Virtually Justifiable Homicide: The Effects of Prosocial Contexts on the Link Between Violent Video Games, Aggression, and Prosocial and Hostile Cognition

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INTRODUCTION

Recent decades have seen a rise in playing video games. Many of the games have also become increasingly realistic, interactive, and explicit in depicting violent activity. Parents, pundits, and others have wondered whether committing simulated acts of violence leads to committing real-world violence. While little evidence exists to suggest that video games can elicit the type of real-world violence that many parents are concerned about, a meta-analysis by Anderson et al. (2010) concluded that violent games can elicit increases in aggressive behavior. Others, however, have found the evidence to be equivocal and suggest that combining all violent games into one category might oversimplify the issue (Sherry, 2001). If the effects of playing such games on subsequent aggression are indeed inconsistent, then it is important to identify factors that might reduce the effect of violent video games on aggressive behavior.

Previous research has shown that the effect of violent games on aggressive behavior may be due to the elicitation of hostile thoughts by such violent games (e.g., Carnagey & Anderson, 2005). One potential way to dampen the effects of hostile cognitive priming could be via the co-elicitation of prosocial/positive thoughts.

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Storyline offers one possible avenue to activate a prosocial mindset while affording the entertainment of violent content—or whatever it is that entices individuals to play violent games. By way of analogy, early research established that watching film violence can increase aggression (e.g., Berkowitz & Geen, 1966), but further studies reduced that effect by manipulating the story and context for the on-screen mayhem (e.g., Geen & Berkowitz, 1967; Geen & Stonner, 1973).

In the present investigation, participants played one of two zombie-killing games or a nonviolent control game. In one of the zombie-killing games, the goal was to save a friend from the zombies so as to enable the friend to carry out a task. In the other, the motivations of the character were morally ambiguous and the zombies were to be killed mainly for sport. We predicted that subsequent aggression toward a human participant (in the context of a laboratory game) would be higher following the morally ambiguous violent game than the explicitly prosocial violent game. A follow up study tested the effect of prosocial content on players’ mindset, with the prediction being that the explicitly prosocially violent game would elicit stronger prosocial mindsets than the morally ambiguous violent game.

Media Violence and Its Context

Anderson and Busman’s (2002) General Aggression Model (GAM) proposes a mechanism by which violent stimuli, such as violent video games, increase short-term and long-term aggression. For the current article, the short-term effects are most relevant, as we did not examine long-term effects. The GAM holds that the variables that produce short-term aggression do so by priming aggressive cognitions, inducing angry affect, and/or increasing arousal. Several studies have found that playing violent video games led to increases in aggressive cognitions (Calvert & Tan, 1994; Carnagey & Anderson, 2005; Kirsh, Olzak, & Mounts, 2005; Krahe & Möller, 2004), angry affect (Anderson & Ford, 1986; Carnagey & Anderson, 2005), and most importantly, aggressive behavior (Anderson & Dill, 2000; Carnagey & Anderson, 2005; Irwin & Gross, 1995). Personological variables such as trait aggression are allowed to moderate this relationship. For example, people with a more aggressive personality might be more strongly influenced by aggressive situational variables than those with less aggressive personalities.

Media effects on behavior are not limited to violent media stimulating aggression. Media can also stimulate prosocial behavior through a similar process as is suggested with the GAM. Several studies have shown that prosocial thoughts and behavior can be increased by playing video games (Gentile et al., 2009; Greitemeyer & Osswald, 2010) and listening to music (Gritemeyer, 2009) that contain prosocial themes. There is nothing in the essential nature of video games, music, or any other medium that increases aggression (or helpfulness). Rather it is the content within the game that can alter human behavior. Games containing antisocial context will stimulate aggressive thoughts, feelings, and behavior, whereas prosocially oriented games will encourage prosocial outcomes. Recognizing this, Buckley and Anderson (2006) modified the GAM into the General Learning Model (GLM), which states that the associated effects of media on cognition, affect, and behavior will depend on the content of those media.

Whether a game is strictly prosocial or antisocial is not often clear, however. In many violent video games, the protagonist engages in aggressive behavior due to virtuous motives (e.g., saving the world). Such prosocial contexts could reduce the effect of violent media on aggressive behaviors and thoughts. In a recent meta-analysis by Anderson et al. (2010), however, no differences were found as a function of whether the main character was depicted as a hero or a criminal. This suggests that the inclusion of prosocial context in violent games may not reduce their effect on aggression. Meta-analytic procedures are not as ideal as experimental studies for testing such effects, however. Coding strategies, such as those employed in the Anderson meta-analysis require a researcher to categorize each game character as either a hero or a criminal. The motives of characters in modern video games might not fit neatly into one of these categories. For example, at first glance the main characters in the popular Grand Theft Auto series could be classified as criminals: They work for criminal organizations and engage in criminal behaviors such as stealing, arson, and murder. Quite frequently, however, these criminal actions are motivated by some prosocial intent, such as protecting innocent victims, stealing in order to provide for the poor, and fighting against a corrupt political system. The coding strategy of the Anderson meta-analysis likely could not account for this mixing of prosocial and antisocial motives and therefore cannot fully address the potential impact of prosocial storyline on the relationship between violent games and aggression.

There are several ways that prosocial context could moderate the relationship between violent games and aggressive behavior. First, prosocial game contexts might change the player’s interpretation of the aggressive behavior. As suggested by Berkowitz (1984), if the observed behavior is not interpreted as aggression, it should not activate hostile thoughts and therefore should not increase aggression. In an effort to support this claim, Berkowitz and Alioto (1973) had angered men watch film clips of football and boxing matches under different conditions of context. Participants who were led to
interpret the sporting matches as aggressive (the players were trying to injure each other) later behaved aggressively themselves. In contrast, significantly less aggression was exhibited by participants who had been led to interpret the sporting matches as nonaggressive (the players were simply engaging in their chosen profession). Prosocial content might be especially effective at altering an individual’s interpretation of violent content. Calvert, Murray, and Conger (2004) found that when shown clips of heroic aggression, children tended to identify more with the prosocial than antisocial qualities of the hero. The way an individual interprets aggressive stimuli also appears to influence the effect of those violent stimuli on hostile thoughts. Bartholow, Anderson, Carnagey, and Benjamin (2005) found that hunters did not show the typical weapons effect (i.e., exposure to guns leads to an increase in hostile cognition and consequently an increase in aggressive behavior) when exposed to images of hunting rifles. Apparently, whereas non-hunters generally associate hunting rifles with hostile intent, hunters are more likely to associate hunting rifles with positive concepts (e.g., spending time with friends and family). Thus, benign experience can alter interpretations, cued thoughts, and ultimately behavior.

Another potential way in which prosocial contexts in violent games could mitigate the effect of such games on aggression is by increasing prosocial thoughts that compete with the hostile thoughts for attention. The GLM (Buckley & Anderson, 2006) suggests that experiences with different types of content lead to the development of associative networks, or knowledge structures, related to that content. Once these knowledge structures have been developed, immediate exposure to similar content will make those knowledge structures more accessible. Exposure to violent content will therefore lead to the development of hostile knowledge structures which can be activated upon future exposure to violent stimuli, increasing the likelihood of aggression. Similarly, exposure to prosocial content will lead to the development of prosocial knowledge structures which should be activated upon exposure to prosocial stimuli, increasing the likelihood of prosocial behavior. These processes likely do not run independently of each other. Exposure to prosocial and hostile content at the same time should lead to greater accessibility of both prosocial and hostile knowledge structures than before exposure. This should lead to a decrease in the likelihood of aggressive behavior due to an increased overall behavioral repertoire accessible to the individual containing both hostile and prosocial scripts than if the individual were exposed to a violent game without prosocial content.

Taken together, these findings point toward potential exceptions to the general pattern in which media violence increases aggression. If the aggression is depicted as justified by explicitly prosocial intent, then it should not incite as much aggression as when that violence is depicted as wanton or vindictive in nature. Hence, we hypothesized that violent games set in the context of prosocial intent should lead to less aggression than violent games without such justification.

**STUDY 1**

**Method**

**Stimulus materials: video games.** The present study used two variants of a violent game (*Evil Dead*), in which the player uses a shotgun and chainsaw to kill hordes of attacking zombies. The two versions have similar mechanics, graphics, and numbers of violent acts. In the explicitly prosocial game (*Regeneration*), players were instructed to protect another character (as well as themselves) from the zombies and aid in that other character’s goal (i.e., collecting several objects and returning them to a central location without allowing the other character to be killed). In the morally ambiguous game (*Fistful of Boomstick*), we told the participants that their goal was solely to kill as many zombies as possible. We give this condition the term *morally ambiguous* rather than *antisocial* because in the game the character could be implied to have prosocial motives (e.g., save the town/world) but his actions are less overtly driven by prosocial motives as is the case of the explicitly prosocial game.

In a separate pilot study, we had male participants (*N = 20*) play either violent game for 15 min and then rate the game on several different items. Subjects did not differ in ratings of how much they felt the games were difficult, enjoyable, frustrating, exciting, violent, and gory, all *Fs < 1*. Participants who played the explicitly prosocial violent video game did score higher than those who played the morally ambiguous violent game on two items assessing participants’ perception that they were helping someone and the importance of helping in the game (*α = .88*), *F* (1,18) = 17.01, *P < .001*. After the full study was complete, we had two raters watch recordings of the game play and count the number aggressive acts (i.e., shotgun blasts and chainsaw swings) by the players (*α = .89*). ANOVA revealed no difference between the morally ambiguous violent game (*M = 441.65*) and the explicitly prosocial violent game (*M = 398.74*), *F* (1, 51) = 1.59, *ns.*
A third game, *Tetris Worlds*, a nonviolent, abstract puzzle game was included as a control group. This game differs in game play style from the two violent games used in this study and therefore would not suffice for most studies on the effect of violent video games on aggression (see Anderson, Gentile & Buckley, 2007). Nevertheless, our intent was to provide a control group that would be equivalent to playing a normal video game so that we could gauge the significance of any decreases in aggression between the two violent game conditions compared to normal conditions. The purpose of the current study was to test the hypothesis that a prosocial context would lead to less aggression than a game with a morally ambiguous context, rather than simply replicating the previously found effect that violent video games increase aggression.

**Participants.** Because males tend to be more aggressive than females, play more video games, and have higher relative preference for violent video games (Krahé, Busching, & Möller, 2009), we used only male participants for this study. One hundred male participants were recruited from a general pool of introductory psychology students and received partial course credit. The 19 who expressed suspicion about the purpose of the study (e.g., that it intended to study the effects of violent video game play on aggression or doubted that the partner they played a reaction time game with actually existed) were excluded from the analyses reported here. Inclusion of these participants did not substantially change the results. The number of participants excluded from the analyses was distributed relatively evenly across conditions leaving 28 participants in the nonviolent game condition, 26 in the morally ambiguous violent game condition, and 27 in the explicitly prosocial violent game condition.

**Procedure.** Upon arrival, the participant was informed that his partner was running late and that the experimenter would get them started on the study. After obtaining informed consent, participants were given a tutorial on the Taylor Competitive Reaction Time (CRT) task. We gave the tutorial prior to the video game exposure to reduce the amount of time that would elapse between playing the video games and assessing participants levels of aggression. The CRT is a valid measure of aggression (Giancola & Parrott, 2008) and has been used frequently as a measure of aggressive behavior in research on violent video games and aggression (e.g., Anderson & Bushman, 1997; Anderson & Dill, 2000). Participants were told they were competing with another participant to respond as quickly as possible to an auditory and visual cue with a mouse click. The “loser” of each trial heard an unpleasant blast of white noise through headphones, the intensity and duration of which were set by the “winner.” In reality, the computer was preset such that the participant would win 13 trials and lose 12. The intensity and duration of the noise blasts on losing trials was preselected and randomized by the experimenter. All participants experienced the same noise blasts on each trial and (supposedly) won and lost the same trials. Once the participant set the intensity and duration levels, a brief prompt and then an auditory cue where presented, whereupon the participant was to click the mouse button as quickly as possible. If the participant lost that trial, he heard the noise blast delivered through headphones. If he won, the intensity set by his partner was displayed on the screen, but the participant did not receive the noise blast.

Recent research has shown intensity settings on the CRT to be more strongly associated with trait aggressiveness than duration settings (Ferguson, Smith, Miller-Stratton, Fritz, & Heinrich, 2008). Consistent with this, the duration measure did not vary across participants in any of the conditions in our sample. Therefore, we will only discuss findings pertaining to the intensity measure.

Following the CRT tutorial, participants were given instructions as to how to play the video game they were assigned to and then were left to play the game. Their progress in the game was recorded. After 15 min of play, the instructions for the CRT were reiterated, and participants played it with their “partner.” After completion of the CRT participants completed a measure of trait aggressiveness (Buss & Perry, 1992). Participants also indicated how many hours per week they played video games as well as a list of their three favorite video games and their rating of how violent each game is on a five-point scale (1 = not at all violent, 5 = very violent). These scales were included at the end of the study to reduce the likelihood of suspicion. Participants were then probed carefully for suspicion and debriefed.

**Results**

Because the GAM suggests that personological factors influence the effect of violent media on aggressive behavior we assessed two potential covariates in Study 1: trait aggression and experience with violent video games. The latter was calculated by averaging the self-rated violence levels of the participant’s three favorite video games and then multiplying the Z-score of this variable by the Z-score of the number of hours per week that he played video games. Scores on these scales did not differ based on condition, did not correlate with any of the dependent measures, and did not moderate any of the effects of condition. We therefore did not include these covariates in the analyses. Analyses conducted including these controls did not substantively change the findings.

The first trial on the CRT is considered by some to be a more pure measure of aggression than the remaining trials, because after the first trial players tend to reciprocate what their partner did on the previous trial.
TABLE I. Aggressive Behavior by Condition

<table>
<thead>
<tr>
<th>Condition</th>
<th>Unprovoked</th>
<th>Win trial response</th>
<th>Loss trial response</th>
<th>All trials combined</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Nonviolent game</td>
<td>5.07a</td>
<td>1.54</td>
<td>5.71a</td>
<td>1.27</td>
</tr>
<tr>
<td>Morally ambiguous violent game</td>
<td>6.69b</td>
<td>2.11</td>
<td>6.37a</td>
<td>1.39</td>
</tr>
<tr>
<td>Explicitly prosocial violent game</td>
<td>5.48a</td>
<td>2.15</td>
<td>6.07a</td>
<td>1.46</td>
</tr>
</tbody>
</table>

Means with different subscripts within the same column are significantly different from each other at the P < .05 level.

(Bushman & Baumeister, 1998). Hence we followed the practice of analyzing the first trial response alone. A one-way ANOVA of game condition on the first trial of the noise blast game indicated significant variation across conditions, $F(2, 78) = 4.99$, $P < .01$. Consistent with predictions, pairwise comparisons revealed that participants in the explicitly prosocial violent game condition were significantly less aggressive than those in the morally ambiguous violent game condition, $F(1, 78) = 5.93$, $P < .05$, $d = .57$, but they did not differ significantly from participants in the nonviolent game condition, $F(1, 78) < 1$, $ns$, $d = .22$. Consistent with previous research, participants in the morally ambiguous violent game condition were more aggressive than those in the nonviolent game condition, $F(1, 78) = 9.15$, $P < .005$, $d = .89$. Mean scores and standard deviations for this analysis and additional analyses on the subsequent trials of the CRT can be found in Table 1.

1 Additional analyses were conducted on trials following a win vs. a loss as well as all 25 trials together. Previous research has shown that aggression effects tend to be larger after losses than wins on the CRT, presumably because people feel good after winning (Anderson & Dill, 2000). On trials following a win (no provocation/retaliation), there was no effect of condition on aggression, $F(2, 78) = 1.55$, $ns$. After losing, however, aggression differed significantly by condition, $F(2, 78) = 4.77$, $P < .05$. The explicitly prosocial violent game again produced less aggression than the morally ambiguous violent game $F(1, 78) = 4.61$, $P < .05$, $d = .54$ and was not different from the nonviolent control game, $F(1, 78) = .72$, $ns$, $d = .26$. The morally ambiguous violent game produced higher aggression than the nonviolent control, $F(1, 78) = 9.05$, $P < .005$, $d = .82$.

Finally, we did conduct analyses for all 25 trials together. A one-way analysis of variance of the effect of violent game condition on subsequent average aggression across the 25 trials revealed significant variation across conditions, $F(2, 78) = 3.79$, $P < .05$. Pairwise comparisons revealed a significant difference between participants in the morally ambiguous violent game and the nonviolent game condition, $F(1, 78) = 7.46$, $P < .01$, $d = .76$. Participants who played the explicitly prosocial violent game did not differ significantly from those who played the nonviolent game, $F(1, 78) = 1.06$, $ns$, $d = .29$. There was a trend for participants in the explicitly prosocial violent game condition to be less aggressive than those in the morally ambiguous game condition, this effect did not reach significance, $F(1, 78) = 2.87$, $P = .09$, $d = .44$. This is not surprising as we previously did not find increases in aggression on trials following a win by the participant. The inclusion of these trials with the other trials where we found significant effects likely washed out the differences.

STUDY 2

Study 1 found that the addition of an explicitly prosocial context in a violent video game led to significantly lowered aggression compared to a violent video game lacking such strong prosocial context. Counter to the proposition by Berkowitz (1984) that explaining violence as stemming from nonaggressive intent would reduce perceptions of violence, participants in the pilot study did not rate the violence in the two games as different. An alternative possibility is that the reduction in aggression results from an increase in prosocial or decrease in antisocial thoughts in memory. Consistent with this, pilot participants from Study 1 did not report feeling more prosocial while playing the explicitly prosocial context violent game compared to the morally ambiguous violent game. It therefore seemed pertinent to test for the effect of violent video games with varying levels of prosocial context on the accessibility of prosocial and hostile thoughts.

Method

Pilot test. A potential criticism of Study 1 is that we did not pilot test the nonviolent game to ensure it was similar to the violent video games on factors other than the amount of violence contained within. We therefore conducted a pilot test of the games used in Study 2 to correct for this issue.

Forty-one participants took part in the pilot study. In addition to the control game from Study 1, Tetris: Worlds, we included Need for Speed: Underground, We Love Katamari, and Snowboard Supercross (SSX 3) as alternative nonviolent games. Participants played all four nonviolent games as well as the two violent games from the first study for 7 min. The order in which participants played these games was randomized. After playing each game, participants rated how difficult, enjoyable, exciting, fast, frustrating, and violent they found each game (Anderson & Ford, 1986). Results indicated that SSX 3 was most similar to the target video games along these dimensions (see Table II for means and standard deviations). Therefore, this game was included as the nonviolent game in Study 2. Differences in the pilot study did not rate the violence in the two games as different. An alternative possibility is that the reduction in aggression results from an increase in prosocial or decrease in antisocial thoughts in memory. Consistent with this, pilot participants from Study 1 did not report feeling more prosocial while playing the explicitly prosocial context violent game compared to the morally ambiguous violent game. It therefore seemed pertinent to test for the effect of violent video games with varying levels of prosocial context on the accessibility of prosocial and hostile thoughts.
remained, however, between this game and the two violent games. To control for these differences, we included the video game rating sheet used in the pilot study in the full study. Another change from Study 1 to the current study was the inclusion of female participants.

**Participants.** A total of 132 (53% male) undergraduates were recruited for a study on the effect of video games on cognitive processes and received course credit for participation. Upon probing for suspicion, one participant spontaneously identified that he was aware the word completion task used as our dependent variable was assessing hostile and prosocial content (those were not the participant’s exact words, but that was the gist of his statement). Therefore, that participant was excluded from all analyses.

**Procedure.** After agreeing to participate, participants were first given a tutorial on the game that they would play. After this tutorial, participants played either SSX 3, Evil Dead: Regeneration, or Evil Dead: A Fistful of Boomstick for 15 min. Upon completion of their playtime, participants completed a word fragment task modified from (Sestir & Bartholow, 2010). Participants were given a sheet of 98 word fragments and given 5 min to complete as many as possible. Of the 98 fragments, 30 could be completed with either neutral or hostile words (E N_A G E) and another 30 could be completed with either neutral or prosocial words (e.g., S _ _ E). Participants were instructed that they would have 5 min to complete the word fragments in any order that they choose. Participants were then left to complete the word fragment task. After 5 min had elapsed, the experimenter returned to collect the word fragment sheet and administer a battery of survey items including the measures used in Study 1 as well as the video game rating sheet. After completion of the survey items, participants were probed for suspicion, debriefed, and escorted out of the laboratory.

Previous studies have used the raw number of prosocial or hostile word stems completed by participants as an indicator of the accessibility of these concepts in memory (e.g., Sestir & Bartholow, 2010). These studies, however, assessed either prosocial or hostile cognition independently. The current study assessed these concepts simultaneously and participants were informed that they could complete them in any order they choose. Therefore, a participant’s tendency to respond to any particular word stem is influenced not only by their vocabulary and the accessibility of hostile or prosocial concepts in memory, but also their attention to those particular items over the other competing items. Therefore, we analyzed the results by looking at the proportion of prosocial, or hostile, word stems completed as a proportion to the total number of words they completed as was done previously by Anderson, Carnagey, and Eubanks (2003).

**RESULTS AND DISCUSSION**

**Preliminary Analyses**

Given that our nonviolent game was not perfectly comparable to our violent games in the pilot test, we first analyzed differences in participants’ ratings of the video games on the video game rating items. There were significant or marginally significant differences between the violent and nonviolent games in participants’ ratings of how difficult, $F(2, 128) = 2.76, P = .07$, enjoyable, $F(2, 128) = 8.83, P < .05$, exciting, $F(2, 128) = 2.62, P = .08$, fast, $F(2, 128) = 3.73, P < .05$, and violent, $F(2, 128) = 51.57, P < .05$ they found the games. Additional analyses revealed that there was a negative correlation ($r = -.19, P < .05$) between the amount of frustration participants experienced and the proportion of word fragments they completed with prosocial items. We therefore included ratings of how difficult, enjoyable, exciting, and fast participants found the games as covariates in all analyses. The participant’s rating of how frustrating they found the game was used only in analyses concerning prosocial cognition. Participant gender, trait aggression, and past violent game experience were not related to any of the outcome variables. Because of the number of covariates already being included in the analyses, and because the inclusion of

<table>
<thead>
<tr>
<th>Items</th>
<th>Evil Dead: Regeneration</th>
<th>Evil Dead: FOB</th>
<th>SSX 3</th>
<th>We Love Katamari</th>
<th>Tetris: Worlds</th>
<th>Need For Speed: Underground</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Difficult</td>
<td>4.25</td>
<td>1.12</td>
<td>3.75</td>
<td>1.43</td>
<td>3.73</td>
<td>1.48</td>
</tr>
<tr>
<td>Enjoyable</td>
<td>3.82</td>
<td>1.52</td>
<td>3.71</td>
<td>1.78</td>
<td>4.98</td>
<td>1.42</td>
</tr>
<tr>
<td>Frustrating</td>
<td>3.69</td>
<td>1.47</td>
<td>3.56</td>
<td>1.66</td>
<td>3.31</td>
<td>1.56</td>
</tr>
<tr>
<td>Exciting</td>
<td>3.67</td>
<td>1.56</td>
<td>3.73</td>
<td>1.58</td>
<td>4.46</td>
<td>1.27</td>
</tr>
<tr>
<td>Fast</td>
<td>3.97</td>
<td>1.44</td>
<td>4.22</td>
<td>1.65</td>
<td>4.41</td>
<td>1.28</td>
</tr>
<tr>
<td>Violent content</td>
<td>5.51</td>
<td>1.12</td>
<td>5.56</td>
<td>1.20</td>
<td>1.56</td>
<td>0.98</td>
</tr>
<tr>
<td>Graphic violence</td>
<td>5.26</td>
<td>1.31</td>
<td>5.24</td>
<td>1.26</td>
<td>1.17</td>
<td>0.67</td>
</tr>
</tbody>
</table>

*Aggr. Behav.*
these covariates did not substantively change the findings presented below, we chose to present analyses that did not include sex, trait aggression, or previous violent game experience.

**Prosocial and Hostile Cognition**

An ANCOVA controlling for the video game rating items assessing the impact of condition on our measure of prosocial cognition revealed a significant effect of condition, $F(2, 123) = 8.34, P < .001$. Contrast analyses revealed that participants in the explicitly prosocial violent game completed a greater proportion of word stems with prosocial words than those in the morally ambiguous violent game condition, $F(1, 123) = 4.24, P < .05, d = .49$, as well as those in the nonviolent condition, $F(1, 123) = 16.60, P < .001, d = .88$. Unexpectedly, participants in the morally ambiguous violent game condition also completed more word stems with prosocial words than those in the nonviolent game condition, $F(1, 123) = 4.07, P < .05, d = .43$. A similar analysis (excluding the frustrating item as a covariate) for hostile cognition was not significant, $F(1, 124) = 1.40, P = .24$, although the trends were consistent with previous research on the effect of violent video games on hostile cognition with both violent games resulting in higher hostile cognition than the nonviolent game. Inclusion of the frustration covariate did not change the results concerning hostile cognition. See Table III for means and standard errors.

## GENERAL DISCUSSION

Past work has found that playing violent video games can increase subsequent aggression and that this effect seems to be facilitated by the accessibility of hostile thoughts (Anderson et al., 2010). The current studies found that the presence of prosocial context in a violent video game can decrease aggressive behavior and increase the accessibility of and attention to prosocial concepts, relative to a morally ambiguous violent game. Specifically, participants who played a violent video game with an explicitly prosocial context—protecting a friend and facilitating his constructive mission—were subsequently less aggressive toward another participant and showed higher accessibility of prosocial thoughts than those who played a violent game with morally ambiguous content. It seems that the simple presence of violent content in a game does not negate the activation of other cognitive processes. Rather, the types of thought that will be elicited will depend on the totality of all of the different types of content in the game including hostile, prosocial, and others.

One surprising result from the current study was that the morally ambiguous violent game also led to higher levels of prosocial thought than the nonviolent game. This finding is divergent from previous research by Sestir and Bartholow (2010), who found a violent game to elicit lower levels of prosocial thought than a nonviolent game. One possibility for this apparent contradiction is that while the morally ambiguous violent game in the current study lacked any overt notion that the character’s actions were prosocially motivated, it was possible to construe his actions prosocially. As the character played the violent game in this study (Evil Dead: A Fistful of Boomstick) there are several Non-Player Characters (NPCs) present. Therefore, participants may have inferred that they were in some way protecting the townspeople, the town itself, or even the world. The games used in the Sestir and Bartholow study, however, were death-match style games and pitted players against other players in a competition format. Such a game makes prosocial construal rather implausible and unlikely.

## Limitations and Interpretive Issues

In light of previous work on the factors contributing to aggressive behavior, it would be implausible that providing a prosocial context for the violence would completely eliminate the effect of violent game play on aggression. Aggression was reduced but arguably not eliminated in the explicitly prosocial condition, even though that condition was not significantly different from the control condition. The effect size difference ($d = \sim .2–.3$) between the explicitly prosocial violent game and the control game in Study 1 was comparable to the effects found in previous studies showing a significant

### TABLE III. Proportion of Word Stems Completed With Prosocial/Hostile Words

<table>
<thead>
<tr>
<th>Condition</th>
<th>Proportion prosocial</th>
<th>Proportion hostile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonviolent game</td>
<td>0.113a</td>
<td>.184a</td>
</tr>
<tr>
<td>Morally ambiguous violent game</td>
<td>0.138b</td>
<td>.211a</td>
</tr>
<tr>
<td>Explicitly prosocial violent game</td>
<td>0.166c</td>
<td>.205a</td>
</tr>
</tbody>
</table>

Means with different subscripts within the same column are significantly different from each other at the $P < .05$ level. Means and SDs are covariate adjusted.

*Aggr. Behav.*
difference between violent and nonviolent games. If the effect size remained the same, a larger sample in Study 1 would have resulted in a significant difference between these two conditions. As discussed earlier, however, our control game was not equivalent to the violent games on many factors other than the violence present in the games. Again, our key comparison in Study 1 was between the two violent games; the control condition served more as a marker of what an individual would do under conditions of playing the most basic video game rather than to establish that the violent games led to more aggression than a non-violent game. So any conclusions as to whether playing the prosocial game led to increases in aggression are reasonable but somewhat limited based on the current evidence.

As a testament to the possibility that prosocial content might not completely eliminate aggression, many previous studies have used games with prosocial content (although this is often not explicitly mentioned in the manuscript), and these studies still find increased aggression for that game compared to a nonviolent control. While this is true, it should be noted that many of the games used in previous research included the kind of morally ambiguous prosocial content as was present in the morally ambiguous violent game in the current study. The decreased effect on aggression in the current study was only found with a game that explicitly required the player to help and protect another player. Nevertheless, this presents the possibility that the findings from previous research are being attenuated by the inclusion of prosocial goals in the games and that the effect size could be larger if the studies employed games without any prosocial context.

Our experiment investigated the effects of violent video game play on aggression immediately thereafter. Caution is warranted in generalizing to delayed effects and long-term exposure to games (see Anderson & Dill, 2000). The presence of prosocial content might activate prosocial thoughts and stifle aggression in the short term, but other factors that might have a more lasting impact on a player’s aggressive behavior, such as aggressive scripts, beliefs, and attitudes (see Anderson et al., 2010 for review) might remain. Future research on these other factors is needed before any conclusions regarding long-term effects of prosocial content can be drawn.

Because of the psychological uncertainty principle, which suggests that the inclusion of mediators in an experiment could reduce the effect of the independent variable on the dependent variable (Lindsay & Anderson, 2000), we did not test the full model examining the mediation of the relationship between the context of a violent video game and aggressive behavior by the accessibility of prosocial and hostile thoughts. We are therefore left only to assume that the elicitation of prosocial and hostile thoughts mediates the relationship between violent game context and aggressive behavior found in Study 1. Future research should examine the full model. It would also be interesting to examine the effect of violent video game context on prosocial behavior. Ewoldsen et al. (2012) tested such a proposition by having individuals play a death-match style game either in competition or in cooperation with others. They found that individuals who played the game cooperatively engaged in more cooperative tit-for-tat behavior with a partner than those who competed. The cooperative framework may have led to an increased accessibility of prosocial thoughts and consequently may have led to the observed increases in cooperative behavior.

Finally, one might worry about the discarding of participants in Study 1 due to suspicion. Our rate of suspicion (discarding 19 of 100) was similar to what previous studies have obtained with similar measures (e.g., Konijn, Nije Bijvank, & Bushman, 2007), but it could still give pause. Most of the suspicious subjects showed clear response tendencies (consistently setting level 10 blasts) in their intensity settings during the CRT, suggesting that suspicion did influence their responses. We did conduct analyses with all subjects included. The findings remained largely the same.

Concluding Remarks

Concerns that violent games may fuel actual violence have led some to suggest that such games be banned or restricted. Our findings confirmed that violent video games can increase aggressive behavior—but they also indicate that certain safeguards can be employed to reduce such unsavory outcomes. Although further research is warranted, specifically concerning long-term effects, it is encouraging to think that game programmers who focus on cultivating prosocial mindsets may be able to continue entertaining young gamers, while also protecting the public from potentially detrimental effects and possibly even benefiting society by fostering prosocial thoughts among today’s teens and young adults.

REFERENCES


