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Brothers and Sisters in Arms: Intergroup Cooperation in a Violent Shooter Game Can Reduce Intergroup Bias

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Objective: Video games increasingly have become multiplayer, and thus online video game players have the unique opportunity to cooperate with players from all over the world, including those who belong to different social groups. Consistent with research showing that intergroup cooperation leads to reductions in intergroup bias, playing a video game cooperatively with a member of a different social group (i.e., an outgroup member) may reduce bias. The goal of the current study, therefore, was to test whether playing a violent video game cooperatively with an outgroup member reduces intergroup bias toward that partner's group. **Method:** In our investigation, Canadians ($n = 138$) played a violent video game cooperatively with an outgroup (American) or ingroup member against alien (i.e., zombie-like) enemies. **Results:** Cooperating with an outgroup member in a violent context for only 12 minutes generated large reductions in outgroup prejudice. **Conclusions:** Our findings highlight the potential for even violent video games to serve as prejudice interventions.

Keywords: intergroup bias, intergroup cooperation, prejudice, violent video games

General MacArthur was famously quoted (as reported by Mayor Achille Lauro of Naples) as having stated that “because of the developments of science, all the countries on earth will have to unite to survive and to make a common front against attack by people from other planets” (“M’Arthur Meets Mayor of Naples,” 1955). Intriguingly, cooperation among different countries (generally considered outgroups) in combating an alien third-party, even on a *violent* task, could reduce prejudices (or improve attitudes) toward these cooperating, allied countries. This proposition captures the imagination, and modern technological advances (i.e., realis-

tic video game simulations) make this an empirically testable question. Specifically, does playing a violent video game cooperatively with an outgroup member against a common enemy produce reductions in intergroup bias toward the group of one's partner?

The consequences of video game play continue to be a hot topic as video games have become the fastest growing form of entertainment in the world, with a global market value of \$67 billion in 2010 and a predicted value of \$112 billion by 2015 (Biscotti et al., 2011). The majority of psychological research on video games has been focused on the *content* of games and its role in influencing aggressive behavior (Anderson et al., 2010; but see Ferguson & Kilburn, 2010 for criticisms of this work). In contrast, experimental research examining the *context* in which video games are played (e.g., playing cooperatively with another player vs. playing alone), is relatively scarce (Gentile, 2011), as only a few studies have examined video game context effects (e.g., Jerabeck & Ferguson, 2013; Schmierbach, 2010). Moreover, because video games increasingly have become multiplayer, it is especially important to examine *intergroup* context effects in video

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games (e.g., playing cooperatively with a member of a different social group). For example, Lenhart et al. (2008) report that more than a quarter of American adolescents play video games online with other people. Online video game players, therefore, have the unique opportunity to cooperate with players who belong to different social groups, with intergroup cooperation potentially leading to reductions in intergroup bias (i.e., prejudice and discrimination; see Pettigrew & Tropp, 2006). Furthermore, most *violent* video games (e.g., first-person shooter games), which are especially popular among adolescents (Lenhart et al., 2008) and emerging adults (Padilla-Walker, Nelson, Carroll, & Jenson, 2010), can be played cooperatively with other players (against a common enemy) online. Thus, although research on violent video games has focused primarily on negative outcomes such as aggression, as opposed to positive outcomes (see reviews by Adachi & Willoughby, 2013a; Granic, Lobel, & Engels, 2014), violent video games may exert positive effects when played in a cooperative intergroup context, such as reducing intergroup bias. To date, no researchers have examined the effect of intergroup cooperation in video games on bias reduction. The goal of the current study, therefore, was to test whether a video game that is violent in nature, yet played cooperatively with an outgroup member, reduces intergroup bias toward that partner's group.

Intergroup Cooperation

Intergroup biases such as prejudice and discrimination are common outcomes of intergroup relations (Hewstone, Rubin, & Willis, 2002). Basic categorization processes easily categorize the world into "us versus them," and intergroup motivations (e.g., competition, dominance) quickly entrench perceived differences and escalate tensions. Fortunately, interventions such as intergroup contact (Allport, 1954; Pettigrew & Tropp, 2006; see Hodson & Hewstone, 2013) and intergroup cooperation (Sherif, Harvey, White, Hood, & Sherif, 1961) can effectively reduce prejudice against outgroups, with interactants becoming part of a common ingroup rather than remaining competing outgroups (for a review, see Gaertner & Dovidio, 2000). For instance, in the classic *Robbers Cave Experiment* (Sherif et al., 1961), competition

against an outgroup exacerbated negative intergroup relations and bias, but introducing intergroup cooperation tasks significantly reduced intergroup biases against nonallied parties. In lab settings with ad hoc groups, intergroup cooperation similarly reduces biases (Gaertner, Mann, Dovidio, Murrell, & Pomare, 1990).

Despite these successes, the field faces a perennial problem: intergroup contact is frequently avoided (Hodson, 2011). Worse, setting up and successfully negotiating actual intergroup cooperation can be fraught not only with tension and resistance but by pragmatic limitations. Recently, prejudice researchers have demonstrated that *simulations* provide effective means to set up favorable intergroup contexts and can themselves reduce bias. For instance, having heterosexual students discuss and contemplate life on an alien planet as stigmatized minority group members significantly reduces prejudices against homosexuals in real life (Hodson, Choma, & Costello, 2009). Crisp and Turner (2012) also have demonstrated clear benefits of mentally imagining positive contact with an outgroup, documenting significant reductions in intergroup anxiety and outgroup prejudices (see also Hodson, Dube, & Choma, in press).

These simulations, however, involve no actual cooperation with an outgroup. In the present study, we ask whether we can employ a virtual cooperation environment to harness the power of intergroup cooperation and thereby reduce prejudice toward a partner's group. If so, this would represent an advance, not only for prejudice researchers and school educators, but for the military, given their routine use of simulations for training purposes. We focus on the type of simulation most pertinent to violent contexts characterized by *allied partnerships*, whereby partners nonetheless experience outgroup biases (e.g., Americans vs. Canadians). For instance, many Canadians enjoy humor disparaging Americans (Hodson, Rush, & MacInnis, 2010), despite sharing strong alliances with this outgroup. In the present investigation, we examine intergroup cooperation in a violent video game, whereby participants cooperate together in a violent battle against outside parties (akin to the MacArthur scenario). This form of simulation has important practical implications because video games increasingly have become multiplayer. Online video game players have a

special opportunity to cooperate with players belonging to outgroups.

Video Games, Cooperation, and Intergroup Bias

Findings from the extant literature suggest that outgroup cooperation is a powerful and effective means to reduce prejudices toward the cooperation outgroup. Yet these studies almost exclusively examine cooperation on prosocial or neutral tasks (e.g., Gaertner et al., 1990; Sherif et al., 1961). What is unknown are the potential benefits of intergroup cooperation when working on negative (e.g., violent) tasks. On the one hand, considerable research on violent video games has examined negative outcomes (see Adachi & Willoughby, 2013a). Specifically, there are more than two decades of research documenting the effect of violent video game play on elevating aggression (e.g., Anderson et al., 2010; but also see Adachi & Willoughby, 2011a; Ferguson, 2013, 2007; Ferguson & Dyck, 2012; Ferguson & Kilburn, 2010; Ferguson & Olsen, 2013 for criticisms of this work). Only a few studies have investigated the impact of violent video game play on intergroup relations. Specifically, Saleem and Anderson (2013) found that playing a violent (vs. nonviolent) game, in which the computer-generated enemy characters were Arabs (outgroup members), increased prejudice toward Arabs. Similarly, Greitemeyer (2014) found that playing a violent video game in which the computer-generated enemy characters were outgroup members led to more aggressive behavior toward a real-life outgroup member compared to a real-life ingroup member (note that the real-life outgroup member was from a different social group than the computer-generated enemy in the game).

In contrast, we are interested in bridging the gap between the intergroup cooperation and prejudice reduction literature, and the violent video game literature, by examining whether violent video games can exert a positive effect of *reducing* intergroup bias, if played in a cooperative intergroup context. Research on interpersonal relations offers promise for our intergroup hypothesis. For instance, Jerabeck and Ferguson (2013) found that participants who played either a violent or a nonviolent video game in a cooperative context subsequently be-

haved less aggressively than participants who played either game on their own. Furthermore, the violent video game did not produce more aggression than the nonviolent video game in either context (i.e., when played cooperatively or alone). Similar effects of video game cooperation have been shown on aggressive cognition; Schmierbach (2010) found that playing a violent video game in a cooperative context led to lower aggressive cognition scores compared to playing the same game alone or competitively against another player.

In terms of pro-social behavior, Greitemeyer, Traut-Mattausch, and Osswald (2012) found that playing a violent video game in a cooperative context led to higher levels of cooperative behavior toward a third participant (not the participants' partner during video game play) compared with playing alone. Furthermore, playing a violent game in a cooperative context led to similar levels of cooperative behavior compared to playing a nonviolent video game alone (see also Greitemeyer & Cox, 2013). In addition, Velez, Mahood, Ewoldsen, and Moyer-Gusé (2012) found that playing a violent video game in a cooperative context led to elevations in helping behavior toward the participants' partner. Furthermore, playing cooperatively with a student from a different university (i.e., an outgroup member) led to reductions in aggressive responses on a story-stem measure of aggressive behavioral tendencies.

The Current Study

The goal of the current study was to examine whether cooperating with an outgroup member in a violent video game reduces prejudice toward that outgroup. This is the first study to our knowledge to use video games to examine the link between intergroup cooperation and prejudice reduction. Consistent with the recent findings on the positive effects of interpersonal cooperation in video games, as well as the intergroup cooperation and prejudice literature (e.g., Gaertner et al., 1990), we predicted that (a) cooperation with an outgroup member in a violent video game will decrease bias against the cooperation group. We provide a strong test of this hypothesis by engaging Canadian participants in a highly violent shooter game, either in an intergroup condition (allegedly cooperating with an American from a neighboring univer-

sity) or an ingroup condition (allegedly cooperating with a fellow ingroup student). Furthermore, we predicted that the effect of intergroup cooperation in a violent video game on prejudice reduction would be specific to attitudes toward the partner's groups and would not necessarily transfer to ingroup attitudes (e.g., Canadians) or attitudes toward other groups not associated with the outgroup partner (e.g., the elderly). We posited two additional hypotheses. First, we predicted that (b) participants would categorize themselves and their partner as one team. Second, although discrimination in the form of ingroup favoritism has been a common finding in the intergroup relations literature (Hewstone et al., 2002), we predicted that (c) after intergroup cooperation in a video game, participants would not favor an ingroup member over their outgroup partner.

Method

Participants

Participants consisted of 154 Canadian undergraduate students at Brock University (Ontario, Canada). Sixteen suspicious participants were excluded from analyses, leaving 138 participants (56% female; M age = 18 years 9 months, SD = 2 years 8 months). Participants were recruited via the undergraduate psychology participant pool and posters that were placed around campus to advertise the study. This study was approved by the University Ethics board, and all participants provided active consent before participation. Students were recruited using the psychology participant pool and received \$20 in exchange for their participation.

Materials

Video games and equipment. The "Cooperative Zombie" mode of the violent first-person shooter game *Call of Duty: Black Ops*, in which players work together to shoot and kill zombies, was played on *XBOX360*. *Call of Duty: Black Ops* is rated "Mature 17+" by the *Entertainment Software Rating Board (ESRB)* because of the "blood, gore, and intense violence" that occurs when players engage in combat with the Zombie characters. Furthermore, the *Call of Duty* video game

series has been used in previous studies examining the effects of violent video game play on attitudes and behavior (e.g., Greitemeyer, 2014; Hasan, Bègue, Scharkow, & Bushman, 2012). Participants cooperated from separate rooms online via *XBOXLive*.

Demographics. A demographic questionnaire assessed age, sex, and experience with first-person shooter games on a scale of 1 (*not at all*) to 5 (*5 or more hours per day*).

Prejudice. Attitudes toward University of Buffalo students (university outgroup) and toward Americans (national outgroup) were assessed both pregame and postgame using attitude thermometers. Participants also rated attitudes toward several other social groups (i.e., immigrants, alcoholics, the poor, drug addicts, AIDS patients, the obese, the mentally ill, ethnic minorities, the elderly, Canadian, Brock University students) to disguise which groups were of interest. Pretest attitudes were assessed with a visual-analogue scale, where participants indicated their attitude with a mark on a 10-cm line anchored from *extremely unfavorable* to *extremely favorable*. Posttest attitudes were assessed on numbered Likert-Type 10-point thermometer scales, with responses ranging from 0 (0–10 degrees = *extremely unfavorable*) to 9 (90–100 degrees = *extremely favorable*). Pretest and posttest scores can be directly compared, using the same 10-point scale, but are procedurally distinct, to avoid suspicion and allow participants to change attitudes in a subtle manner (see Hodson et al., 2010). Attitude thermometers are widely used and validated in the prejudice field, providing a simple and meaningful index of summary evaluations toward a group (see, e.g., Dijkster, 1987; Gaertner et al., 1990; Haddock, Zanna, & Esses, 1993; Hodson et al., in press; Hodson et al., 2009). Not only do such measures reflect methods commonly employed in large-scale nationally representative surveys (Dijkster, 1987), they can be employed to tap attitudes toward one group (e.g., lesbians) and another group (e.g., Muslims), allowing for comparisons between target groups. Thermometers also demonstrate strong test-retest reliability (e.g., Haddock et al., 1993) and predictive relations with multiple-item scales (e.g., Stangor, Sullivan, & Ford, 1991).

Categorization as one team. After playing the video game, participants rated the extent to which they felt like they and their partner "were

one team playing the game” on a scale from 1 (*not at all*) to 7 (*very much so*; Gaertner et al., 1990). This measure is widely used in the prejudice field (e.g., Gaertner et al., 1990; Gaertner & Dovidio, 2000; Hodson et al., 2009) to assess whether group categorizations are inclusive in nature.

Discrimination. To assess discriminatory behavior, participants were asked to select a video for their partner (ingroup or outgroup partner depending on condition) to watch, which allegedly elicits positive (*happy/pleasant*; coded as 1), neutral (*control group*; coded as 0), or negative (*sad/unpleasant*; coded as -1) emotions. This measure, adapted from Hodson, Dovidio, and Esses (2003), is a relatively face-valid discrimination measure, whereby participants actively make decisions to determine the outcome or fate of ingroup or outgroup members. This captures the construct of “discrimination” as a negative or biased behavioral outcome that disadvantages (or advantages) a target as a result of their group membership (see Dovidio, Hewstone, Glick, & Esses, 2010). In this case, higher scores indicate selection of more positive or favorable outcomes. Participants then chose a video for a Brock (ingroup) student to watch; this target person was not their interaction partner but a future study participant. Our particular interest concerned whether participants in the intergroup condition were (on average) more likely to select the video eliciting positive emotions for an ingroup member than their own outgroup partner. We were not interested in whether there were differences in discrimination in the intragroup condition, wherein participants selected a video for two ingroup members, given in this condition there was no intergroup comparison. The participants were thoroughly debriefed at the end of the study and told that their partner did not have to watch the video.

Suspiciousness. A suspiciousness questionnaire assessed knowledge of the study’s goals or deception (Adachi & Willoughby, 2011b). Specifically, participants were asked whether they knew the true purpose of the study, whether anyone had told them about the study before completing it, and whether they were aware of any deception.

Procedure

Two students participated together in different rooms and were told that they were in a study examining the relationship between personality and video game play. Participants interacted online via *XBOXLive* in a first-person shooter game, and were randomly assigned to one of two conditions. In the *intergroup condition* participants were allegedly cooperating online with an American participant at the University of Buffalo (US), a cross-border university approximately 50 km away. In reality the participant was an ingroup (Brock) university student, playing in an adjacent room. In the *intragroup condition*, participants were allegedly (and actually) cooperating with a Brock (ingroup) university student in an adjacent room. Participants could not communicate. Participants completed a demographic questionnaire and pretest intergroup attitude measure before playing the shooter game for 12 minutes. Afterward, participants rated the extent to which they categorized themselves and their partner as one team, and completed posttest attitude measures. Finally participants completed a behavioral discrimination measure (allocating negative, neutral, or positive video viewing experiences), before completing a suspicion questionnaire and debriefing. Sixteen participants were excluded from the study because they indicated that they were wise to the deception used in the cover story. Specifically, these participants did not believe that their partner was actually a Brock University student or a University of Buffalo student (e.g., but instead could have been a confederate or a computer-generated opponent). No participants were wise to the true purpose of the study (i.e., the effect of intergroup cooperation in a video game on intergroup bias).

Results

Testing for Nonindependence

Because participants played the video game in pairs, intraclass correlations were calculated to test for nonindependence in the outcome variables that could have been affected by the (virtual) interaction between the members of each pair (see Alferes & Kenny, 2009). No intraclass correlations were significant ($ps > .15$), and

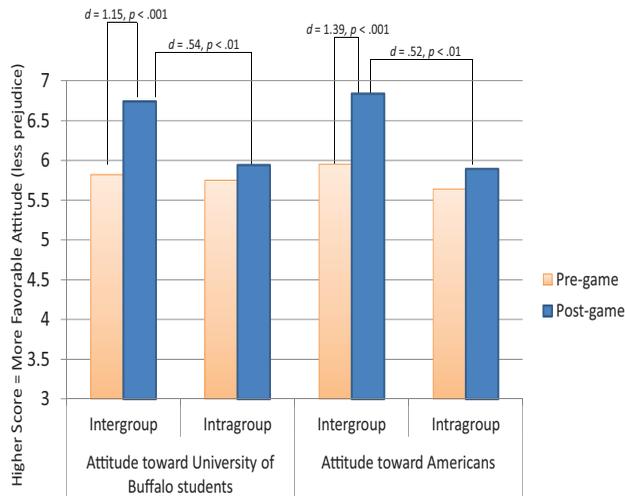
thus the assumption of independent observations was not violated.

Pregame and Postgame Intergroup Attitudes

To examine the effects of intergroup versus intragroup cooperation in a violent video game on attitudes toward University of Buffalo students and Americans, we conducted a multivariate 2 (Condition) \times 2 (Time) \times 2 (Attitude) repeated measures analysis of variance (RM-ANOVA), with time and attitude as the within-subjects variables and condition as the between-subjects variable. The 3-way interaction was not significant $F(1, 136) = .12, p = .73$, partial $\eta^2 = .001$; however, we found a significant 2-way interaction (Condition \times Time), $F(1, 136) = 14.82, p < .001$, partial $\eta^2 = .10$. Specifically, attitudes toward both University of Buffalo students and Americans became significantly more favorable after cooperating in the video game with an outgroup member (intergroup condition; see Figure 1), representing large effect sizes ($ds > 1$). The lack of a significant 3-way interaction indicates that the effects did not differ as a function of whether the

attitude target was University of Buffalo students or Americans. In contrast, participants who cooperated with an ingroup member (intragroup condition) exhibited no change in attitudes toward University of Buffalo students or Americans after game play. In terms of between-groups contrasts, postgame attitudes toward Americans and University of Buffalo students were significantly more favorable among participants in the intergroup (vs. intragroup) condition ($ds > .50$).

There was a broad range of pregame attitudes toward the other unrelated outgroups not linked to the participants' partner (i.e., drug addicts [2.22], alcoholics [2.81], the obese [5.17], AIDS patients [6.09], the mentally ill [6.34], the poor [6.42], immigrants [6.72], ethnic minorities [6.78], the elderly [7.81]). To examine whether the effect of intergroup cooperation in a violent video game on prejudice reduction transferred to these other unrelated outgroups, or to ingroup attitudes (i.e., Canadians and Brock University students), we conducted a multivariate 2 (Condition) \times 2 (Time) \times 11 (Attitude) RM-ANOVA. Consistent with our hypotheses, we found that both the 3-way inter-



Notes. Only significant effects and associated p values are shown in figure (not omitted from paper). Although the 3-way interaction (condition \times time \times group) was non-significant, we presented the data as a 3-way interaction to display attitudes toward University of Buffalo students and Americans separately.

Figure 1. Pre- and postgame attitudes toward Americans and University of Buffalo Students among (Canadian) participants in the intergroup and intragroup cooperation conditions. The color version of this figure appears in the online article only.

action, $F(10, 1330) = .66, p = .73$, partial $\eta^2 = .005$, and the 2-way interaction (Condition \times Time), $F(1, 133) = .05, p = .82$, partial $\eta^2 = .000$, were nonsignificant. The simulation, therefore, affected attitudes toward the partner's groups, but not ingroup attitudes or attitudes toward outgroups that were not linked to the participants' partner (see Table 1). That is, there was no evidence of a secondary transfer to unrelated outgroups, but rather evidence that working with an allied outgroup boosted favorability toward that particular group.

Tests of Categorization and Discrimination Scores Against the Scale Midpoints

To examine whether intergroup cooperation in the video game led participants to view themselves and their outgroup partner as one team, and to avoid discriminating against their outgroup partner, scores on these dependent variables were compared with their scale midpoints among the intergroup condition participants. The average categorization score ($M = 4.56, SD = 1.83$) was significantly higher than the scale midpoint (4), $t(72) = 2.62, p = .01$; thus, in the intergroup condition participants categorized themselves and their outgroup partner as one team. In addition, the average discrimination score toward one's outgroup partner ($M = 0.44, SD = .78$) was significantly higher than the scale midpoint (0), $t(72) = 4.79, p < .001$, suggesting that intergroup participants did not discriminate against their outgroup partner.

Postgame categorization (as one team). As predicted, there was no significant difference

in the degree to which participants in the intergroup condition categorized themselves and their partner as belonging to one team (outgroup partner $M = 4.56, SD = 1.83$) compared with participants in the ingroup condition (ingroup partner $M = 4.42, SD = 1.70$), $F(1, 136) = .23, p = .87$, overriding an otherwise strong tendency to view the outgroup as "other."

Postgame discrimination. Likewise, at postgame there was no significant difference among participants in the intergroup condition when selecting positive videos for an ingroup (Brock) future participant ($M = .54, SD = .69$) versus their outgroup partner ($M = .44, SD = .78$), $F(1, 71) = .80, p = .37$ (higher scores = selecting the relatively more positive outcome). No discrimination, therefore, was expressed in the intergroup condition.

Sex as Potential Moderator

Consistent with past video game research (Anderson et al., 2010), there were no significant interactions between condition and sex for any of the outcome variables.

Discussion

Intergroup cooperation has been shown to reduce prejudice against outgroups but is frequently avoided because of tension and resistance among outgroups, as well as pragmatic limitations, such as large geographical distances between groups or deadly conflict history. To circumvent this problem, we examined whether intergroup cooperation in a realistic simulation

Table 1
Outgroup and Ingroup Attitudes Pre- and Post-Game

Target	Intergroup condition		Ingroup condition		$F(1, 136)$	Partial η^2
	Pregame attitude	Postgame attitude	Pregame attitude	Postgame attitude		
University of Buffalo students (university outgroup)	5.82 (1.78)	6.74 (1.61)	5.75 (1.21)	5.94 (1.30)	10.00*	.06
Americans (national outgroup)	5.95 (1.88)	6.84 (1.80)	5.64 (2.08)	5.89 (1.89)	8.21*	.07
Brock University students (university ingroup)	8.32 (1.48)	8.25 (1.42)	8.05 (1.54)	7.95 (1.49)	0.02	.00
Canadians (national ingroup)	8.88 (1.21)	8.59 (1.54)	8.63 (1.26)	8.35 (1.33)	0.01	.00

Note. Higher scores indicate more favorable attitudes. F test reported for interaction effect (Condition \times Attitude). Results for attitudes toward other outgroups (i.e., immigrants, alcoholics, the poor, drug addicts, AIDS patients, the obese, the mentally ill, ethnic minorities, and the elderly) can be obtained from the first author.

* $p < .01$.

task (a violent video game) could paradoxically reduce intergroup bias. Consistent with our hypotheses, playing a violent video game cooperatively with an outgroup member for 12 minutes reduced prejudice toward that outgroup. Our test of video games' effectiveness as a catalyst for intergroup cooperation was especially strong, considering that playing a violent video game in which the enemy characters were Arab has been shown to *increase* prejudice toward Arabs (i.e., the video game target), compared with a nonviolent game involving Arab characters (Saleem & Anderson, 2013). Furthermore, the effect of intergroup cooperation in a violent video game on prejudice reduction was specific to attitudes toward the partner's groups (i.e., did not generalize to the ingroup or toward unrelated outgroups). In support of the effect of intergroup cooperation on prejudice reduction, after cooperating in the game participants perceived themselves and their outgroup partner as one team and did not discriminate against their outgroup partner, despite these being pervasive intergroup reactions. Thus, intergroup cooperation in a video game may promote the perception of one common group and may dissuade the tendency to discriminate against an outgroup member.

Limitations

We investigated intergroup cooperation between Canadians and Americans. This context addresses our research question, that is, whether playing a violent video game against a third party (e.g., "aliens," zombies, or foreign invaders) with an *allied* outgroup improves attitudes toward that allied group. Such contexts routinely exist in real life, as when American and British troops invaded Iraq in 2003, or when American, Canadian, and British forces fought (alongside others) against the Nazis in WWII. In both past research (e.g., Hodson et al., 2010) and the present research (see Table 1), attitudes toward Americans among Canadians are not entirely positive, leaving room for interventions to improve attitudes. It is unclear, however, whether our findings generalize to different intergroup contexts, particularly those characterized by extreme conflict (e.g., Palestinians and Israelis). For example, whereas participants' average pregame attitudes toward Americans (5.80) in the current study were similar to their

attitudes toward groups such as AIDS patients (6.09) or the mentally ill (6.34), participants expressed even less favorable attitudes toward groups such as drug addicts (2.22) or alcoholics (2.81). Intergroup cooperation in video games may have a smaller impact on reducing bias toward highly disparaged groups (e.g., drug addicts) than toward groups that are viewed relatively favorably (e.g., Americans). Yet, considering that intergroup attitudes may be less entrenched and thus more malleable in childhood compared with adulthood (Killen, Richardson, & Clark Kelly, 2010), intergroup cooperation in video games may be an effective preintervention tool for precluding intergroup bias among children from highly conflicting groups. Future research is needed, therefore, to investigate whether the current findings generalize to different intergroup contexts, and whether attitudes toward other groups (i.e., non-Americans), by additional groups (i.e., non-Canadians) are impacted in a similar manner.

Moreover, although we demonstrated short-term effects of intergroup cooperation in a video game on bias reduction immediately after playing the game, it is unclear how long these short-term effects last. Consistent with research demonstrating that the short-term effects of video game play on aggressive thoughts and aggressive behavior lasts less than 10 minutes (Barlett, Branch, Redeffer, & Harris, 2009), the short-term impact of video game play on bias reduction may persist only for several minutes. Future research is needed to examine the duration of our short-term effect. In addition, repeated video game exposure over time may have long-term effects on intergroup attitudes, similar to findings from longitudinal research on video game play and aggression (e.g., Adachi & Willoughby, 2013b). Thus, longitudinal research may prove valuable.

It also is important to note that although we found that playing a violent video game in a cooperative intergroup context reduced intergroup bias, it is unclear whether intergroup cooperation in a nonviolent game would produce similar effects. In the future, researchers can examine this effect with nonviolent video games, such as sports games, in which the intergroup participants work together against a common opponent. Perhaps the effect of intergroup cooperation in video games on bias reduction will not differ between violent and non-

violent video game conditions, consistent with research showing null effects of violent content on aggression (e.g., Adachi & Willoughby, 2011b; Ferguson et al., 2008; Ferguson, Garza, Jerabeck, Ramos, & Galindo, 2013; Ferguson & Olsen, 2013; Ferguson & Rueda, 2010; Jerabeck & Ferguson, 2013; Przybylski et al., 2014; Williams & Skoric, 2005). In contrast, the effect of intergroup cooperation in video games on bias reduction may be stronger in the absence of violent content, consistent with Greitemeyer et al. (2012). Finally, we employed widely used single-item measures of prejudice and categorization as one team; this limitation of the current study can be addressed by future researchers using multi-item measures.

Research Implications

We provide the first evidence that violent yet cooperative video game play can be an effective means to reduce intergroup bias. This novel finding offers a solution to the problem that researchers and practitioners routinely face in setting up and successfully negotiating intergroup cooperation, representing an advance in the literature. Furthermore, video games may be an efficient vehicle to study intergroup cooperation in the laboratory, as it allows people from distant locations to work together on tasks that are engaging, enjoyable, and challenging.

In addition, the current findings have practical implications for the military, given that video simulations are commonly used for military training (Orvis, Moore, Belanich, Murphy, & Horn, 2010). For example, if allied American and British or Canadian forces are training together for an upcoming mission, cooperating in an online military training game before the mission may reduce intergroup bias and improve teamwork during the actual mission.

Finally, our results make a contribution to the violent video game literature, in which the findings are mixed regarding whether video game violence leads to negative outcomes (e.g., Anderson et al., 2010; Adachi & Willoughby, 2011a, 2011b; Ferguson, 2013; Ferguson et al., 2013). Specifically, the current study supports the notion that playing even a violent video game may reduce intergroup bias when played in a cooperative intergroup context, as we found that participants bonded in a video game task that was characterized by extreme simulated

violence toward a third party. Thus, our findings suggest that playing a violent video game in a cooperative intergroup context can have positive intergroup effects which trump any potential negative impact of the violent content on increasing prejudice (see Saleem & Anderson, 2013).

Policy Implications

The fact that video games appear to be effective *intervention* tools to reduce bias also has practical implications for video game developers. For example, the finding that 12 minutes of cooperative video game play reduced prejudice, and that millions of people from all over the world play games online for hours every day (Lenhart et al., 2008), suggests that game developers can focus on implementing more cooperative online formats in which players from different geographical locations cooperate on the same team. Such interventions will be most effective when the partner's group membership is salient. For instance, game developers could clearly convey partners' social group membership, by having this information (e.g., American) appear beside each player's name throughout the match. In addition, competitive video game content (e.g., competing with opponent characters in a shooting battle for survival) has been previously found to be positively linked with aggressive behavior in both the short (Adachi & Willoughby, 2011b) and long term (Adachi & Willoughby, 2013b). Therefore, playing competitive video games in a cooperative team context may ameliorate the impact of video game competition on elevating aggression, similar to findings by Jerabeck and Ferguson (2013) and Greitemeyer et al. (2012). Future research is needed to examine this question.

Conclusion

In conclusion, the current study bridges the gap between the intergroup cooperation literature and the violent video game effects literature by demonstrating that when played in a cooperative intergroup context, violent video games can be a valuable tool to reduce intergroup bias akin to other forms of mental simulation (e.g., Crisp & Turner, 2012; Hodson et al., 2009). Although intergroup cooperation has been shown to reduce intergroup bias, setting up and successfully negotiating intergroup cooperation

has been fraught with challenges. With video games being played online for hours every day by millions of people from different social groups (Lenhart et al., 2008), these realistic simulations may have been an overlooked yet effective catalyst for intergroup cooperation. Modern technology allowing participants to cooperate in battle against alien (or zombie-like) foes enables us to realize MacArthur's vision for a cooperative intergroup context that bonds otherwise disparate groups.

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