

## BRIEF REPORT

# From Outgroups to Allied Forces: Effect of Intergroup Cooperation in Violent and Nonviolent Video Games on Boosting Favorable Outgroup Attitudes

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Here we addressed whether even violent video games can improve intergroup attitudes if played cooperatively with an outgroup, in keeping with the Contact Hypothesis. In addition, we examined potential mechanisms of this effect. In Experiment 1 ( $N = 77$ ), Canadians played a violent video game (*Call of Duty: Black Ops*) against zombies, either cooperatively or independently (i.e., at the same time but solo) with a (supposed) University of Buffalo participant. As expected, cooperative (vs. solo) play significantly improved outgroup attitudes and pro-outgroup participant behavior, effects explained by heightened 1-group recategorization (i.e., feeling psychologically on the same team and connected with the outgroup member). In Experiment 2 ( $N = 239$ ), effects of cooperation (vs. solo play) held whether playing a violent or nonviolent video game. Importantly, our findings offer an engaging and pragmatic solution to the pervasive issue of setting up and negotiating opportunities for successful intergroup cooperation.

**Keywords:** intergroup cooperation, video games, intergroup relations

Although the majority of violent video game research has focused on negative outcomes such as aggression (see meta-analyses by Ferguson, 2015, and Greitemeyer & Mügge, 2014), researchers increasingly are considering positive outcomes (e.g., Ferguson & Garza, 2011; Velez, Mahood, Ewoldsen, & Moyer-Gusé, 2014). For instance, video games can reduce prejudice via intergroup cooperation (Adachi, Hodson, & Hoffarth, 2015; Adachi, Hodson, Willoughby & Zanette, 2015). Indeed, many video games are played online with others (Entertainment Software Association [ESA], 2014), providing the unique opportunity to cooperate with different social groups. This opportunity is especially important because intergroup cooperation often is avoided and plagued by pragmatic obstacles (Hodson, 2011). It is presently unclear whether effects of intergroup cooperation on prejudice reduction are generalizable across violent and nonviolent games. This ques-

tion has significant implications, given that violent video games are a very popular video game genre, played online by millions (ESA, 2014).

It may seem paradoxical that playing violent video games may reduce prejudice, given the longstanding focus on negative outcomes, and research demonstrating that playing a violent game against outgroup enemy characters (Arabs) increases prejudice toward the enemy's social group (Saleem & Anderson, 2013). However, when playing a violent video game cooperatively with an outgroup member, working together to achieve a common goal, the partners may experience a favorable shift in intergroup attitudes toward that group (see Pettigrew & Tropp, 2011). Furthermore, a growing literature demonstrates positive outcomes of playing video games in cooperative contexts, including even violent video games (e.g., Greitemeyer & Cox, 2013; Greitemeyer, Traut-Mattausch, & Osswald, 2012; Velez et al., 2014). Thus, we hypothesized that intergroup cooperation when playing even a violent video game would boost favorable outgroup attitudes.

In addition, although Adachi, Hodson, Willoughby, et al. (2015) demonstrated intergroup cooperation effects in a video game on prejudice reduction, the underlying mechanisms for this effect are unknown. The second goal of the current study was to test two potential mechanisms: recategorization (feeling psychologically on the same team and connected with the outgroup member) and empathy toward the outgroup member, representing a novel contribution to the literature.

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We tested these hypotheses in two experiments. In Experiment 1, only a violent video game was used; in Experiment 2, participants were randomly assigned to play a violent or nonviolent video game. Experiment 2 allowed for the examination of video game violence as a moderator. Overall, this novel research bridges the video game and intergroup literatures, by investigating whether even violent video games may be an innovative intervention tool to boost favorable outgroup attitudes when played cooperatively, and by testing potential mechanisms of this effect.

## Experiment 1

Experiment 1 sought to examine the potential underlying mechanisms (recategorization, empathy) of intergroup cooperation effects (in a violent video game) on bias reduction.

## Method

**Participants.** A power analysis for repeated-measures analysis of variance (RMANOVA) revealed that an  $N = 68$  sample was required to attain an effect size of partial  $\eta^2 = .05$  for the analysis examining the effect of intergroup cooperation in a violent video game on outgroup attitudes. To be conservative, we used a smaller effect size estimate in our power analysis than demonstrated by Adachi, Hodson, Willoughby, et al. (2015; partial  $\eta^2 = .10$ ), because our control group (i.e., solo play context) mentions an outgroup member, whereas the control group (intragroup cooperation) in the previous study did not. Furthermore, because some participants may be suspicious and necessitate exclusion (e.g., Adachi, Hodson, Willoughby et al., 2015), our data collection stopping rule was set to  $N = 88$ . Participants consisted of 88 Canadian undergraduates at Brock University. Eleven suspicious participants (i.e., did not believe there was a University of Buffalo student in the study) were excluded from analyses, leaving 77 participants (67% female; mean age = 18.7 years). Participants were recruited via the psychology participant pool and through campus posters. This study was approved by the university ethics board, and participants consented before participation. Participants received one research credit and \$5 as compensation.

### Materials.

**Video games and equipment.** Participants played either the cooperative or solo-play “Zombie” mode of the violent first-person shooter game *Call of Duty: Black Ops* on an XBOX360 console. In the cooperative mode, players worked together to kill zombies, cooperating from separate rooms online via XBOXLive. In the solo-play mode, participants played alone. Participants played the same map (*Kino der Toten*) in both the cooperative and solo-play modes. *Call of Duty: Black Ops* is rated “Mature 17” by the Entertainment Software Rating Board because of the “blood, gore, and intense violence” that occurs when players engage in Zombie combat.

**Attitudes.** Attitudes toward University of Buffalo students and Americans were assessed, both pregame and postgame, using attitude thermometers. Participants also rated their attitudes toward 11 other social groups (e.g., immigrants, alcoholics) to disguise the groups of interest. Pretest attitudes were assessed with a visual-analogue scale, indicating attitudes with a mark on a 10-cm line anchored from *extremely unfavorable* to *extremely favorable*. Posttest attitudes were assessed on num-

bered Likert-type 10-point thermometer scales, with responses ranging from 1 (0–10 degrees = *extremely unfavorable*) to 10 (90–100 degrees = *extremely favorable*). Pretest and posttest scores can be directly compared, using the same 10-point scale, but are procedurally distinct, to reduce suspicion and allow attitude change in a subtle manner (see Hodson, Rush, & MacInnis, 2010).

**Pro-outgroup participant behavior.** To assess whether intergroup cooperation versus solo play led to more pro-outgroup participant behavior, participants selected a video for the outgroup participant (i.e., their partner in the cooperation context, or a fellow participant in the solo-play context) to watch (specific video titles were not given to participants), which allegedly elicits positive (*happy/pleasant*; coded as 1), neutral (coded as 0), or negative (*sad/unpleasant*; coded as -1) emotions. This measure, which was used by Adachi, Hodson, Willoughby, et al. (2015) and adapted by Hodson, Dovidio, and Esses (2003), captures the construct of “pro-outgroup participant behavior” as a biased behavioral outcome that advantages (or disadvantages) a target. Here, higher scores indicate selection of more positive/favorable outcomes (pro-outgroup participant behavior).

**Recategorization.** After playing the video game, participants reported the degree to which they felt like they and the outgroup participant “were one team playing the game” on a scale from 1 (*not at all*) to 7 (*very much so*; Gaertner, Mann, Dovidio, Murrell, & Pomare, 1990). Participants also indicated their “sense of connection” with the outgroup participant on a scale from 1 (*not at all*) to 7 (*very much so*). These items ( $r = .82$ ) were averaged into a recategorization measure, with higher scores indicating a stronger sense of common-group categorization.

**Empathy.** To assess empathy toward the outgroup participant, we used a 5-item empathy measure ( $\alpha = .90$ ) from Greitemeyer (2013; adapted from DeWall & Baumeister, 2006). Specifically, participants read a short essay supposedly written by the outgroup participant prior to the study, wherein the author had broken his or her leg during an intramural sports game and was experiencing significant distress. Participants indicated the degree to which they felt empathetic toward the outgroup participant (Batson, Fultz, & Schoenrade, 1987), using scales from 1 = *not at all* to 10 = *very much*.

**Suspiciousness.** A questionnaire assessed knowledge of the study’s goals or deception (Adachi & Willoughby, 2011).

**Procedure.** Participants were told that they were in two unrelated studies, the first examining the relation between personality and video game play, the second examining impressions formed about other university students’ experiences (to disguise the purpose of the empathy measure). Participants were told that the researchers were working with researchers at the University of Buffalo (United States), a cross-border university 50 km away. Participants were randomly assigned a context. In the intergroup context, participants were allegedly cooperating online in a first-person shooter game via XBOXLive with an American at the University of Buffalo; Brock University participants actually played together from different rooms online via XBOXLive. In the solo-play context, participants were told that an American at the University of Buffalo was participating at the same time, but their video game play would be completely independent (i.e., each played the game separately). Participants could not communicate

in either context. Same-sex participants were paired together, although the participants were not aware of the sex of the other player. Participants provided outgroup attitude ratings prior to playing the video game for 12 min and then completed the other measures.

## Results

**Testing for nonindependence.** Given that participants in the intergroup cooperation context played in pairs, intraclass correlations were calculated (see Kenny, Kashy, & Cook, 2006). The intraclass correlations were not significant ( $ps > .40$ ), suggesting that the assumption of independent observations was not violated.

**Pregame and postgame intergroup attitudes.** To examine the effects of intergroup cooperation versus solo play in a violent video game on attitudes toward University of Buffalo students and Americans, we conducted a 2 (Context: cooperative vs. solo play)  $\times$  2 (Time: pregame vs. postgame)  $\times$  2 (Attitude: University of Buffalo students vs. Americans) RMANOVA, with time and attitude as within-subjects variables and context as the between-subjects variable. Only the main effect of time,  $F(1, 75) = 9.67$ ,  $p = .003$ , partial  $\eta^2 = .11$ , and the two-way interaction (Context  $\times$  Time) were significant,  $F(1, 75) = 10.38$ ,  $p = .002$ , partial  $\eta^2 = .12$ . The absence of a three-way interaction indicates that effects did not differ whether the target involved University of Buffalo students or Americans. Consequently, attitudes toward these targets were collapsed into a general outgroup (American University of Buffalo students) attitude score in follow-up analyses, which revealed that participants in the intergroup cooperation context reported more favorable attitudes toward the salient outgroup after cooperating in the video game (see Figure 1), representing a large effect ( $d = 1.28$ ). In contrast, playing the video game alone resulted in no change in attitudes toward this outgroup. Furthermore, there was no evidence of a secondary transfer to the 11 unrelated outgroups.<sup>1</sup>

**Postgame prooutgroup participant behavior.** An ANOVA revealed that participants in the intergroup cooperation versus solo-play context were more likely to select positive videos for the outgroup participant to view (see Figure 2),  $F(1, 75) = 4.81$ ,  $p = .03$ , partial  $\eta^2 = .06$ .

**Mechanisms of the effects of intergroup cooperation in a violent video game on attitudes and pro-outgroup participant behavior.** To test the indirect effects of intergroup cooperation in a violent video game on attitudes and pro-outgroup participant behavior through recategorization and empathy, we conducted a path analysis in Mplus (see Figure 3A). We specified paths from context (i.e., intergroup cooperation vs. solo play) to the recategorization and empathy variables, and from recategorization and empathy to the postgame outgroup attitude and pro-outgroup participant behavior variables (outcomes). We also included an autoregressive path from the pregame outgroup attitude variable to the postgame outgroup attitude variable. Model fit was excellent,  $\chi^2(4) = 5.47$ ,  $p = .24$ , confirmatory fit index (CFI) = 1.00, root-mean-square error of approximation (RMSEA) = .036, 90% confidence interval (CI), [.000, .196]. The results showed a significant indirect effect of context on postgame outgroup attitudes through recategorization, with participants in the cooperation (vs. solo) context reporting greater recategorization, which in turn predicted more favorable postgame outgroup attitudes)  $\beta = .12$

[.002, .24],  $p = .047$ . Empathy showed no indirect effect,  $\beta = .034$  [−.019, .090],  $p = .197$ . In addition, there were no significant indirect effects of context on pro-outgroup participant behavior through recategorization  $\beta = .22$  [−.040, .255],  $p = .162$ , or empathy  $\beta = .14$  [−.025, .163],  $p = .157$ .

## Sex as a Potential Moderator

Consistent with Adachi, Hodson, Willoughby, et al. (2015), there were no significant interactions between context and sex for any of the outcome variables.

## Experiment 2

Experiment 2 sought to replicate and extend the findings from Experiment 1, testing our hypothesis that engaging in cooperative gaming with an outgroup member should boost favorable outgroup attitudes even if violent content is present.

## Method

**Participants.** A power analysis for RMANOVA revealed that a sample of  $N = 220$  was required to attain an effect size of partial  $\eta^2 = .02$  (this was the smallest effect of violent video game play on explicit outgroup attitudes in two experiments conducted by Saleem & Anderson, 2013). Because we anticipated some suspicion necessitating exclusion, our data collection stopping rule ( $N = 260$ ) ensured a sufficient final sample size. Canadian undergraduates ( $n = 259$ ) at Brock University participated for compensation as in Experiment 1. Twenty suspicious participants (i.e., did not believe there was a University of Buffalo student in the study) were excluded, leaving 239 participants (66% female; mean age = 19 years, 1 month,  $SD = 1$  year, 2 months). Importantly, the sample sizes remained relatively balanced across the experimental conditions, with  $N$  ranging from 113 to 126.

### Materials.

**Video games and equipment.** In Experiment 2 we used a 2  $\times$  2 design, such that participants either played the violent first-person shooter game *Call of Duty: Black Ops* (cooperatively or solo; see Experiment 1) or the nonviolent basketball game *NBA 2K14* (cooperatively or solo) on an XBOX360 console. Participants played the same match-up in *NBA 2K14* (*Oklahoma City Thunder* vs. *San Antonio Spurs*) in both the cooperative and solo-play modes.

**Attitudes.** See Experiment 1.

**Pro-outgroup Participant Behavior.** See Experiment 1.

**Recategorization.** See Experiment 1. The correlation between the two items was .70.

**Empathy.** See Experiment 1. The  $\alpha$  for the empathy scale was .86.

**Procedure.** The procedure was identical to that of Experiment 1, except that participants were randomly assigned to play either a violent (*Call of Duty: Black Ops*) or a nonviolent (*NBA 2K14*) video game, either cooperatively or alone.

<sup>1</sup> We also conducted a RMANOVA with immigrants included in the attitude factor as a baseline social group. Consistent with our primary analysis, the results showed evidence of attitude change toward relevant outgroup (i.e., American University of Buffalo students), but not toward immigrants.

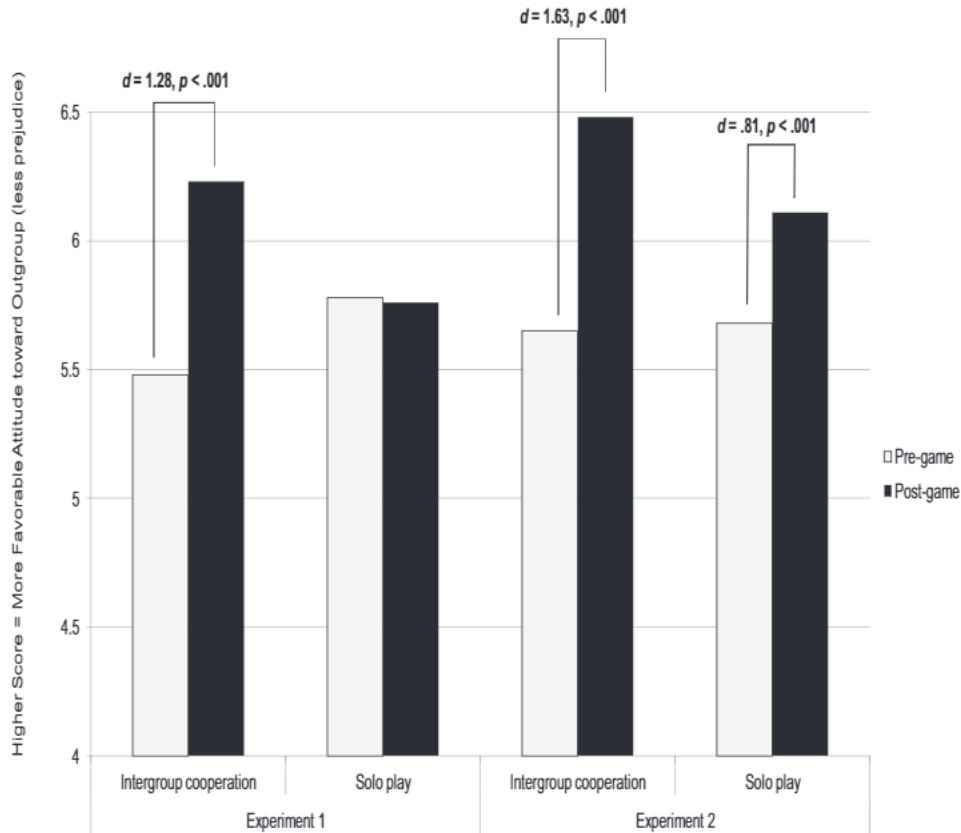


Figure 1. Pre- and postgame attitudes toward the salient outgroup (American University of Buffalo students) in the intergroup cooperation and solo play contexts.

## Results

**Testing for nonindependence.** Consistent with Experiment 1, no intraclass correlations were significant ( $ps > .19$ ), suggesting that the assumption of independent observations was not violated.

**Pregame and postgame intergroup attitudes.** To examine the effects of intergroup cooperation versus solo play in video games on salient outgroup attitudes, we conducted a 2 (Context: cooperative vs. solo play)  $\times$  2 (Time: pregame vs. postgame)  $\times$  2 (Game Type: violent vs. nonviolent)  $\times$  2 (Attitude target: University of Buffalo students vs. Americans) RMANOVA, with time and attitude target as within-subjects variables, and context and game type as between-subjects variables. Only the main effect of time,  $F(1, 235) = 85.31, p < .001$ , partial  $\eta^2 = .27$ , and the two-way interaction (Context  $\times$  Time) were significant,  $F(1, 235) = 8.44, p = .004$ , partial  $\eta^2 = .04$ . The lack of significant four-way or three-way interactions indicates that the effects did not differ as a function of whether the video game was violent or nonviolent, or whether the attitude target was University of Buffalo students or Americans. In subsequent analyses, therefore, the violent and nonviolent video game contexts were collapsed into general intergroup cooperation versus solo-play contexts, and attitudes toward Americans and University of Buffalo students were collapsed into a general outgroup attitude score. These follow-up analyses revealed that participants in the intergroup cooperation

context reported more favorable attitudes toward the salient outgroup (i.e., American University of Buffalo students) after cooperating in the video game than did participants who played alone (see Figure 1). Although attitudes toward the outgroup became more favorable in both contexts, the effect of intergroup cooperation from pre- to postgame was twice the magnitude ( $d = 1.63$ ) of playing alone ( $d = .81$ ). As in Experiment 1, there was no secondary transfer to the 11 unrelated outgroups.<sup>2</sup>

**Postgame prooutgroup participant behavior.** An ANOVA revealed a trend such that participants in the intergroup cooperation (vs. solo play) context were more likely to select positive videos for the outgroup participant (see Figure 2),  $F(1, 235) = 3.67, p = .06$ , partial  $\eta^2 = .015$ . Furthermore, the effect of intergroup cooperation on pro-ingroup behavior did not differ as a

<sup>2</sup> We also conducted a RMANOVA with immigrants included in the attitude factor as a baseline social group. Consistent with our primary analysis, the results showed evidence of attitude change toward the relevant outgroup (i.e., American University of Buffalo students), but not toward immigrants.

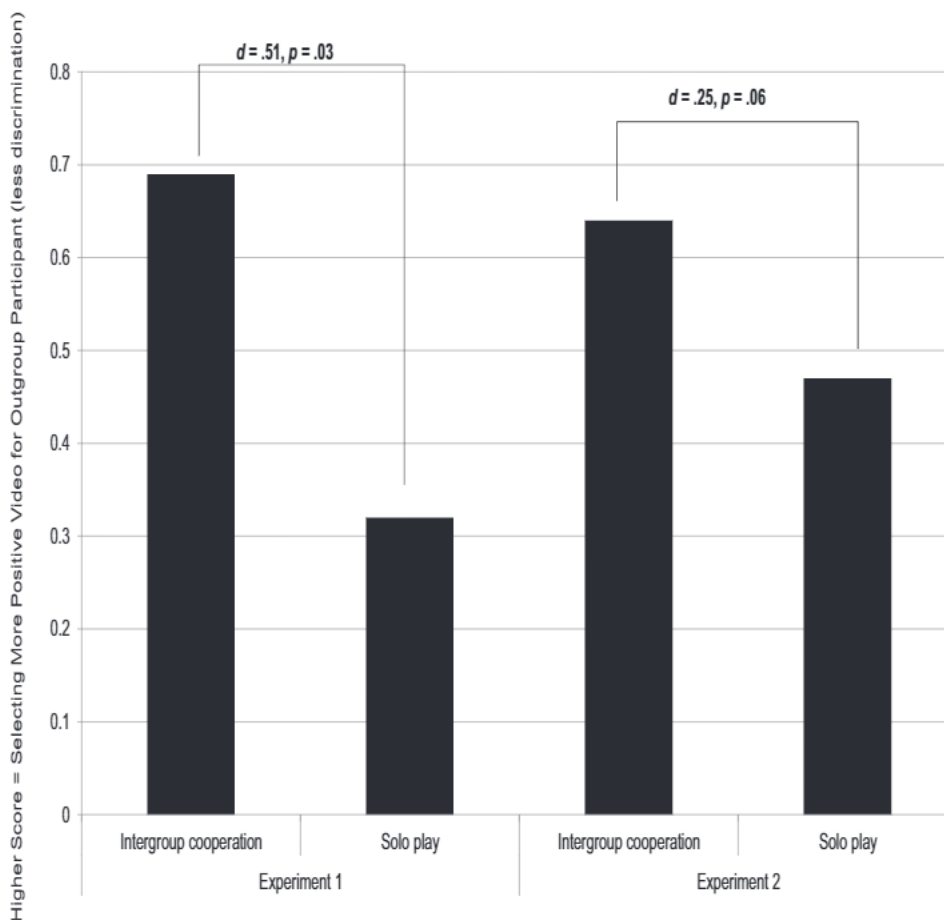


Figure 2. Pro-outgroup participant behavior in the intergroup cooperation and solo play contexts.

function of playing the violent versus the nonviolent video game, as expected.

**Mechanisms of the effects of intergroup cooperation in video games on attitudes and pro-outgroup participant behavior.** To test the indirect effects of intergroup cooperation in a violent video game on attitudes and pro-outgroup participant behavior through recategorization and empathy (mechanisms), we created a path model as in Experiment 1 (see Figure 3B). Model fit was excellent,  $\chi^2(4) = 4.75$ ,  $p = .32$ , CFI = 1.00, RMSEA = .028, 90% CI, [.000, .105]. The results showed a significant indirect effect of context on postgame outgroup attitudes through recategorization, such that participants in the cooperation (vs. solo) context reported greater recategorization, which in turn predicted more favorable postgame outgroup attitudes,  $\beta = .06$  [.01, .10],  $p = .018$ . No indirect effect of empathy emerged,  $\beta = .002$  [-.007, .010],  $p = .680$ .<sup>3</sup> In addition, there was a significant indirect effect of context on pro-outgroup participant behavior through recategorization,  $\beta = .08$  [.006, .150],  $p = .035$ , but not empathy,  $\beta = .01$  [-.015, .035],  $p = .446$ .

### Sex as a Potential Moderator

Consistent with Adachi et al. (2015), there were no significant interactions between context and sex for any of the outcome variables.

### General Discussion

We investigated whether intergroup cooperation in both violent and nonviolent video games may be an innovative tool to boost favorable outgroup attitudes, and tested potential underlying mechanisms of this effect. Experiment 1 showed that only 12 min of intergroup cooperation in a violent video game exerted a large effect on boosting outgroup attitudes. Greater recategorization, but not empathy, explained this effect. Specifically, intergroup cooperation in the violent game produced a sense of teamwork and connection with one's outgroup partner, which reduced bias toward the partner's social group. In contrast, empathy may be more pertinent for long-term effects that allow for the development of deeper affective connections between players.

In Experiment 2, we replicated these results and demonstrated that the beneficial effects of intergroup cooperation in a video game on bias reduction occurred when playing a violent or nonviolent video game. This finding may seem counterintuitive, given the prominent focus on potential negative effects of video game violence. However, this finding is consistent with research dem-

<sup>3</sup> There was no significant difference between video game type (*Call of Duty: Black Ops* vs. *NBA NK14*) in terms of self-reported empathy scores,  $F(1, 237) = .008$ ,  $p = .930$ , partial  $\eta^2 = .000$ .

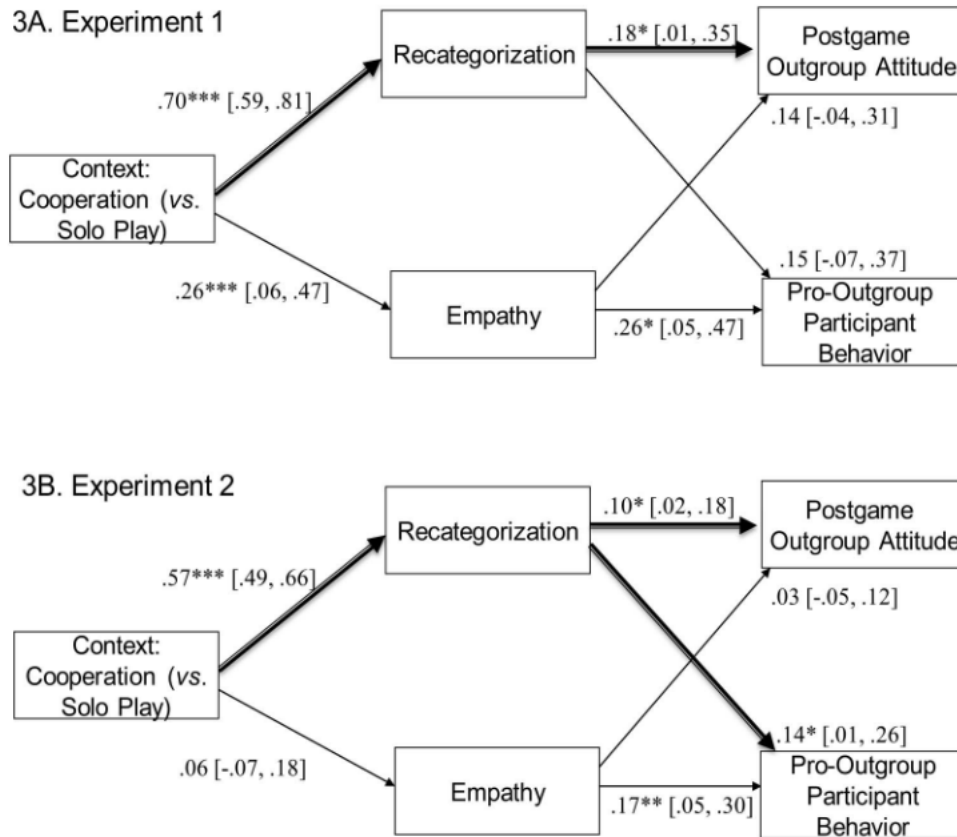


Figure 3. Final model results for analyses assessing the indirect effects of context (intergroup cooperation vs. solo play) on postgame (positive) outgroup attitudes and pro-outgroup participant behavior through recategorization and empathy. Standardized coefficients are reported, and 95% confidence intervals are in brackets. Paths that are boldface solid lines represent significant indirect effects. Paths to postgame (positive) outgroup attitude are controlling for pregame outgroup attitude (paths from pregame to postgame outgroup attitude = .59\*\*\* [.46, .73] in Experiment 1, and .74\*\*\* [.68, .80] in Experiment 2). \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

onstrating strong benefits of intergroup cooperation (Pettigrew & Tropp, 2011), and with a growing literature demonstrating positive outcomes of playing video games cooperatively (e.g., Greitemeyer et al., 2012; Greitemeyer, 2013). It is important to note that it is unclear whether other features of the in-game experience, such as presence (Ryan, Rigby, & Przybylski, 2006), may have differed between the cooperative and solo-play conditions. This may be an interesting direction for future research.

Overall, this novel research bridges the video game literature and intergroup relations literature, suggesting that even violent video games, when played cooperatively, can boost favorable outgroup attitudes and that this effect is explained by an enhanced sense of teamwork and connection with one's outgroup partner. Although the current findings may offer a valuable starting point for research on the link between video game play and intergroup relations, more work is needed to elucidate whether video games may serve as a general prejudice reduction tool that can extend to groups characterized by high levels of bias or aggravated conflict. Nonetheless, this work has several important implications. First, the current findings advance the intergroup relations literature by offering a potential solution to the pervasive difficulties in setting up and negotiating opportunities for successful intergroup coopera-

tion. Second, the current findings make an important contribution to the video game field, adding to a growing literature demonstrating positive outcomes of playing video games cooperatively. Third, with video game simulations often used in military training (Orvis, Moore, Belanich, Murphy, & Horn, 2010), video games may be valuable tools for improving teamwork and cohesion between allied forces if there are minimal to moderate preexisting biases. Finally, because video games can boost favorable intergroup attitudes when played cooperatively, developers can implement more salient intergroup cooperative formats in online game platforms to realize prosocial outcomes.

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### Retraction of Förster (2009)

The following article from the February 2009 issue is being retracted: Förster, J. (2009). Relations between perceptual and conceptual scope: How global versus local processing fits a focus on similarity versus dissimilarity. *Journal of Experimental Psychology: General, 138*(1), 88–111. doi:10.1037/a0014484

The retraction is at the request of the author and the University of Amsterdam. This retraction follows the results of an investigation by the University of Amsterdam into the work of Jens Förster. The University requested the retraction of this article based on its qualitative judgement of “strong statistical evidence for low veracity”. The author joined in the request for the retraction.

<http://dx.doi.org/10.1037/a0040143>