Violent Video Games and Reciprocity: The Attenuating Effects of Cooperative Game Play on Subsequent Aggression

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Abstract
Numerous studies have shown that playing violent video games alone increases subsequent aggression. However, social game play is becoming more popular than solo game play, and research suggests cooperative game play is beneficial for players. The current studies explore the effects of cooperative game play on player’s subsequent aggressive behaviors toward video game partners (Experiment 1) and non-video game partners (Experiment 2), while providing a discussion of possible theories applicable to social video game play. Cooperative games resulted in less aggression between video game partners (Experiment 1) and between non-video game partners (Experiment 2) than did competitive or stand-alone games. Interestingly, cooperative game play and no-game play produced similar levels of aggression (Experiment 1), whereas competitive and solo game play produced similar levels of aggression (Experiment 2). These findings are consistent with the theory of bounded generalized reciprocity. Playing violent games cooperatively can offset the aggression-increasing effects of violent video games.

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Competition has been shown to be useful up to a certain point and no further, but cooperation, which is the thing we must strive for today, begins where competition leaves off.

—Franklin D. Roosevelt

Franklin D. Roosevelt was the U.S. president between 1933 and 1945, a time of worldwide economic crisis and war. He understood the necessity of bringing a fragmented country under a unified goal. As Roosevelt suggests, the benefits of a competitive mindset are limited, whereas cooperation can transcend barriers between conflicting people by fostering symbiotic relationships. The present research tests whether Roosevelt’s views extend beyond the real world to the virtual world of video games. We examine whether the competitive versus cooperative mindset of video game players will influence their aggression levels after the game is over. We consider both the general aggression model (GAM) and bounded generalized reciprocity theory as possible theoretical frameworks.

General Aggression Model
Extensive research suggests that violent video games increase aggressive behaviors, aggressive thoughts, angry feelings, and physiological arousal while decreasing empathic feelings and helpful behaviors (for example, see Anderson et al., 2010; Greitemeyer & Mügge, 2014, for meta-analytic reviews). GAM proposes that two types of input variables can influence aggression: personal and situational variables (e.g., Bushman & Anderson, 2002). Personal variables include anything the individual brings to the situation (e.g., gender, genetic predispositions, personality traits, attitudes, beliefs, values). Situational variables include all external factors that can influence aggression (e.g., alcohol, aggressive cues, frustration, provocation, violent media exposure, and hot temperatures). In the model, personal and situational factors influence one’s internal state, such as aggressive thoughts, angry feelings, and physiological arousal levels. These internal states are all interconnected. If people have the cognitive resources available, they might use higher order cognitive processes to further analyze the situation. For example, they might think about how they feel, make causal attributions for what led them to feel this way, and consider the consequences of acting on their feelings. If people engage in higher order cognitive processing, they are more likely to behave in a thoughtful, deliberate manner. If people fail to engage in higher order cognitive processing, they are more likely to behave in an impulsive manner.

According to this model, personal variables (i.e., attitudes, beliefs, values, or traits) and violent media content may interact to increase affective states, prime aggressive thoughts, and activate aggression-related schemas stored in memory or learned from repeated exposure to violent media. The learning and activation of
aggressive scripts or schemas purportedly caused by exposure to violent media content is proposed to influence appraisals and decision-making processes, which in turn can increase aggression (Bushman & Anderson, 2002).

The majority of research utilizing the GAM to predict the negative effects of violent video games has focused on single players who are isolated during game play (Anderson et al., 2010). Isolated players are able to focus and engage with the violent content of violent video games, which the GAM predicts leads to the learning and activation of aggressive scripts. However, this research has overlooked the social context in which most video games are played. The social aspects of video games have become a major motivation and source of enjoyment for video game players (Cole & Griffiths, 2007; Griffiths, Davies, & Chappell, 2004; Peña & Hancock, 2006; Velez & Ewoldsen, 2013). Players particularly prefer to play video games cooperatively with others against a common opponent (Durkin & Barber, 2002; Kerr, 2006; Kutner & Olson, 2008; Southwell & Doyle, 2004). Interestingly, the video games that offer the most opportunities to play cooperatively with others are often the most violent (i.e., video games rated “mature” by the Entertainment Software Review Board; Velez, Ewoldsen, Mahood, & Moyer-Guse, 2011). This suggests that violent video games are being played cooperatively with others, whereas previous research has focused on single players.

Playing a violent video game in a social context poses a problem for the theoretical predictions proposed by the GAM. Research has demonstrated that the social interactions and relationships taking place during cooperative video game play serve a more vital role in influencing players’ subsequent behaviors than the violent video game content. For example, research shows that playing a violent video game cooperatively can decrease aggressive thoughts (Schmierbach, 2010; Velez, Mahood, Ewoldsen, & Moyer-Guse, 2012) and angry feelings (Eastin, 2007), and can increase pro-social behaviors (Ewoldsen et al., 2012; Greitemeyer & Cox, 2013; Greitemeyer, Traut-Mattausch, & Osswald, 2012; Velez et al., 2012) and empathic feelings (Greitemeyer, 2013). This suggests that playing a violent video game in a social context should lead players to focus more on the dynamic social interactions with other players. In order to understand how cooperative game play influences players’ subsequent behaviors, a theoretical framework that focuses on the effects of dynamic social interactions is needed.

Bounded Generalized Reciprocity Theory

Bounded generalized reciprocity (Yamagishi, Jin, & Kiyonari, 1999) was originally proposed to explain people’s behaviors in intergroup social situations. Much of social video game play provides opportunities for players to engage in intergroup social interactions with teammates and opposing team members (Velez & Ewoldsen, 2013). This theory proposes that during intergroup social interactions, people will behave in a manner that best serves their self-interests. When it comes to behaving positively toward others (i.e., giving favors), bounded generalized reciprocity predicts that people expect in-group members to behave positively and reciprocate positive behaviors. However, people do not expect out-group members to do the same. These expectations
are purported to determine people’s behaviors toward in-group and out-group members because it better serves people’s self-interests to behave positively toward someone who will reciprocate such behaviors compared with someone who will not (Jin & Shinotsuka, 1996; Jin, Yamagishi, & Kiyonari, 1996; Karp, Jin, Yamagishi, & Shinotsuka, 1993; Rabbie, Schot, & Visser, 1989; Yamagishi & Kiyonari, 2000). If an in-group member balks on giving a favor but also receives a favor from another in-group member, then the person runs the risk of being perceived as a freeloader by all other in-group members (i.e., someone who receives favors from in-group members but does not reciprocate). This decreases the likelihood of receiving favors from all in-group members. Therefore, it is in one’s self-interest to behave positively toward all in-group members in order to avoid repercussions. This leads people to behave positively toward in-group members and to expect other in-group members to also behave positively. However, if people have a reason to expect out-group members to behave positively and reciprocate positive behaviors, then people will behave positively toward in-group and out-group members equally (Yamagishi & Kiyonari, 2000). Thus, bounded generalized reciprocity suggests that people’s expectations of reciprocal behaviors from others influence their behaviors in social interactions. Indeed, researchers have found that people do not donate more money to in-group members than out-group members when controlling for people’s expectations of reciprocal positive behaviors from others (Jin & Shinotsuka, 1996).

Social video game play naturally categorizes players into in-groups (i.e., teammates) and out-groups (i.e., opposing team members). Congruent with the theory of bounded generalized reciprocity, research has demonstrated that playing violent video games with others influences players’ expectations of reciprocal positive behaviors from others. Furthermore, these expectations of pro-social reciprocity from others lead cooperative game players to behave more pro-socially toward others after game play despite being exposed to violent content (Greitemeyer & Cox, 2013; Greitemeyer et al., 2012). This suggests that the social interactions during violent video game play have a stronger influence on players’ subsequent behaviors than the violent content.

Bounded generalized reciprocity (Yamagishi et al., 1999) offers an appropriate theoretical framework to aid our understanding of how social video game play can have beneficial effects on violent video game players. However, this research has not examined the effects of cooperative game play on players’ subsequent aggressive behaviors, which is surprising considering that the contentious debate on violent video games is centered on their effects on aggressive behaviors (Anderson, Gentile, & Buckley, 2007). The current studies look into the effects of playing violent video games with others on aggression and discuss how the theory of bounded generalized reciprocity can provide valuable insights into players’ aggressive behaviors after engaging in social video game play.

**Experiment 1**

When engaging in social video game play, people can either play with others cooperatively, competitively, or cooperatively in a competitive context (i.e., team competitions where people play cooperatively with teammates in competition against another
team; Velez & Ewoldsen, 2013). In order to better understand the direct influence of cooperative and competitive social contexts on aggression, the current studies focus on the first two types of social video game play independently. As discussed above, the theory of bounded generalized reciprocity predicts that when interacting with in-group members (i.e., video game teammates), players should expect others to reciprocate positive behaviors, whereas when interacting with out-group members (i.e., opposing team members) players should expect others to not reciprocate positive behaviors (Yamagishi et al., 1999). This suggests that when given the opportunity to behave positively toward other players, cooperative partners will engage in such behaviors but competitive partners will not. Congruent with this prediction, previous research has demonstrated that cooperative game partners consistently donate more money to each other than competitive game partners (Ewoldsen et al., 2012; Velez et al., 2012).

Although research on the theory of bounded generalized reciprocity has traditionally examined people’s monetary donations to others, the theory encompasses any tangible or intangible “favors” that people may exchange during intergroup situations (Yamagishi et al., 1999; Yamagishi & Kiyonari, 2000). In terms of aggression, it is possible that social game play may lead cooperative game partners to actively shield their partners from aggression. This can be construed as a “favor” or positive behavior that people expect in-group members (i.e., cooperative game partners) to reciprocate. In contrast, competitive game partners should not be concerned with shielding their partners from aggression. This leads to the first hypothesis:

**Hypothesis 1:** Playing a violent video game cooperatively will result in less aggression between game partners than playing competitively.

If cooperative game partners are expecting each other to reciprocate positive behaviors due to shared group membership, as predicted by the theory of bounded generalized reciprocity, then they should also be less aggressive toward each other than a pair of people who do not have any group affiliations (i.e., a pair of people who do not belong to each other’s in-group or out-group). Thus, after playing a video game cooperatively, the game partners should refrain from being aggressive toward each other compared with people who did not play a video game at all. However, although the video game partners played cooperatively, they were still exposed to violent content in contrast to a pair of people who did not play a violent video game. As discussed above, research suggests that exposure to violent video games can increase aggression (Anderson et al., 2010; Greitemeyer & Mügge, 2014), and even though cooperative game play has been shown to decrease aggressive affect (Eastin, 2007) and cognitions (Schmierbach, 2010; Velez et al., 2012), it is unknown whether cooperative game play can also decrease actual aggressive behavior. Furthermore, research has demonstrated that playing a violent video game alone can have detrimental effects on players’ expectations of others to reciprocate pro-social behaviors (Rothmund, Gollwitzer, & Klimmt, 2011). Although cooperative players may expect their partners to reciprocate positive behaviors, these expectations may be weakened by players’ exposure to violent video game content. Therefore, it is possible that cooperative partners who play a violent
video game together may still be more aggressive towards each other than a pair of people who do not share group membership but were not exposed to violent video game play. This leads to the first research question:

**Research Question 1:** Will cooperative video game partners be more or less aggressive toward each other than a pair of people who did not play a violent video game?

According to the theory of bounded generalized reciprocity, neither competitive video game partners nor non-video game partners should expect their partner to reciprocate positive behaviors. This is because competitive game partners consider each other out-group members, and non-video game partners do not share any group memberships and consequently do not know what to expect of their partner. However, because game partners were exposed to violent and competitive video game play, they should be more likely to behave aggressively toward each other than a pair of people who did not play a violent video game. This leads to the second hypothesis:

**Hypothesis 2:** Playing a violent video game competitively will result in more aggressive behaviors between partners than not playing a video game at all.

**Method**

**Participants.** Participants were 126 college students (72.2% males; $M_{age} = 20.7$, $SD = 2.26$; experience with video games, $M_{years} = 8.88$, $SD = 5.37$) who received extra course credit.

**Procedure.** Participants were randomly paired and assigned to one of three conditions of video game play: cooperation, competition, and control. Participants played the violent video game *Halo: Reach* for 15 minutes on a 19-inch (48.3-centimeter) television screen. Instructions for game play varied depending on the condition. Participants in the cooperative condition were instructed to work together with their partner to get as many points as possible by killing enemies and staying alive. Participants then played the *Firefight* mode in the game in which participants were confronted by waves of varying enemies on a single map. The consistency of enemies in each wave was manipulated and pretested to ensure that they were not too hard or too easy. Participants in the direct competition conditions were instructed to try and kill their partner more times than their partner kills them. Participants then played the *Deathmatch* mode in the game in which participants gained points for killing each other on a single map. No other enemies were present in this condition. Participants in the control condition played the game in the single-player mode, but aggressive behaviors were measured. Thus, the video game could not have affected how aggressive they were toward their partner.

Aggression was measured using a competitive reaction time task (Taylor, 1967), which has been well validated in previous research (e.g., Giancola & Zeichner, 1995).
On each of 25 trials, participants ostensibly competed with their game partner to see who could press a button faster. Participants in the control conditions were told that they were engaging in the competitive task with another participant in the study. On each trial, participants could punish their partner with noise blasts ranging in intensity from Level 1 = 60 decibels, to Level 10 = 105 decibels (about the same level as a fire alarm), in 5 decibel increments. The noise was a mixture of noises that most people hate (e.g., fingernails scratching a chalkboard, dentist drills, ambulance sirens). A non-aggressive Level 0 was also offered. Participants set the punishment levels at the beginning of each trial, before they knew what their partner set. If they lost the trial, they received a blast of noise through headphones. At the end of each trial, participants were given feedback on the punishment levels set by their partner. The ostensible partner set random punishment levels across the 25 trials. Participants won 12 trials (randomly determined). In other words, within the ethical limits of the laboratory, participants controlled a weapon that could be used to blast their opponent with unpleasant noise. A debriefing followed, which included a probe for suspicion.

**Results**

**Aggression.** To obtain a more reliable measure of aggression, the noise intensity chosen by participants was averaged across the 25 trials of the competitive reaction time task (Cronbach’s $\alpha = .90$). There were 10 participants who were removed from the data because they suspected they were not playing against their game partner during the task. Additionally, three participants were removed because their averaged score on the task was greater than 2.5 SD from the mean of responses in their condition. The dyadic nature of the cooperative and competitive game play conditions suggests that aggression in these conditions may be dependent on their game partners’ behaviors during video game play. In order to determine whether participants’ aggressive behaviors in the cooperative and competitive game play conditions should be analyzed at the dyad level, we calculated the intraclass correlation between game partners’ aggressive behaviors (32 dyads; Griffin & Gonzalez, 1995). The results suggest that participants’ aggressive behaviors are independent of their game partner ($r_{xy} = .19$, $p = .58$) and therefore, participants’ aggressive behaviors were analyzed at the individual level.

As predicted, aggression differed across video game conditions, $F(2, 123) = 3.68$, $p < .05$, $\eta^2 = .06$ (see Table 1). Planned contrasts were conducted in order to test the hypotheses and research question. Equal variances were assumed when conducting the

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planned contrasts because Levene’s test of homogeneity of variances was not significant, $F(2, 123) = 1.25, p = .29$. The results indicated that participants in the cooperative condition ($M = 5.16, SD = 1.37$) were less aggressive to their partners than those in the competition condition ($M = 5.88, SD = 1.93$), consistent with the first hypothesis, $t(123) = -1.99, p < .05, d = -0.43$. There was no significant difference between the cooperative and control groups, which answers the first research question, $t(123) = 0.60, p = .55, d = 0.15$. As predicted in the second hypothesis, participants in the competitive condition were more aggressive to their partners than those who did not play a video game ($M = 4.94, SD = 1.61$), $t(123) = 2.60, p < .05, d = 0.53$.

**Discussion**

Previous research has demonstrated that cooperative game play can increase players’ subsequent pro-social behaviors (Ewoldsen et al., 2012; Greitemeyer & Cox, 2013, Greitemeyer et al., 2012; Velez et al., 2012) and decrease aggressive thoughts (Schmierbach, 2010; Velez et al., 2012) and angry feelings (Eastin, 2007). The results of Experiment 1 are among the first to show that cooperative game play can also decrease players’ aggressive behaviors. Additionally, it was previously unknown to what extent cooperative game play can attenuate the negative effects of violent video game exposure. Cooperative game play may have a positive effect on violent video game players but it is still possible that, regardless of the social context, violent video games may increase aggression. Experiment 1 addressed this concern by comparing the aggressive behaviors of cooperative game partners with participants who did not play a video game. Based on Experiment 1, it seems that cooperative game partners behaved as if they did not play a violent game. Indeed, cooperative game partners were no more aggressive than pairs of participants who did not play a violent video game.

From the lens of bounded generalized reciprocity, these results suggests that sharing group membership due to cooperative game play can lead game partners to reciprocate positive behaviors, whereas competitive game play does not foster such positive reciprocation. Indeed, cooperative game partners behaved less aggressively toward each other than competitive game partners. Interestingly, cooperative game partners were not more aggressive toward each other than participants who did not play a violent video game nor shared group membership. This suggests that the benefits of cooperative game play were strong enough to substantially reduce the aggression-facilitating effects of violent video game exposure. However, it is possible that violent video game exposure still had an effect on players because, according to the theory of bounded generalized reciprocity, in-group members (i.e., cooperative game partners) should have been less aggressive toward each other than participants who did not have any group affiliations (i.e., two people who did not play a violent video game). Previous research has demonstrated that violent video game exposure can lower players’ expectations of others to behave pro-socially (Rothmund et al., 2011). It is possible that the expectations of cooperative partners to behave less aggressively were mitigated by the violent content in the video game which may explain why they were not
less aggressive than people who did not play a violent video game nor shared group membership. Although previous research suggests that cooperative game play can decrease players’ aggressive cognitions (Schmierbach, 2010; Velez et al., 2012) and feelings (Eastin, 2007), it is also possible that the violent video game content still had some influence on cooperative players’ aggressive behaviors through increases in their aggressive cognitions and feelings. The influence of violent video game exposure on aggression may also explain why competitive game partners were more aggressive than participants who did not play a video game. If competitive game partners and non-video game partners did not have expectations of reciprocal positive behaviors from each other, as suggested by bounded generalized reciprocity theory, then both sets of partners should have been equally aggressive toward each other. The results suggest, however, that competitive game partners’ exposure to violent video game play increased their subsequent aggressive behaviors compared with participants who were not exposed to violent video game play. However, this is uncertain because there was not a condition where participants played a violent video game alone.

**Experiment 2**

Although the results of Experiment 1 suggest that cooperative game play can reduce aggression in violent video game players, the results are only generalizable to subsequent interactions with video game partners. This presents a problem for the results of Experiment 1 because the majority of previous research suggesting that violent video games can lead to aggression has examined social interactions in which only one person has played a violent video game (Anderson et al., 2010). Therefore, a second study was conducted in which participants were given opportunities to behave aggressively toward a non-video game partner. Additionally, in order to properly explore the effects of cooperative game play on previously studied social interactions (i.e., only one person in a social interaction has played a violent video game) and to further examine the potential effects of competitive video game play, Experiment 2 compared social video game players with people who played alone.

Research has demonstrated that engaging in the reciprocal behaviors predicted by bounded generalized reciprocity can lead people to perceive such reciprocation as normative (i.e., a norm of reciprocity; Gouldner, 1960) in similar situations with anonymous others (i.e., another person whose group status is unknown; Bettenhausen & Murnighan, 1991; Yamagishi et al., 1999; Yamagishi & Kiyonari, 2000; Yamagishi, Mifune, Liu, & Pauling, 2008). In the context of violent video game play, research has demonstrated that playing cooperatively can create a norm of pro-social reciprocity that leads players to expect more pro-social behaviors from a non-video game partner (Greitemeyer & Cox, 2013; Greitemeyer et al., 2012). Consequently, cooperative game players behaved more pro-socially toward a non-video game partner than those who played alone. This suggest a norm of positive reciprocity is created by cooperative game play, which should lead players to treat a non-video game partner more favorably by being less aggressive compared with individuals who are exposed to violent video game play alone. This leads to the third hypothesis:
**Hypothesis 3:** Playing a violent video game cooperatively with another will lead players to be less aggressive toward a non-video game partner than participants who played alone.

In competitive video game play, players are the targets of each other’s aggressive behaviors. If people’s behaviors are determined by their expectations of others’ reciprocal behaviors as predicted by bounded generalized reciprocity, then playing competitively may lead players to expect others to behave and reciprocate aggressive behaviors. Therefore, similar to how cooperative game play may form a positive norm of reciprocity that propagates to subsequent social interactions with anonymous others, competitive game play may form a negative norm of reciprocity (Gouldner, 1960). However, research suggests that people form negative norms of reciprocity from interacting with people who are intentionally aggressive (see the review by T. J. Ferguson & Rule, 1982). It is unclear if players will perceive their competitive partners’ behaviors during video game play as having aggressive intent. Indeed, competitive video game play requires players to attack each other and therefore, players may only perceive their partners’ behaviors as part of the video game. This may deter the formation of a negative norm of reciprocity and subsequent aggressive behaviors toward non-video game partners. Therefore, the current study proposes a second research question:

**Research Question 2:** Will competitive video game players be more or less aggressive toward a non-video game partner than players who played alone?

Regardless of whether competitive video game play leads to a negative norm of reciprocity or not, competitive players should not expect others to behave positively. This is because people do not expect out-group members to behave positively or reciprocate positive behaviors (Yamagishi et al., 1999). Therefore, in comparison with cooperative players, competitive game play should lead players to behave more aggressively. This leads to the fourth hypothesis:

**Hypothesis 4:** Playing a violent video game cooperatively with another will lead players to behave less aggressively toward a non-video game partner than participants who played competitively.

**Method**

**Participants.** Participants were 88 college students (57.2% females, $M_{age} = 22.6$, $SD = 2.21$) who received extra course credit.

**Procedure.** Participants reported to the lab in same-sex pairs. They were told that they would play and evaluate a video game, which would allegedly be used in future research. After giving consent, they were randomly assigned to cooperative, competitive, or single-player conditions. All participants played the violent first-person shooter
Time Splitters 2 for 15 minutes on a PlayStation 2 game console attached to a 40-inch (101-centimeter) television screen.

After game play, participants were separated and informed about a second study involving the relationship between aversive experience and learning and motivation. They were told that this second study was with a different partner than the one who played the video game with them. Their new partner was also a college student of the same sex. Participants were informed that their new partner would later recall several items of information on 10 trials and would receive noise blasts for incorrectly remembered items. Participants then selected the noise blasts their partners would receive for each trial, ranging from Level 1 (10 decibels) to Level 7 (130 decibels), in 20 decibel increments (see Fast & Chen, 2009, for more details about the procedure). A nonaggressive Level 0 was also offered. This different measure of aggression was used to increase the generalizability of the findings. A debriefing followed, which included a probe for suspicion. None of the participants expressed suspicion.

Results

To obtain a more reliable measure of aggression, the levels of noise blast chosen over the 10 trials were averaged (Cronbach’s α = .96). As with Experiment 1, we calculated the intraclass correlation between game partners’ aggressive behaviors to determine whether partners’ scores were independent of each other (35 dyads; Griffin & Gonzalez, 1995). The intraclass correlation suggests that video game partners’ aggressive behaviors were dependent on each other ($r_{xx'} = 2.89, p < .01$) and therefore, we analyzed the data at the dyad level.

Aggressive behavior differed across video game conditions, $F(2, 50) = 6.61, p < .05, \eta^2 = .21$ (see Table 2). The Levene’s test of homogeneity of variances was significant and therefore, equal variances were not assumed when conducting the planned contrasts, $F(2, 50) = 4.57, p < .05$. Planned contrasts indicated that participants who played cooperatively ($M = 1.10, SD = .69$) were less aggressive toward a non-game partner, as evidenced by the level of noise blasts they administered to their partner, than were participants who played by themselves ($M = 2.19, SD = 1.55$), $t(23.79) = -2.72, p < .05, d = -0.91$. The third hypothesis was therefore, supported. The difference in aggressive behaviors between competitive game play participants ($M = 2.55, SD = 1.25$) and participants who played alone ($M = 2.19, SD = 1.55$) did not statistically differ, $t(32.53) = 0.77, p = .45, d = 0.26$. This addresses the second research

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Table 2. Descriptive Statistics for Aggression Measures by Condition (Study 2).
question. Another planned contrast tested the fourth hypothesis by comparing the aggressive behaviors of participants who played cooperatively and competitively. The results indicate that cooperative game play participants were less aggressive than competitive game play participants and therefore, supported the fourth hypothesis, $t(26.81) = -4.29, p < .001, d = -1.44$.

Discussion

The results from Experiment 2 suggest that the benefits of cooperative game play are not limited to subsequent interactions with video game partners but can be applicable to social interactions with others. These results also provide a better picture of how social contexts can influence the effects of violent video game exposure. Experiment 1 suggested that cooperative game play can substantially reduce the effects of violent video game exposure on aggression such that cooperative partners resembled participants who were not exposed to violent video games. Experiment 2 corroborates this finding by demonstrating that cooperative game play decreased players’ aggression in comparison with solitary game play and competitive game play.

As predicted by bounded generalized reciprocity (Yamagishi et al., 1999), the results from Experiment 2 suggest that reciprocity norms formed during game play can guide players’ subsequent behaviors toward non-video game partners. For example, it seems that reciprocating positive behaviors during cooperative game play can lead players to perceive such reciprocation as normative in similar situations with an anonymous partner. On the other hand, behaving aggressively toward a competitive partner does not seem to increase players’ aggressive behaviors by forming a negative norm of reciprocity.

General Discussion

Previous research suggests that playing violent video games alone can increase aggression (see, for example, Anderson et al., 2010; Greitemeyer & Mügge, 2014, for meta-analytic reviews). While debate over this research questions the mechanisms behind violent video games’ effects on players’ subsequent aggression (i.e., Adachi & Willoughby, 2011) or that a link even exists (C. J. Ferguson & Kilburn, 2010; but see the response by Bushman, Rothstein, & Anderson, 2010), the available evidence suggests that the cooperative social interactions during game play may lead players to be more pro-social and less aggressive than if they had played alone.

Experiment 1 is one of the first to examine the extent to which cooperative game play can decrease the effects of violent video games on players’ subsequent aggressive behaviors. Experiment 1 compared the aggressive behaviors of participants who played a violent video game cooperatively with aggressive behaviors of people who did not play a violent video game at all. This comparison is important because if cooperative game partners are still more aggressive than those who are not exposed to violent video game play then violent video games still have a negative influence on players regardless of how they are played (e.g., cooperatively with others). However,
the results of Experiment 1 suggest that cooperative game play can reduce players’ aggression to levels similar to people who are not exposed to violent video games.

Experiment 2 examined whether the effects of cooperative game play on players’ subsequent behaviors are generalizable to social interactions with non-video game partners. The importance of studying social video game play would be limited if the benefits of cooperative game play are only applicable to aggressive behaviors between video game partners. The results of Experiment 2 suggest that playing a violent video game cooperatively leads players to behave less aggressively toward non-video game partners than playing alone or competitively.

The results regarding the effects of competitive game play were less conclusive. Experiment 1 demonstrated that competitive game play increased players’ aggression toward video game partners compared to not playing a violent video game at all. Due to the absence of a single game play condition, it is unclear whether competitive game play increased players’ aggression because of the violent content of the video game or because of the competitive context. Experiment 2 suggests that competitive video game play does not form a negative norm of reciprocity that leads to greater aggressive behaviors toward non-video game partners. However, a closer look at the means suggest that competitive players were more aggressive than players who played alone, albeit not statistically different (see Table 2). Perhaps with a larger sample size, the difference between competitive and single game players may statistically differ which may suggest that competitive contexts lead players to expect others to behave aggressively. However, in line with previous research, the results of Experiment 2 suggest that the effect of competitive game play is relatively weak (Anderson & Morrow, 1995; Schmierbach, 2010; Velez et al., 2012). Future research should examine if playing violent video games competitively against other players leads them to subsequently behave aggressively due to expectations of others to behave and reciprocate aggressive behaviors. As discussed above, whether competitive players perceive aggressive intent in their game partners’ behaviors likely plays an important role in this process (T. J. Ferguson & Rule, 1982).

The results of the current experiments suggest that the theory of bounded generalized reciprocity may be a useful theoretical framework to aid our understanding of social video game play. Specifically, bounded generalized reciprocity suggests that cooperative game play should lead players to expect video game partners to reciprocate positive behaviors due to shared group membership. Cooperative players should also expect non-video game partners to reciprocate positive behaviors due to norms of reciprocity formed during cooperative game play. Likewise, the theory suggests that competitive game play should lead players to not expect positive behaviors from video game and non-video game partners (Yamagishi et al., 1999). The results of the current experiments are congruent with these predictions by demonstrating that cooperative game partners are less aggressive toward each other and non-video game partners than competitive game partners and single players.

Because the current article argues that social video game play research needs a theory capable of predicting the effects of dynamic social interactions, it is important to note other such theories that may be applicable to the current results. For example,
researchers have proposed that Deutsch’s (1973) theory of cooperation and competition may be used to predict social video game play’s effects (Anderson & Morrow, 1995; Eastin, 2007; Schmierbach, 2010). Deutsch’s theory describes situations that are most likely to lead to cooperative behaviors (Deutsch, 1973). However, Deutsch does not provide a theoretical explanation for these cause and effect relationships nor did he intend to explain the underlying mechanisms behind them (Deutsch, 2006). Future research should examine how different types of goal interdependence in social video game play and how different types of actions that players engage in can lead to cooperative outcomes (Deutsch, 1973). However, bounded generalized reciprocity provides a theoretical framework for explaining why such effects may occur.

The interdependence theory (Kelley & Thibaut, 1978) proposed by researchers to explain the pro-social effects of cooperative game play (Greitemeyer & Cox, 2013; Greitemeyer et al., 2012) also describes social situations of varying complexity that lead to cooperative outcomes. However, the interdependence theory also provides a list of potential mediating and moderating factors that influence people’s pro-social behaviors in these varying social situations (see Rusbult & van Lange, 2008). For example, the interdependence theory suggests that cooperating with others increases cohesion between partners, which leads to increases in pro-social behaviors by activating trust norms (De Bruin & van Lange, 1999; Kreijns, Kirschner, & Jochems, 2003; Van Lange & Kuhlman, 1994). Previous research has corroborated this assertion in the context of cooperative video game play (Greitemeyer & Cox, 2013; Greitemeyer et al., 2012). Although the terminology differs, trust norms and expectations of others’ behaviors, as discussed by bounded generalized reciprocity, are qualitatively the same construct. This is evidenced by studies having the same operationalization of trust norms (Greitemeyer & Cox, 2013; Rusbult & Van Lange, 2008) and expectations of others’ behaviors (Rothmund et al., 2011; Yamagishi & Kiyonari, 2000). Although interdependence theory is superior to Deutsch’s theory of cooperation and competition (Deutsch, 1973) by providing theoretical mechanisms underlying people’s pro-social behaviors, it still lacks a theoretical explanation of why such mechanisms are proposed. On the other hand, bounded generalized reciprocity provides a theoretical explanation of why trust norms or expectations of others’ behaviors may determine people’s behaviors toward teammates and opposing team members.

Research on interdependence theory may have great utility in proposing other relevant mediators and moderators of cooperative game play effects as the social relationships between video game partners become more complex. For example, interdependence theory discusses situations in which one partner is more dependent on the other. This may occur in cooperative video game play when one player is much better than the other. Interdependence theory suggests that players’ behaviors may be impacted by their comfort with vulnerability (i.e., dependent partner) or responsibility (i.e., powerful partner; Holmes, 2002) in these types of situations. Future research should consider other possible influential factors proposed by interdependence theory that influence cooperative players’ behaviors in conjunction or in parallel with their expectations of others’ behaviors.
Social identity theory is another viable theoretical framework that was created to explain intergroup situations such as social video game play. Social identity theory proposes that belonging to a group can have a positive influence on one’s self-esteem if one regards the group positively. Positive evaluations of one’s group identity occur by making favorable comparisons with other inferior groups (Tajfel & Turner, 2001). Social identity theory predicts that cooperative game partners view each other as in-group members because they are working together toward a common goal and therefore, cooperative partners will engage in biased behaviors in which players actively attempt to benefit in-group members (i.e., in-group favoritism) while minimizing any benefits out-group members receive (i.e., out-group discrimination).

Contrary to the predictions of social identity theory, previous research suggests that biased behaviors aimed at protecting one’s group identity cannot explain the positive effects of cooperative game play. For example, players who played cooperatively or competitively with an in-group member (attending the same university as the player) or an out-group member (attending a rival university) did not demonstrate any group biases toward their partners in terms of subsequent pro-social behaviors (Velez et al., 2012). The results of the current experiments present the same problem for social identity theory predictions. According to social identity theory, cooperative players in the first study should have demonstrated an in-group bias toward their partners regardless of the violent video game play by behaving less aggressive than people who did not share group membership (i.e., participants in the control condition). Social identity theory would also predict that interactions with an in-group or out-group member should not influence subsequent interactions with an anonymous other (Tajfel & Turner, 2001). This suggests that social video game play in Experiment 2 should not have led players to behave more or less aggressive toward others. Consequently, the results of both experiments are incongruent with social identity theory.

The current experiments corroborate previous research that suggests that cooperative video game play has a stronger influence on players’ subsequent behaviors than the violent content (Eastin, 2007; Ewoldsen et al., 2012; Greitemeyer, 2013; Greitemeyer & Cox, 2013; Greitemeyer et al., 2012; Schmierbach, 2010; Velez et al., 2012). As discussed above, the GAM (Bushman & Anderson, 2002) is less applicable to social video game play because of the emphasis the model places on violent content. However, the general learning model (Buckley & Anderson, 2006) expands the scope of the GAM to include pro-social-related outcomes using the same social cognitive and social learning theories. For example, the general learning model has been used to explain how pro-social video game content can teach and activate pro-social-related scripts and schemas that lead to positive behaviors (see Gentile et al., 2009; Greitemeyer, 2011; Greitemeyer & Osswald, 2010, for an overview).

If cooperative players are focusing more on the pro-social behaviors between teammates compared with the violent content, then it is possible that cooperative game play leads to less aggressive behaviors through processes proposed by the general learning model. Given that previous research suggests that cooperative video game play decreases aggressive cognitions (Schmierbach, 2010; Velez et al., 2012), angry feelings (Eastin, 2007), and arousal (Lim & Lee, 2009), it is likely that cooperative video
game play can also prime cooperative and pro-social cognitions as suggested by the general learning model. However, competitive game play should also prime competitive cognitions, which should increase players’ aggressive behaviors. Indeed, previous research has established that people view competitive situations as more aggressive (Anderson & Morrow, 1995; Study 1), and therefore playing competitively against others in a violent video game should teach and activate aggressive scripts and schemas that influence subsequent aggression (Adachi & Willoughby, 2011). Although it is likely that competitive game play activates and primes competitive cognitions, the results of Experiment 2 suggest that such cognitions do not play a pivotal role in influencing competitive players’ aggressive behaviors. This is because participants who played competitively were not reliably more aggressive than people who played alone. The current experiments do not, however, suggest that cognitions play an insignificant role in people’s behaviors. Although beyond the scope of the current experiments, it is possible that the teaching and activation of pro-social- or aggression-related scripts by pro-social or violent video game content can account for single players’ subsequent behaviors (Anderson et al., 2010; Greitemeyer & Mügge, 2014). However, the current experiments suggest that theories explicitly designed for dynamic social interactions (e.g., bounded generalized reciprocity) should also be considered when examining social video game play.

**Limitations**

Although previous research (Giancola & Parrott, 2008; Giancola & Zeichner, 1995) has demonstrated the reliability and validity of the competitive reaction time task (Taylor, 1967) used in Experiment 1, it has come under some criticism (C. J. Ferguson & Rueda, 2009). However, using different measures of aggressive behaviors across the two studies supports the validity of the findings.

Another limitation is that we did not explicitly measure players’ expectations for reciprocal behaviors. We decided not to include such measures because we did not want participants to become suspicious about our hypotheses. In addition, previous research has demonstrated that cooperative game play can increase players’ expectations for reciprocal behaviors (Greitemeyer & Cox, 2013; Greitemeyer et al., 2012). Because players’ behaviors were congruent with the purported effects of reciprocation expectations, the current experiments suggest that bounded generalized reciprocity can be applied to social game play effects. However, future research should examine how social video game play can influence players’ expectations of reciprocal positive behaviors and the effects of such expectations on players’ subsequent aggressive behaviors.

**Conclusion**

Violent video games and research pointing to their negative effects have been a controversial topic. Most researchers claim that violent video games are a major cause of aggression (Anderson et al., 2007), though a few question the link (C. J. Ferguson &
Kilburn, 2010; for a meta-analytic review of these conflicting views, see Greitemeyer & Mügge, 2014). However, we are beginning to understand that playing violent video games cooperatively does not appear to be as harmful as playing them alone. Previous research suggests that cooperative game play is capable of reducing the negative effects violent video games are purported to have on players (Eastin, 2007; Ewoldsen, et al., 2012; Greitemeyer, 2013; Greitemeyer & Cox, 2013; Greitemeyer et al., 2012; Schmierbach, 2010; Velez et al., 2012). The current experiments are among the first to address the major concern over violent video games and their effects on players’ aggressive behavior. The results are the first to suggest that cooperative game play may reduce players’ aggression after violent video game play to innocuous levels, regardless of whether the aggression target is a video game or non-video game partner.

The current experiments argue that social video game play requires a theoretical framework that encompasses dynamic social interactions found in such game play and presents arguments and evidence that the theory of bounded generalized reciprocity (Yamagishi et al., 1999) may be an appropriate theoretical background. Indeed, future research should focus on how the reciprocation of behaviors during game play may play a pivotal role in players’ subsequent behaviors by influencing their behavioral expectations of others. As Franklin D. Roosevelt famously stated, cooperation is what we should strive for in the real world. Our research suggests that it is also what we should strive for in the virtual world.

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Notes
1. Another study suggests that cooperative game play can reduce players’ subsequent aggressive behaviors in comparison with people who play alone (Jerabek & Ferguson, 2013). Participants either played a non-violent video game (Portal 2) or a violent video game with an antisocial context (Borderlands) or pro-social context (Lego Star Wars III). Participants played one of these games cooperatively with another participant or by themselves. However, the study suffers from several issues that limit its conclusions. For instance, the researchers did not ensure the games were comparable in cooperativeness when played in the cooperative game mode. For instance, in Portal 2 (non-violent video game), players are not able to progress through the game in the cooperative game mode unless they engage in cooperative behaviors with each other. In contrast, the cooperative game modes of Borderlands and Lego Star Wars III allow players to interact with the virtual environment together but are not required to engage in cooperative behaviors to the same degree.
as players in Portal 2. Therefore, the study is limited in their claim that their results are due to cooperative game play and not to the game play found in one specific video game. While this issue could easily be addressed in the statistical analysis, the lack of proper reporting of the statistical analyses makes it impossible to know whether there were differences between the three games. Although there were three ANCOVAs using the three types of video games as one independent variable and the type of game play (cooperative vs. single game play) as the other independent variable, the researchers failed to mention the analyses of the interactions between independent variables. Likewise the researchers do not provide the means of cooperative game players and single game players’ aggressive behaviors for the three video games to allow readers to compare the means. An analysis of the interaction term for each ANCOVA would have revealed whether each video game’s cooperative game mode varied in its effect on players’ subsequent aggressive behavior. However, because the researchers did not provide this information, it is unknown whether the main effects found in the study are qualified by interactions between the different games that were used across the conditions, which calls into question the validity of the reported main effects.

2. It is likely that video game partners’ aggressive behaviors in the first study were not dependent on each other because the random punishment levels set by the competitive reaction time task dissipated any dependence between video game partners formed during video game play. Likewise, video game partners’ aggressive behaviors in the second study were likely dependent on each other because they did not experience such randomness from their ostensible partner during the measure of aggressive behaviors.

References


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