level of violence of the game and that reward behavior toward women is not impacted as easily by game content.

Post hoc analyses indicated that gender of confederate may affect punishment behavior following violent video game play. Whereas male

confederates were not punished differently across varying levels of violence, females were punished most aggressively when the participants were exposed to the most violent version of *Mortal Combat* (MK2). Further, punishment scores for MK1 and MK1-BC lay between those for NBA Jam and MK2, and although the differences were not significant, the linear trend across levels of violence was significant. These results are consistent with other research examining the effects of gender of victim and media violence (Donnerstein, 1980a, 1980b; 1983; Huesmann & Malamuth, 1986; Linz et al., 1984; Malamuth & Check, 1981). In our study, women and men were treated differently by the participants after exposure to increasingly violent media. Further, there was not just a difference in punishment behavior between the nonviolent and violent games, but punishment became more stringent for women as the level of violence in the games escalated (see Fig. 3).

Contrary to the hypothesis, reward did not decrease significantly (even while punishment increased) across conditions for female confederates. Nor did punishment of male confederates increase significantly (even as reward behavior decreased) from violent to nonviolent conditions for male confederates. Overall, the correlations between reward and punishment behavior were stable and negative, but weak, with r s ranging from $-.06$ to $-.11$. The weak relation between the dependent variables may be due to the fact that they were measured as different units (number of jellybeans versus time of immersion in cold pressor), or something in the context of the situation or the interaction of the participants may have impacted reward and punishment behavior differently for males and females.

Taken as a whole, the results suggest that video game violence may decrease reward behavior toward others, particularly males, and increase punitive behavior toward others, especially females. If these findings generalize to natural settings, playing violent video games could have immediate negative consequences on interpersonal interactions. While our laboratory environment differed substantially from a video arcade or dormitory room, the competitive experimental context, where the participants were almost invariably beaten in the game, should mimic similar natural situations to some extent. [Anecdotal reports suggest that both object (i.e., destroying game controllers, hardware, and televisions) and physical (fighting) aggression among males are relatively common sequelae of violent video game play in the dorms on this campus.] There is evidence that competitive situations tend to increase aggression (Anderson & Morrow, 1995). A combination of violence and competition may serve to heighten aggression. This possibility may be especially salient in terms of female competitors, since competition is a normative aspect of male-to-male, but not male-to-female, interactions and friendships (Kilmartin, 1994). Thus men may not

be used to competing against, and being beaten by, female competitors and may respond with more camaraderie to similar competition, even if they lose, with other men. (This may be particularly true of the basketball context, since basketball seems to be an important social and friendship activity for many men.) Further, Donnerstein (1980b) found that men were most aggressive when they were angered by a female confederate and were then allowed to aggress against her following viewing a sexually violent film. Perhaps some of the participants were angered by losing to a woman on a task that they perceived to be masculine and then took their anger at losing out on her in the teacher/learner paradigm, with the level of violence in the game played serving to moderate this effect. However, gendered perceptions of the task and level of participant anger were not measured, so this hypothesis should be directly explored in the future.

Finally, the hypothesis that level of game violence would affect reward and punishment behavior was supported, although these findings are qualified by the interactions described above. Overall, participants rewarded the confederates most under the nonviolent game condition and punished them most aggressively under the most violent game condition. Although Ballard and Wiest (1996) and Anderson and Ford (1986) found that increases in video game violence increased hostility, others (Cooper & Mackie, 1986; Winkel et al., 1987) failed to find increased aggressive behavior after violent video game play. Our results suggest that level of game violence does affect interpersonal behavior overall but, more importantly, suggests that this effect is moderated by other factors, including gender of victim.

There are some weaknesses in the study that must be addressed. The primary weakness involves the use of Mileena in the MK2 condition. However, stringent post hoc analyses (see previous footnotes) suggest that gender of character did not affect reward or punishment behavior in a systematic fashion. To better answer the question of the effect of gender of character, this variable should be directly examined in future studies. Second, we could reduce the variability caused by individual differences in reward and punishment behavior by providing specific levels of reward and punishment (i.e., 1, 3, or 5 jellybeans or 1, 3, or 5 seconds of cold pressor), rather than allowing the participants to reward and punish at will. Third, for logistic reasons, we did not control for gender or ethnic background of experimenter; however, these variables were balanced across conditions. Fourth, although our participants were relatively heterogeneous in terms of ethnicity and majors for a 'convenience' sample, this project should be replicated with broader samples, including children and adolescents. Fifth, we used only male participants in the study because fewer college-aged women regularly play video games and we were interested in gathering

data with practical significance. However, as young girls are increasingly becoming involved in video game play, the relation between video game play and aggression should be examined among females as well. Sixth, we cannot assure that the confederates behaved in a nongendered fashion when interacting with participants; however, since gendered behavior interacts with gender in day-to-day situations, we do not think this affects the validity of the results. Finally, since the control game was chosen through a process of elimination to find the most equivalent game, we did not explicitly examine the level of arousal or excitement produced by the games. If violent video games are more intrinsically exciting and arousing than nonviolent games, it may be arousal rather than violence per se that elicits higher levels of aggression and hostility.

In addition to the directions for research suggested above, we should also expand this research in terms of the variables examined. For example, physiological and affective measures (such as levels of anger or hostility) could be used in addition to the behavioral measures of reward and punishment. Further, to examine the suggestion that men's anger further moderated their behavior toward women, we could use a paradigm similar to that of Donnerstein whereby participants are deliberately angered by the confederate during the procedure. Finally, since exposure to video game play might serve to sensitize and/or desensitize players to game violence, we should investigate the roles of prior video game experience and time of exposure on behavioral sequelae of video game play.

SUMMARY

In light of recent media controversy about the role of violent video games on violent behavior among teens (e.g., Grossman, 1999; Howe, 1999; Ingall, 1998; Leo, 1999), the results of this study seem particularly salient. Our results, both in this study and elsewhere (Ballard & Weist, 1996), provide evidence that video game violence and level of video game violence affect aggressive behavior, reward behavior, feelings of hostility, and cardiovascular reactivity. Violent video games are arousing (e.g., Griffiths & Dancaster, 1995; Kubey & Larson, 1990), fun (Mehrabian & Wixen, 1986), and, according to anecdotal reports and observation, often frustrating. It is our conclusion that, under some circumstances, perhaps following intense competition or frustrating game play, violent video game play may have an immediate negative effect on interpersonal interactions. We would expect these negative behaviors to be relatively minor, ranging from behavioral and verbal crankiness to possible fisticuffs. Given our findings, females may be the more likely victims of such hostility. However, we doubt that

violent video game play is directly related to a pattern of serious or explosive violence. While exposure to violent media over time might have a desensitizing effect, it is unlikely that it is solely exposure to violent material that culminates in violence. Rather, it is likely that violent behavior develops as the result of the interaction of multiple biological and environmental risk factors, one of which may prove to be violent media.

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Does Alternating Between Masculine and Feminine Pronouns Eliminate Perceived Gender Bias in Text?

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This study explores whether alternating between the pronouns "he" and "she" in a text is an effective way to avoid sexist language. Participants were psychology students at a large midwestern university and were predominantly White and from middle-class backgrounds. Students read two versions of an essay, one that alternated between masculine and feminine pronouns and one that exclusively used paired, "he or she"-type pronouns. Readers perceived the alternating version to be biased in favor of females and lower in overall quality than the paired version. However, the alternating version appeared to be more effective at combating sexism, suggesting an alternating strategy may be desirable for authors with this goal. If the author is not primarily concerned with increasing readers' awareness of gender issues, techniques such as pluralization or the singular "they" may be more appropriate.

INTRODUCTION

Sexist language has been barred from academic and professional writing by a number of professional organizations including the American Psychological Association (APA) (1994), the Modern Language Association (Gibaldi, 1998), the American Medical Association (1998), the American Marketing Association (AMA 1996), and the Association of American

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