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Research Report

Video games and prosocial behavior: A study of the effects of non-violent, violent and ultra-violent gameplay

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ABSTRACT

Experimental evidence has pointed toward a negative effect of violent video games on social behavior. Given that the availability and presence of video games is pervasive, negative effects from playing them have potentially large implications for public policy. It is, therefore, important that violent video game effects are thoroughly and experimentally explored, with the current experiment focusing on prosocial behavior. 120 undergraduate volunteers (M_{age} = 19.01, 87.5% male) played an ultra-violent, violent, or non-violent video game and were then assessed on two distinct measures of prosocial behavior: how much they donated to a charity and how difficult they set a task for an ostensible participant. It was hypothesized that participants playing the ultra-violent games would show the least prosocial behavior and those playing the non-violent game would show the most. These hypotheses were not supported, with participants responding in similar ways, regardless of the type of game played. While null effects are difficult to interpret, samples of this nature (undergraduate volunteers, high male skew) may be problematic, and participants were possibly sensitive to the hypothesis at some level, this experiment adds to the growing body of evidence suggesting that violent video game effects are less clear than initially thought.

1. Introduction

Contemporary Western culture is saturated by multiple forms of media and their concomitant impact on society has hence been a popular topic of research for several decades. As a result of this research endeavor, few would question that the effect of media is a profound one. At the societal level, media campaigns are used to influence behavior in a number of ways, from purchase decisions (Milner & Rosenstreich, 2013) to health behavior (Wakefield, Loken, & Hornik, 2010). Indeed media, in one form or another, can be used for benefit and can cause harm. It is the latter, and particularly the influence of media violence, which has dominated much of the experimental research on media effects (Anderson et al., 2003).

Concern with violent media arose from the mass media explosion of the 20th century (Bushman & Anderson, 2001), leading researchers to investigate the impact of violence in a variety of media forms, including tabletop games (Martin & Fine, 1991), pornography (Malamuth & Briere, 1986), and television (Eron, Huesmann, Lefkowitz, & Walder, 1972). With the advent of personal computers and video game consoles and their subsequent proliferation, much of the violent media research turned its focus toward video games, with many early experiments (Anderson & Dill, 2000) and reviews (Dill & Dill, 1999; Griffiths, 1999) finding detrimental effects. For example, participants who played a violent video game were more likely to deliver noxious stimuli to a (fictitious) partner than a participant who played a non-violent video game (Anderson & Dill, 2000). Subsequent studies have shown that after playing violent video games, participants expect greater hostility from characters in a vignette (Bushman & Anderson, 2002), have greater access to aggressive cognitions (Anderson et al., 2004), and are quicker to associate their self-concept with aggression (Uhlmann & Swanson, 2004). Given consistent reports that violent video games increase anti-social behavior (aggression included) (although see Ferguson, 2013), it seems reasonable to expect that violent video games will decrease prosocial behavior, that is, behavior intended to help others (Gentile et al., 2009).

Unfortunately, the violent video game literature on prosocial behavior is limited and somewhat contradictory. Seminal work by Chambers and Ascione (1987) was among the first to demonstrate that violent video games can reduce prosocial behavior by showing that children who played a violent video game donated less to charity than those who played a prosocial game (although results for another behavioral helping measure were

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not significant and, sadly, not reported). Subsequent experiments found that participants who played a violent game, compared to a non-violent game, were less likely to reward a confederate (Ballard & Lineberger, 1999), and less likely to cooperate (Sheese & Graziano, 2005). However, an experiment conducted by Greitemeyer and Osswald (2010) failed to reveal an expected detrimental effect of violent video games on prosocial behavior (indeed, the strength and direction of this relationship is empirically contested see Ferguson & Garza, 2011; Valadez & Ferguson, 2012). In Greitemeyer and Osswald's experiment, the researcher asked participants to play either a violent, non-violent, or prosocial video game, and then surreptitiously spilled a handful of pens on the ground, before observing whether the participants helped gather the spilt pens. Participants who had played the prosocial video game picked up more pens than those who played a violent or non-violent video game. Importantly, there was no difference in frequency of helping between the violent and non-violent games.

Tear and Nielsen (2013) explored potential reasons for this failure to demonstrate that violent games decrease prosocial behavior, compared to non-violent games. Adapting the pen-drop task used by Greitemeyer and Osswald (2010), Tear and Nielsen used contemporary and classic games, delayed and immediate test-phases, and short and long exposures in order to create optimal conditions for revealing a decrease in prosocial behavior following violent video game play. In none of their experiments, were Tear and Nielsen able to show that playing violent video games diminished prosocial behavior. While these findings, coupled with those of Greitemeyer and Osswald, suggest playing violent video games does not impact prosocial behavior, they are based on participants' responses to just one task (the pen-drop task). Since the notion that violent video games should decrease prosocial behavior seems intuitive, and persistent (Greitemeyer, 2011, p. 252; Greitemeyer & Osswald, 2010, p. 215), we sought to run an experiment using other measures of prosocial behavior and observe whether the expected video game effect would reveal itself.

Here, we used two established measures of prosocial behavior: (1) a charity donation task, used in several other domains, such as behavioral mimicry (van Baaren, Holland, Kawakami, & Knippenberg, 2004), social priming (Garcia, Weaver, Moskowitz, & Darley, 2002), and social preferences (Levitt & List, 2007); and (2) the tangram task, used in past violent video game research (Gentile et al., 2009; Saleem, Anderson, & Gentile, 2012). To militate against any potential findings being attributable to the idiosyncratic influence of one game it is also important that research does not rely on only one exemplar per game category. Moreover, if violent video games impact on prosocial behavior it would be reasonable to expect that stronger effects would be found with more violent games. We thus employed two distinct violent video game conditions: One in which participants played games rated as suitable for and legally saleable only to those aged 15 years and older and more graphic versions of the same games rated as suitable for and legally saleable only to those aged 18 years or older. Assuming an incremental effect of violence, that is the more violent the game the stronger the effect (Barlett, Harris, & Bruey, 2008; Farrar, Krcmar, & Nowak, 2006), it was hypothesized that participants who played the ultra-violent games would donate least to charity, and assign the most difficult tangrams, while those who played a non-violent game would donate most to charity, and assign the least difficult tangrams.

2. Materials and methods

2.1. Participants

Participants were 120 undergraduate students from a first-year introductory psychology course at a large metropolitan university (87.5% male, M_{age} = 19.01, SD_{age} = 2.72). Most participants self-reported as Caucasian (67.5%), with a minority reporting Asian (25%) or other (7.5%). In past experiments we found that participants with no video game experience often struggled to grasp basic mechanics essential for playing the games. To overcome this problem we recruited participants who played games at least once a week, which may explain the skew toward male participants. In this context, it is notable that Gentile et al. (2014) suggest it remains unclear what role gender has in violent video game effects. This research was given ethical clearance by the university's ethics board (ethics clearance number: 2011000541).

2.2. Video game stimuli

Two games were chosen for each category in order to avoid the possibility of an effect being tied to the idiosyncrasies of one particular game. For the violent games (violent and ultra-violent) we elected to use games from the same franchise in order to evaluate the relative impact of increased violence while keeping other factors (e.g. game mechanics, pace, characterizations) relatively constant. In terms of varying amount of violence, video game classification provides a useful, although imperfect, distinction between levels of violence. To this end, we chose a violent game franchise (e.g. Mortal Kombat) and picked exemplars from that franchise (e.g. Mortal Kombat vs. DC Universe, rated as suitable for those over 15 years, and Mortal Kombat: Komplete Edition, restricted to adults). Descriptions of the games we used follow.

2.2.1. Non-violent games (Portal 2 and Modnation Racers)

Portal 2 is a non-violent puzzle game, where players use a gun that shoots entry and exit points of a portal, allowing them to access areas they would not normally be able to. Thus, as is common in violent games, the player uses a gun-shaped tool to interact with the virtual world. Except, instead of firing bullets, the gun in Portal 2 shoots portals. Modnation Racers is a non-violent racing game, where the player competes against several other computer controlled characters in a race around a circuit. Players can earn boosts by performing tricks while racing. They can also interfere with their opponents' race by picking up items (e.g. a green beam that slows their nearest opponent).

2.2.2. Violent games (God of War 3, Mortal Kombat vs. DC Universe)

God of War 3 is a violent combat game set in the mythology of ancient Greece, where the player uses a variety of hand-weapons (blades, knives, mauls) to slay large quantities of non-human enemies. Participants played the combat arena mode, which pits him or her against a selected enemy type. Players must utilize a variety of weapons and techniques to slay their enemies and avoid death. Mortal Kombat vs. DC Universe is a fighting game where players select a fighter and engage in a series of one-to-one matches against computer-controlled opponents. Players win these fights by using punches, kicks, and special moves involving projectiles to reduce their opponents' 'life' to nil. Mortal Kombat received much criticism in the early 90s for the inclusion of 'fatalities', hyper-violent finishing moves than often involve the dismemberment of the loser. It is important to note here that the fatalities in Mortal Kombat vs. DC Universe were a minor component of the participants' full experience. That is, fatalities were rarely executed by participants and were only ever experienced when the participant lost a round. Further, the extremity of fatalities in the version of Mortal Kombat we used were significantly reduced (in order to achieve a M 15+ rating).

2.2.3. Ultra-violent games (God of War: Ascension, Mortal Kombat: Komplete Edition)

At the time of writing, God of War: Ascension was the latest version of the God of War franchise. Participants played a game mode where they must kill as many enemies as they could with a variety of weapons and combat techniques. While the differences in gameplay between the two God of War games were minimal, the important difference was the level of violence depicted in each game. Indeed, God of War: Ascension was restricted to adults aged 18 or older, as it was deemed to have "high impact violence", compared to the "moderate impact violence" of God of War 3. Again, at the time of writing, Mortal Kombat: Komplete Edition was the latest version of the Mortal Kombat franchise. Participants used a variety of techniques to defeat successive computer-controlled characters. This version of Mortal Kombat was advertized as the most violent in the series, with comments like "characters, environments and fatalities have never been presented with as much gory detail as in this next generation Mortal Kombat". Consequently, Mortal Kombat: Komplete Edition was also restricted to adults aged 18 or older, as it was deemed to have "high impact violence, blood and gore", compared to the "moderate impact violence" of Mortal Kombat vs. DC Universe.

2.3. Questionnaire measures

Because video game stimuli may vary considerably on a number of factors (e.g. game mechanics, pace, competitiveness), it is important to evaluate participants' impressions of important experiential factors. For each video game the participant played, we thus collected self-report measures of frustration, arousal, and interest. Example items included "the game was too hard" (frustration), "the game got my heart racing" (arousal), "the game kept my attention" (interest). Participants responded to the 12-item questionnaire (four items per measure) via Likert scale (1: strongly disagree, to 9: strongly agree). The participants also recorded their video game habits by listing their three most played games, whether those games were violent or not, and the category their most played games belonged to (e.g. fighting, sports, etc.). A secondary aim of the video game questionnaires was to uphold our cover story for playing the video games, as discussed in the procedure section below. We also included a single item manipulation check to assess how violent participants perceived the games they played, measured via the above Likert scale: "I felt violent while playing the game".

At the end of each session participants were debriefed and probed for suspicion via a four question funneled debrief interview. Questions included: (1) what did you think the purpose of the session was; (2) have you ever completed tasks like these before; (3) was there anything strange about the experiment, or anything that did not seem quite right; and (4) do you think the way you responded to any of the tasks was affected by how you responded on an earlier task. A composite score was created by summing the number of questions the participants indicated suspicion.

2.4. Behavioral measures

2.4.1. Tangram task

The tangram task is a measure of prosocial behavior in absence of personal cost. Tangrams are puzzles that are completed by using small shapes (e.g. squares, diamonds, triangles) to form larger, and more complex, patterns. Participants completed the tangram task under the guise that they were selecting tangram stimuli for another participant. Experimenters told the participants that an ostensible other participant would have to complete a series of tangrams under time pressure, winning a cash prize if they could complete the selected tangrams. The current participant was further told that the experimenters could not ethically select the tangrams because they varied in difficulty, meaning the cash prize created a conflict of interest. The experimenter then showed the participant the tangrams on a piece of paper, which were categorized by easy, medium, or hard difficulty (10 tangrams per difficulty category), and then asked the current participant to set the difficulty of the task by selecting 11 tangrams. Participants were reminded that the other participant would win a cash prize if they completed the selected tangrams under time pressure. Because the current participant loses nothing and ostensible future participants have everything to gain, this task provides a measure of prosocial behavior without personal cost. Therefore, the tangram task can be used to measure both helping and hurting behavior: helping behavior operationalized as the number of easy tangrams assigned, and hurting behavior as the number of difficult tangrams assigned (Gentile et al., 2009).

2.4.2. Charity donation

We recorded participants' donations to a real charity as a measure of prosocial behavior that has a personal cost. Participants were paid $5 in $1 coins at the apparent end of the experimental session, before having their attention directed toward a donation box and a pile of questionnaires. The experimenter explained that the lab works closely with a charity at a local children's hospital (Children's Health Foundation) and that the charity often asks if the lab can help with some data collection. Participants were asked if they would volunteer their time to fill out a short questionnaire (4 items about public awareness of the charity, e.g. "I have heard of the Children's Health Foundation", "I know people who donate to the Children's Health Foundation"). If the participant was willing (none were not), then the experimenter directed the participant's attention toward two metal boxes with the Children's Health Foundation logo, explaining that the participant should fold up their questionnaire upon completion and put into the box marked 'questionnaires'. The other box was marked 'donations' and the experimenter said that if the participant wanted to, they could make a contribution to the Children's Health Foundation by depositing money into that box. After full explanation, the experimenter immediately said that he would leave the room to give the participant privacy and to ensure anonymity. Prosocial behavior measured via the donation task was operationalized as the number of $1 coins the participant placed into the donations box.

2.5. Procedure and design

Participants were informed that they were to take part in two pilot studies. The first, evaluations of different video games to assess their suitability as stimuli for future experiments, and the second, a stimuli selection task, where participants decide what stimuli future participants were exposed to (the tangrams). In reality, these two tasks were separate components of the same experiment; the first task comprising the video game measures, the second task comprising the tangram task, with the charity donation collected afterwards. Participants were randomly allocated to one of the three video game conditions where they played two exemplars of that category (i.e. two non-violent games, two violent games, or two ultra-violent games) in separate 15 min blocks. It was explained to participants that they would play one game for 15 min, record their reactions and experience via questionnaires (which served to uphold the cover story), then play the other game for 15 min and complete a second set of questionnaires. Participants were then told that their final task would be the stimuli selection task, thereby completing the experimental session.

In actual fact, the order that participants experienced the tasks was never as described. A recent review has suggested the timing

of behavioral measurements in violent video game effects research is important (Engelhardt & Bartholow, 2013). We were, therefore, conscious of minimizing the time between playing a video game and our behavioral measurements (the tangram task and charity donation), while still maintaining a brief delay. This was achieved in the first case by pretending to have left the video game questionnaires in another lab, and having the participant complete the tangram task ahead of schedule, while the experimenter retrieved the missing questionnaires. The video game questionnaires were completed once the experimenter returned. After the second block, the participant completed a shortened version of the video game questionnaires (minus the video game habits questions) to keep the time between the video game and the charity donation to a minimum. Once the second set of video game questionnaires were completed, the participant was given $5, thanked for participating in the experiment then had their attention directed toward the charity questionnaires and donation box. The experimenter left the room so that participants did not feel pressured to make a donation. Before participants left, they were probed for suspicion and debriefed.

3. Results

3.1. Differences between games within a category

First, we conducted *t*-tests on the self-report experience measures to determine how the games within categories differed from each other. In the non-violent game condition, the games did not differ on measures of frustration, $t(39) = .22$, $p = .826$, $D = 0.04$, arousal, $t(39) = 1.35$, $p = .187$, $D = 0.23$, or interest, $t(39) = .73$, $p = .471$, $D = 0.04$. In the violent game condition, the games did not differ on measures of arousal, $t(39) = .18$, $p = .856$, $D = 0.03$, or interest, $t(39) = .23$, $p = .817$, $D = 0.13$. However, God of War 3 was rated as less frustrating ($M = 2.74$, $SD = 1.05$) than Mortal Kombat vs. DC Universe ($M = 4.32$, $SD = 1.72$), $t(39) = 5.23$, $p < .001$, $D = 0.86$. In the ultra-violent game condition, the games did not differ on measures of frustration, $t(39) = 1.33$, $p = .192$, $D = 0.21$, arousal, $t(39) = 1.27$, $p = .211$, $D = 0.20$, or interest, $t(39) = .79$, $p = .436$, $D = 0.13$. Given these minimal differences all subsequent analysis was conducted with the two games used within each condition combined.

3.2. Manipulation checks

We next conducted manipulation checks to check that the violent games were perceived as more violent than the non-violent games. Indeed, the omnibus test was significant, $F(1,117) = 40.03$, $p < .001$, violent games ($M = 4.35$, $SD = 2.18$) and ultra-violent games ($M = 4.81$, $SD = 1.89$) were perceived as more violent than non-violent games ($M = 1.55$, $SD = 0.99$), $ps < .001$, $Ds > 1.76$.

We conducted a series of one-way ANOVAs to evaluate whether the categories of games (non-violent, violent, ultra-violent) were experienced differently, beyond violent content. Omnibus tests revealed differences between conditions on frustration, $F(2,117) = 3.71$, $p = .028$, and arousal $F(2,117) = 5.75$, $p = .004$, but not interest, $F(2,117) = 1.36$, $p = .175$. Tukey follow-up tests revealed the difference in frustration was between the violent ($M = 3.53$, $SD = 1.06$) and ultra-violent games ($M = 4.13$, $SD = 1.04$), $p = .043$, $D = 0.57$. For the arousal measure, the non-violent games were significantly less arousing ($M = 4.50$, $SD = 0.97$) than the violent ($M = 5.09$, $SD = 0.97$) and ultra-violent games ($M = 5.16$, $SD = 0.92$), $ps < .018$, $Ds > 0.61$.

3.3. Behavioral measures

To evaluate whether there was an effect of video game category on observed behavior, we ran one-way ANOVAs on our behavioral measures (charity donation, helping and hurting measures via tangram task). Means and standard deviations are summarized in Table 1.

3.3.1. Tangram task

The tangram task was used to measure both helping and hurting behavior: (1) helping was measured by counting the number of easy tangrams participants assigned to an ostensible other participant; and (2) hurting was measured by counting the number of difficult tangrams assigned. We first analyzed the helping behavior DV and found no difference between game categories, $F(2,117) = .19$, $p = .830$, $\omega^2 = .014$. That is, it did not matter whether participants played a non-violent ($M = 3.20$, $SD = 1.92$), violent ($M = 3.20$, $SD = 1.34$), or ultra-violent ($M = 3.02$, $SD = 1.03$) game, participants assigned an equal number of easy tangrams to an ostensible other participant. While the primary focus of our experiment was the effect of violent games on prosocial behavior, the tangram task allows us to also examine hurting behavior. Given that violent games have previously been associated with antisocial behavior, we also analyzed the hurting behavior data. Again, we found no effect of our video game condition on hurting behavior, $F(2,117) = .01$, $p = .987$, $\omega^2 = .017$. Participants assigned equal numbers of difficult tangrams across the non-violent ($M = 3.35$, $SD = 1.97$), non-violent ($M = 3.30$, $SD = 1.52$), and ultra-violent ($M = 3.35$, $SD = 1.21$) conditions.

3.3.2. Charity donation

We conducted a further ANOVA on the charity donation measure to see whether the type of game that participants played influenced donation tendencies. Omnibus tests revealed no differences between conditions on charity donation, $F(2,117) = 2.54$, $p = .083$, $\omega^2 = .025$, that is, participants donated equal amounts across the non-violent ($M = 2.00$, $SD = 1.94$), violent ($M = 2.33$, $SD = 2.03$), and ultra-violent ($M = 3.00$, $SD = 2.10$) conditions.

3.4. Suspicion measures

We created a summary suspicion score by recoding participant responses to the four debrief questions. Participants were coded as suspicious if they indicated suspicion on any of the debrief questions. We then conducted an ANOVA to determine if this suspicion varied between video game conditions, revealing no difference in suspicion between conditions, $F(2,117) = .60$, $p = .553$ $\omega^2 = .007$. Because the afore-reported pattern of results remained after excluding suspicious participants (non-violent: 3; violent: 4; ultra-violent: 6), we elected to report the total sample.

3.5. Learning effects

Because participants played two exemplar games within a category (the first game at the beginning of the session and the second toward the middle), it's possible that participants became more sensitive to the experiment's hypotheses after playing the second game. Indeed, we did find that participants in the violent and ultra-violent conditions rated the second game as more violent (violent: $t(39) = 3.29$, $p = .002$, $D = 0.52$; ultraviolent: $t(39) = 4.28$, $p < .001$, $D = 0.68$), despite the presentation order of the games being counter-balanced. While participants in the violent and

Table 1
Means and standard deviations for focal DVs.

DV	Non-violent	Violent	Ultraviolent
Helping behavior	3.20 (1.92)	3.20 (1.34)	3.02 (1.03)
Hurting behavior	3.35 (1.97)	3.30 (1.52)	3.35 (1.21)
Charity donation	2.00 (1.94)	2.33 (2.03)	3.00 (2.10)

ultra-violent conditions reported a greater sensitivity to the violent content, they were no more suspicious of the experiment's true hypothesis than participants in the other conditions (see Section 3.4).

4. Discussion

A growing literature has reported on the negative effects on behavior of playing violent video games (Anderson et al., 2010). This literature has been met with increasingly concerted efforts at delineating the flaws in this research (Adachi & Willoughby, 2011), with calls for replication and the dissemination of null result findings (Australian Government, Attorney General's Department, 2010), the absence of which risks presenting a skewed view of the real effect (Ferguson, 2013). Regardless of the merits of the perspectives proposed by both sides of this debate, it stands to reason that if playing violent video games leads to increases in antisocial behavior it should similarly lead to decreases in prosocial behavior. The current experiment adds weight to the argument that it does not.

Previous research failed to find a negative effect of playing violent video games on prosocial behavior. Greitemeyer and Osswald (2010) reported that playing an arcade-style violent video game did not diminish prosocial behavior as measured using the classic pen drop task. Extending this to modern, graphic games, and expanding exposure time similarly failed to find any impact (Tear & Nielsen, 2013). In the current study we sought an effect using two new measures of prosocial behavior and games so extreme in their violence that it is illegal to sell them to minors. Yet we too failed. Those playing an ultra-violent video game were as likely to set an easy tangram task for an ostensible future participant as those playing a non-violent game. They also donated similar amounts of money to charity.

It is standard practice to criticize null result studies for lacking sufficient power. However, the effects of the video games for the two tangram measures were so small that we would have required 3005 and 44000 participants to detect the effect for the helping and hurting measures, respectively. Moreover, to the extent that any effect might be found, the only discernible trend was for participants who played the ultra-violent games to donate *more* to charity. There are many explanations for why this may happen, such as moral cleansing (Bastian, Jetten, & Fasoli, 2011) or as a response to perceived demand characteristics (Bender, Rothmund, & Gollwitzer, 2013). Regardless of the reasons, testing sufficient numbers of participants to get this trend to significance would still render as unfounded because the hypothesized direction was that playing violent video games would decrease prosocial proclivities, not increase.

It is notable that each of the studies failing to find an effect of playing violent video games on prosocial behavior has been conducted with adults (Greitemeyer & Osswald, 2010; Tear & Nielsen, 2013). It is possible that by the onset of early adulthood the factors contributing to prosocial inclinations have been well-established and are not easily shifted by playing a video game for half an hour. Indeed, Griffiths (1999) found that young children are more aggressive after a violent game than young adults. Furthermore, given the proliferation of video games within contemporary culture, older participants have likely had more opportunity to habituate to video games. Experimental research is now needed to explore the issues raised here in younger populations, where prosocial inclinations are more flexible and where habituation to video games has not yet been established. Our sample was also disproportionately male. Indeed, only 12.5% of our sample was female. Given purported gender differences in aggression (Archer, 2004; Bettencourt & Miller, 1996) and prejudice (Ekehammar, Akrami, & Araya, 2003), it seems likely that a gender difference might exist for prosocial tendancies, although it is unclear what this difference might look like. Interestingly, past research has been able to reveal violent video game effects on prosocial behavior with similar gender imbalances. The experiment conducted by Sheese and Graziano (2005) found, with an identical gender skew (87.5% male), that participants who played a violent game were more likely to exploit their partners than cooperate with them. A further concern with our sample is its cultural heterogeneity. Attitudes toward acting prosocially could conceivably differ between cultures.

It remains possible that participants suspected the hypothesis, despite reporting no suspicion, and that the marginally significant trend for ultra-violent video games to lead to more donations was driven by their suspicions or sensitivity to the hypothesis. Indeed, participants who identify strongly as gamers often modify their responses to transparent dependent variables in order to manage representations of gamers in the literature (Bender et al., 2013). Any future work using this methodology should counter-balance the order of the prosocial dependent variables to address possible learning effects.

There is now growing reason to suspect that playing violent video games does not impact prosocial behavior in a normal population. However, it should be acknowledged that the effects explored, both here and in previous studies, are short-term and do not account for the possible effect of sustained playing. It remains to be established whether or not playing for long hours over an extended period of time will have detrimental effects. Recent research has concluded that long term effects of video games, as superordinate category, on behavior are minimal (Parkes, Sweeting, Wight, & Henderson, 2013). It then seems reasonable to expect that *violent* video games would similarly show no effect, given that 89% of video games contain violence (Glaubke, Miller, Parker, & Espejo, 2001).

However, it is worth considering that the debate about violent video games has been focused on showing that violent games have negative effects on behavior, usually in simple exposure paradigms (participants play a game then respond to a dependent measure). We believe that mere exposure is not a sufficient framework for discussing violent video game effects. Indeed, if that were true, then our experiment should have shown conditional effects on prosocial behavior. Furthermore, research in the field is increasingly considering mechanisms beyond mere exposure to violence, and toward pinning down the exact mechanisms by which video games may influence behavior. For example, violent games are both more competitive (Adachi & Willoughby, 2011) and potentially more difficult (Przybylski, Deci, Rigby, & Ryan, 2014) than non-violent games, and it may be these features that drive previous demonstrations of violent video game effects rather than the violent content per se. The results of the experiment we report here challenge the belief that these exposure effects exist at all.

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