Playing Violent Video Games Increases Intergroup Bias

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Abstract

Previous research has shown how, why, and for whom violent video game play is related to aggression and aggression-related variables. In contrast, less is known about whether some individuals are more likely than others to be the target of increased aggression after violent video game play. The present research examined the idea that the effects of violent video game play are stronger when the target is a member of an outgroup rather than an ingroup. In fact, a correlational study revealed that violent video game exposure was positively related to ethnocentrism. This relation remained significant when controlling for trait aggression. Providing causal evidence, an experimental study showed that playing a violent video game increased aggressive behavior, and that this effect was more pronounced when the target was an outgroup rather than an ingroup member. Possible mediating mechanisms are discussed.

Keywords

video games, intergroup bias, aggressive behavior, media effects

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Playing violent video games appears to be associated with aggression and aggression-related variables. Cross-sectional studies typically reveal positive correlations between violent video game play and aggression in real world contexts (e.g., Krahé & Möller, 2004). Experimental work suggests that playing violent video games causally increases aggression (e.g., Fischer, Kastenmüller, & Greitemeyer, 2010). Finally, longitudinal investigations show that habitual violent video game play predicts later aggression even after controlling for initial aggressiveness (e.g., Anderson et al., 2008). It should be noted that some studies failed to find that violent video games cause aggression (e.g., Adachi & Willoughby, 2011). However, the most comprehensive meta-analysis so far (Anderson et al., 2010) found clear evidence that playing violent video games significantly increases aggressive thoughts, hostile affect, and aggressive behavior. Effect sizes were small to medium, but they were consistently found in experimental, cross-sectional, and longitudinal studies. Thus, the question is no longer whether violent video game exposure increases aggression. It is more interesting to ask, for instance, whether some individuals are more likely than others to be the target of increased aggression after violent video game play. The present research examines the idea that outgroup members more than ingroup members will suffer from another person's violent video game play, in that violent video game play is assumed to be associated with intergroup bias. Intergroup bias refers to the tendency to evaluate one's ingroup and its members more favorably (ingroup favoritism) and/or to derogate the outgroup and its members (outgroup negativity). It may be expressed in prejudiced attitudes, stereotyped cognitions, and discriminatory behavior (Hewstone, Rubin, & Willis, 2002). In the present research, measures of ethnocentrism and discrimination (i.e., increased aggression toward an outgroup member) were used as proxies for intergroup bias. In the following, these terms will be used interchangeably.

Theoretical Perspectives

When explaining the effects of violent video games on aggression and aggression-related variables, many researchers refer to the General Aggression Model (GAM) proposed by Anderson and colleagues (e.g., Anderson & Bushman, 2002a). This model integrates assumptions from various theories, such as social learning theory and related social-cognitive research (Bandura, 1986), social information-processing

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model (Dodge & Crick, 1990), script theory (Huesmann, 1986), and excitation transfer model (Zillmann, 1983). According to the GAM, violent video games may affect a person's internal state in that they evoke associations to aggressive cognitions, arousal, and affect related to aggression. This internal state in turn influences how social events are perceived and interpreted. Finally, on the basis of this decision process, the person behaves more or less aggressively in a social encounter. Moreover, the model does not only account for short-term effects of playing violent video game but also for long-term changes as a result of repeated encounters with violent video games.

There has been good evidence for the predictive validity of the GAM for the effects of playing violent video games on aggression and aggression-related variables. As noted above, numerous studies have shown that playing violent video games is associated with increased aggressive behavior. Violent video game play has been also shown to increase aggressive thoughts (Anderson & Dill, 2000) and affect (Anderson & Ford, 1986). Moreover, internal states, consisting of cognition, affect, and arousal, appear to underlie the effects of playing violent video games on aggressive behavior (e.g., Anderson et al., 2004). Research has also addressed whether individuals with some personality characteristics are more vulnerable to these effects than others (e.g., Markey & Markey, 2010). In sum, it appears that the aim of the GAM to integrate the effects of violent video games on aggression and aggression-related variables into a common theoretical framework is supported by empirical evidence and that this model can be successfully employed to predict how, why, and for whom violent video game play is related to aggressive behavior.

In contrast, less is known in terms of whether some individuals are more likely than others to be the target of increased aggression after violent video game play. According to the GAM, video games can be seen as sources of social learning that may convey ideas about social groups. These ideas in turn may affect the player's attitudes and behavior toward members of this social group. Likewise, the theory of media imagery and social learning (Dill & Burgess, 2012) proposes that portrayals of social groups influence judgments about members of these groups as well as corresponding behavior. For instance, after being exposed to admirable portrayals of a social group, individuals should make positive judgments about its group members and should engage in more helpful behavior and less aggressive behavior toward members of this group. In contrast, contemptible portrayals of a social group should yield negative judgments about its members and should increase aggressive behavior and decrease helping behavior toward members of this group.

Several studies have provided supportive evidence for the predictions of the GAM and the theory of media imagery and social learning. For instance, exposure to images of sex-typed video game characters has been found to increase male participants' attitudes supporting aggression against women (Dill, Brown, & Collins, 2008). Likewise, Saleem and Anderson (2013) demonstrated that playing an antiterrorist video game increases anti-Arab attitudes relative to participants who played a nonviolent game. It thus appears that video game depictions of social groups can influence attitudes, feelings, and behavior toward members from those groups.

But violent video game play may affect attitudes and behavior toward members of an outgroup even when the video game does not contain any reference to this particular outgroup. According to frustration-aggression and scapegoating models of prejudice (Allport, 1954; Berkowitz, 1989; Dollard, Doob, Miller, Mowrer, & Sears, 1939; for a modern approach, see Rothschild, Landau, Sullivan, & Keefer, 2012), individuals who are frustrated or unhappy displace aggression onto stigmatized outgroups. In fact, experiencing negative affective experiences, such as anger or anxiety, increases intergroup bias (e.g., Baron, Inman, Kao, & Logan, 1992; DeSteno, Dasgupta, Bartlett, & Cajdric, 2004; Kuppens et al., 2012). On the other hand, violent video game exposure has been shown to be associated with a wide range of negative affective states. Playing violent video games stimulates anxiety and feelings of depression (Anderson & Ford, 1986), evokes hostile feelings (Ballard & Wiest, 1996), and increases not only angry feelings in the short term (e.g., Carnagey & Anderson, 2005) but also trait anger in the long term (Bartholow, Sestir, & Davis, 2005). Taken together, because playing violent video games tend to elicit negative affective experiences, which have been shown to evoke intergroup bias, it was expected that the effects of violent video game play would be more pronounced when the target is an outgroup rather than an ingroup member.

Note that the present research did not address why violent video game play increases intergroup bias. Measurement of possible mediators, such as negative affective experiences, may influence subsequent measures of intergroup bias (cf. Lindsay & Anderson, 2000; Spencer, Zanna, & Fong, 2005). The present research aimed to provide first evidence that violent video game play is associated with intergroup bias and thus abstained from measuring possible mediators, which may have produced differences in intergroup bias. Clarifying the exact causal mechanisms awaits future research. This issue will be more thoroughly addressed in the General Discussion.

The Present Research

The present research addressed the hypothesis that playing violent video games increases intergroup bias. This hypothesis was examined in two studies, employing two different dependent measures (prejudice and discrimination) and two different study designs (correlational and experimental). Each study design has distinct strength and weaknesses. The major strength of experimental studies is that causality can

Table 1. Descriptive Statistics and Correlations for Study 1.

	M	*SD*	α	1	2	3	4
1. Video game violence exposure	347	594	.67	—	.17	.10	.27
2. Ethnocentrism	2.19	0.80	.87		—	.25	.16
3. Trait aggression	2.48	0.84	.76			—	−.05
4. Sex	—	—	—				—

Note. Sex was coded 1 = female, 2 = male.

be determined. Experimental studies are usually used to measure short-term effects. Correlational studies allow overcoming the primary weakness of experimental studies, because they can examine the effects of a wide range of video games on "real world" measures. Moreover, correlational studies can be used to measure long-term effects. The major weakness of correlational studies is that causality cannot be determined. Hence, converging findings from studies using multiple methodologies enhance confidence in the validity of the conclusions drawn (Prot & Anderson, 2013). Because gender has been shown to be associated with expressions of intergroup bias, aggressive behavior, and liking of violent video games, participant sex was controlled in both studies.

Study 1

Study 1 provides a first test of the notion that violent video game exposure is related to intergroup bias. In a cross-sectional correlational study, participants were asked to indicate their amount of playing violent video games as well as to respond to a standardized scale measuring ethnocentrism (i.e., the preference for the ingroup over outgroups). Participants also responded to a trait measure of aggression. It was predicted that violent video game exposure would be positively associated with ethnocentrism. Moreover, playing violent video games was assumed to affect ethnocentrism even when controlling for trait aggression.

Method

Participants, procedure, and materials. The sample included 244 respondents from an Austrian university. Only individuals who indicated to play video games were allowed to participate. Thirteen participants failed to respond to at least one of the main variables. These participants were excluded from all analyses, leaving a sample of 231 participants (126 women, 105 men, *M* age = 23 years, *SD* = 4).

To measure violent video game exposure, participants were asked to name their three favorite video games, to estimate the number of hours per week spent playing each video game, and to rate how violent the content of each video game was. For each video game, the amount of time playing was multiplied by violent content. These three violent video game exposure scores were averaged to provide an overall index of violent video game exposure. This approach has been successfully employed in previous video game research (e.g., Anderson & Dill, 2000; Gentile et al., 2009).

To measure trait aggression, participants responded to the short version of the Buss and Perry aggression questionnaire (Bryant & Smith, 2001), which comprises 12 items. The Buss and Perry scale is one of the most popular measures of dispositional aggression. Sample items are "Given enough provocation, I may hit another person" and "I have trouble controlling my temper." To measure ethnocentrism, the Generalized Ethnocentrism scale (Neuliep & McCroskey, 1997) was employed. This scale includes 15 items (among 7 filler items). Sample items are "Most other cultures are backward compared to my culture" and "Life in my country is much better than in most other places." This scale has been successfully employed in past research (e.g., Greitemeyer, 2012; Navarrete & Fessler, 2006). For both scales, items were pooled, using the average.

Results

Descriptive statistics and intercorrelations of all measures are shown in Table 1. As predicted, violent video game exposure was positively related to ethnocentrism, $r(231) = .17$, $p = 008$. Violent video game exposure was related to trait aggression, $r(231) = .10$, $p = .122$, but not significantly. Ethnocentrism and trait aggression were also positively related, $r(231) = .25$, $p < 001$. To examine whether violent video game exposure affects ethnocentrism even when controlling for trait aggression, a multiple regression was performed. Violent video game exposure and trait aggression were used as predictors for ethnocentrism. The overall regression was significant, $F(2, 228) = 10.28$, $p < .001$. Most importantly, violent video game exposure was still significantly related to ethnocentrism, $\beta = .15$, $p = .019$. Trait aggression also significantly predicted ethnocentrism, $\beta = .23$, $p < .001$.[1]

Sex of participants was significantly associated with violent video game exposure, $r(231) = .27$, $p < .001$, in that males played more violent video games than females. Expressions of ethnocentrism were also associated with sex of participants, with males having higher scores than females, $r(231) = .16$, $p = .018$. In contrast, trait aggression was not associated with sex of participants, $r(231) = -.05$, $p = .491$.

The correlation between violent video game exposure and ethnocentrism was stronger for men ($r = .19$) than for women ($r = .07$), but this difference was not statistically significant, $Z = 0.91$, $p = .366$.[2] Finally, the link between violent video game exposure and ethnocentrism remained significant when the influence of sex of participants was partialled out, $r(228) = .14$, $p = .036$.

Discussion

Study 1 provided initial support for the hypothesis that violent video game exposure affects intergroup bias. It is important to note that the relation between violent video game exposure and ethnocentrism remained significant when controlling for trait aggression. As in previous research (e.g., Hoeft, Watson, Kesler, Bettinger, & Reiss, 2008; Lucas & Sherry, 2004), males were more likely than females to play violent video games. There was a nonsignificant tendency that males' more than females' expressions of ethnocentrism were affected by violent video game exposure. This issue will be addressed in more detail in the General Discussion. Importantly, when controlling for the influence of sex of participants, the relation between violent video game exposure and ethnocentrism remained significant. Overall, it appears that violent video game exposure is associated with intergroup bias. However, due to the correlational nature of these findings, no causal interpretations are appropriate. It may be that violent video game exposure increases intergroup bias, but it is also conceivable that intergroup bias precedes violent video game exposure and/or that some third variable leads to both. To address this issue, Study 2 employed an experimental design.

Study 2

Participants either played a violent or a neutral video game. Afterwards, aggressive behavior was assessed. About half of the participants were led to believe that the target was an ingroup member, whereas the remaining participants were led to believe that the target was an outgroup member. It was predicted that participants who had played a violent video game would show the highest levels of aggression when the target was an outgroup member (relative to the remaining three experimental conditions). Note that no mediating variables (such as ethnocentrism) were assessed. Measuring possible mediating variables may affect the subsequent measure of aggressive behavior (Lindsay & Anderson, 2000). I will return to this issue in the "General Discussion" section.

Method

Participants, procedure, and materials. Participants were 100 students at an Austrian university. One participant was excluded from the following analyses, due to extreme responses on the behavioral aggression task (i.e., more than 3 standard deviations above the mean), leaving a final sample of 99 participants (53 women, 46 men, M age = 22 years, $SD = 6$). At the onset, participants learned that they would take part in two unrelated studies, the first study about the enjoyment factor of video games, the second study about reaction times.

Participants in the violent video game condition played "Call of Duty 2," which is a shooter game. We employed a third-person version. The player takes on the role of an Allied protagonist during World War II. It is important to note that no game character was depicted as being a member of the outgroup against which aggression was later assessed. Participants in the neutral video game condition played "Flipper," which is a pinball game. Greitemeyer (2013) employed these video games and found that the content of Call of Duty 2 was perceived as being more violent than the content of Flipper. All participants played the video game for 15 min. Participants were then asked to indicate their liking, perceived difficulty, frustration, excitement, and pace of the video game. To assess mood, they indicated how they felt at the moment. Such a one-item measure has been successfully employed in previous studies on affective forecasting (e.g., Greitemeyer, 2009). Liking was assessed by two items (Cronbach's $\alpha = .93$), the remaining constructs were assessed by one item each. All items were assessed on Likert-type scales from 1 to 7. Afterwards, participants were thanked and told that the first study was over.

Then, participants learned that they would complete a competitive reaction time task. On each of 25 trials, they would compete with an opponent to see who can press a mouse button faster after hearing an auditory cue. Participants further learned some information about the ostensible opponent. It was varied whether the opponent was allegedly an ingroup or an outgroup member. Some participants were led to believe that the opponent was born in Austria (ingroup condition). Others were led to believe that the opponent was born in Serbia (outgroup condition). A Serbian was chosen as the outgroup target group member because in Austria Serbians represent one of the largest numbers of immigrants. Participants were told that they could punish the opponent with bursts of white noise. At the beginning of each trial, they could set both the duration (ranging from 1 to 10) and level of punishment for their opponent. The noise levels ranged in intensity from 60 decibels (Level 1) to 105 decibels (Level 10). A nonaggressive no-noise option (Level 0) was also offered. After each trial, participants learned about the punishment levels set by the opponent. If they lost the trial, they received a blast of noise. In actuality, there was no opponent—a computer controlled wins and losses, as well as the noise intensities and durations a participant received. The task was preprogrammed so that the participant won 12 trials and lost 13 trials, with the first trial always being a loss (with intensity 10 and duration 10). In the following trials, a random pattern of noise blasts from the opponent was given.

Table 2. Means (and Standard Deviations) of Aggressive Behavior as a Function of Type of Video Game and Type of Target (Study 2).

	Video game			
Target member	Violent	*n*	Neutral	*n*
Ingroup	−0.28 (1.31)	23	−0.47 (1.30)	26
Outgroup	1.08 (2.81)	25	−0.34 (1.28)	25

Previous research has shown that the first trial provides the best measure of unprovoked aggression because participants have not yet received noise from their opponents (e.g., Bushman & Baumeister, 1998; Twenge, Baumeister, Tice, & Stucke, 2001). After the first trial, aggression converges on reciprocation of what levels of aggression the opponent had ostensibly chosen. Thus, noise intensity and duration levels from the first trial were used as the measure of aggressive behavior. To form a more reliable measure, noise intensity and duration levels were standardized and summed. Previous research has shown that this task is a valid measure of aggressive behavior (Anderson & Bushman, 1997; Giancola & Chermack, 1998). Finally, participants were thanked and fully debriefed.

Results

Means and standard deviations of aggressive behavior as a function of the experimental conditions are reported in Table 2. To examine whether aggressive behavior was particularly pronounced after violent video game play and when it was targeted against an outgroup member, a planned contrast was performed on the data (Rosenthal & Rosnow, 1985; Steiger, 2004). As predicted, participants who had played the violent video game were more aggressive against the outgroup member (contrast weight: 3) compared with participants who had played the violent video game and the partner was an ingroup member (contrast weight: −1), participants who had played the neutral video game and the partner was an outgroup member (contrast weight: −1), and participants who had played the neutral video game and the partner was an ingroup member (contrast weight: −1), $t(95) = 3.46$, $p = .001$. As suggested by Abelson and Prentice (1997), an analysis of residuals testing the significance of between-condition effects not captured by the a priori contrast was performed next (i.e., whether there was significant variance left to explain after the variance explained by the a priori contrast has been removed). Results revealed that the remaining systematic between groups variance was *not* larger than would be expected by chance, $F(2, 95) = 1.73$, $p = .183$. It thus appears that the a priori contrast captures most of the relevant variance.[3]

When sex of participants was also included in the experimental design, the a priori contrast remained significant, $F(1, 95) = 14.05$, $p < .001$, $\eta^2 = .13$. There was a significant effect of sex of participants, $F(1, 95) = 8.25$, $p = .005$, $\eta^2 = .08$. Male participants ($M = 0.34$, $SD = 2.30$) were more aggressive than female participants ($M = -0.30$, $SD = 1.38$). Finally, the interaction was also significant, $F(1, 95) = 7.05$, $p = .009$, $\eta^2 = .07$. Male participants who played the violent video game and their partner was an outgroup member ($M = 2.22$, $SD = 3.36$) were significantly more aggressive than male participants in the remaining three experimental conditions ($M = -0.32$, $SD = 1.31$), $t(44) = 3.73$, $p = .001$, $d = 1.00$. In contrast, for female participants, the a priori contrast was not significant, $t(51) = 0.98$, $p = .331$, $d = 0.29$. Aggression by female participants who played the violent video game and their partner was an outgroup member ($M = 0.03$, $SD = 1.70$) was relatively similar to aggression by female participants in the remaining three experimental conditions ($M = -0.41$, $SD = 1.27$).

The violent and the neutral video game did not significantly differ in terms of liking, perceived difficulty, frustration, pace, and mood, all ts < 1.74, all ps > .08. In contrast, the violent video game was perceived as being more exciting ($M = 3.90$, $SD = 1.79$) than the neutral video game ($M = 2.84$, $SD = 1.45$), $t(97) = 3.23$, $p = .002$, $d = 0.65$. However, when controlling for liking, perceived difficulty, frustration, excitement, pace, and mood in a multiple regression, the effect of the contrast (violent video game/outgroup member compared to the other three experimental conditions) on aggressive behavior remained significant, $\beta = .31$, $t(91) = 3.32$, $p = .001$. The remaining predictors did not receive a significant regression weight, all βs < .21, all ts < 1.62, all ps > .10.

Discussion

As in previous research (Anderson et al., 2010), playing violent video games was associated with increased aggressive behavior (see Footnote 3). Extending previous research, Study 2 showed for the first time that this effect was more pronounced when the target was an outgroup rather than an ingroup member. Thus, it appears that violent video game exposure indeed has a causal effect on intergroup bias. Results also revealed that this effect was stronger for male than for female participants. I will return to this issue in the "General Discussion" section. It is noteworthy that only one violent and one neutral video game were employed. Although the effect of violent video game play on intergroup bias remained reliable when controlling for a host of video game properties, it is still possible that this effect might be due to specific features of the particular games used other than the extent to which the content is violent. For instance, it is noteworthy that the violent video game that was employed includes an intergroup context (i.e., World War 2), whereas the neutral video game does not. Thus, it may be that playing violent video games that do not contain an intergroup context does not affect intergroup bias. Importantly, no character in the video game was a member of the same social group as the opponent in the competitive reaction time task (i.e., Serbians). Thus, it is unlikely that playing the violent video game led to negative associations toward

Serbians in particular. Nevertheless, future research that examines to what extent the finding of increased intergroup bias after violent video game play is generalizable to other video games is definitely welcome.

General Discussion

So far, numerous studies have examined the relation between violent video game play and aggression and aggression-related variables. These studies appear to suggest that playing violent video games causes an increase in the likelihood of aggressive thinking, aggressive affect, and aggressive behavior (for a recent meta-analysis, see Anderson et al., 2010). Research has also addressed why and for whom violent video game play is related to aggressive behavior. In contrast, less has been known whether some social groups will be more likely to be the target of increased aggression after violent video game play than others (see Saleem & Anderson, 2013). The present research addressed the hypothesis that violent video game play is positively associated with intergroup bias, implying that outgroup members more than ingroup members suffer from another person's violent video game play. Indeed, findings of two studies suggest that violent video game exposure increases intergroup bias. Study 1 showed a positive association between the amount of violent video game play and prejudiced attitudes. Study 2 showed that playing a violent video game causally increases discriminatory behavior. It is noteworthy that converging findings have been obtained from different study designs (correlational and experimental), which increases the confidence that violent video game play is indeed positively associated with intergroup bias.

Previous research has found that men show more group-based responses to intergroup conflict than women do. For instance, the experience of anger increases intergroup bias only for men (Kuppens et al., 2012). Likewise, priming intergroup threat enhances discrimination in men, but not in women (Yuki & Yokota, 2009). In Study 1 of the present research, the correlation between violent video game exposure and ethnocentrism was stronger for men than for women, but this difference was not significant. In Study 2, the effects of violent video game play on intergroup bias were significantly larger for male participants than for female participants. Overall, there was a clear trend that intergroup bias displayed by males (relative to by females) was more strongly affected by violent video game exposure. Inasmuch as males are more attracted to playing violent video games than females (e.g., Hoeft et al., 2008; Lucas & Sherry, 2004), this tendency is of special concern.

Theoretical Implications and Future Directions

As noted in the introduction, violent video game effects can be explained by referring to the GAM. As also noted, the model can be successfully employed to predict how, why, and for whom violent video game play is related to aggressive behavior. In contrast, less theoretical and empirical work has been done on whether some individuals are more likely than others to be the target of increased aggressive behavior after violent video game play. In line with the GAM, Study 2 revealed that playing violent video games increases the likelihood of aggressive behavior. This study also revealed that the violent video game effect was more pronounced when the target was an outgroup rather than an ingroup member. Past discussions of the GAM have not explicitly made this prediction, so the present work is among the first to integrate the GAM with research on intergroup aggression, including the frustration and scapegoating models of prejudice.

Future empirical work is needed to examine how violent video game exposure increases intergroup bias. Perhaps the most likely candidate for such a mechanism would be negative affective states. As noted in the Introduction, negative affective states have been linked to both violent video game exposure and intergroup bias. Note, however, that general mood did *not* account for the effect of violent video game play on intergroup bias. Thus, rather than emotional valence, specific emotions, such as anger, that are applicable to intergroup relations (Dasgupta, DeSteno, Williams, & Hunsinger, 2009) are better candidates to account for increased intergroup bias after violent video game play. Importantly, even angry feelings that are not elicited by the outgroup may spill over and lead to intergroup hostility (e.g., Bodenhausen, Sheppard, & Kramer, 1994; Dasgupta et al., 2009). That is, violent video game play may elicit anger (Ballard & Wiest, 1996; Bartholow et al., 2005; Carnagey & Anderson, 2005), which in turn leads to increased outgroup hostility—even though the outgroup target had nothing to do with evoking the angry feelings.[4]

Of course, it may well be that variables other than angry feelings underlie the finding that violent video game play increases intergroup bias. For instance, the denial of human qualities of outgroup members has been shown to be associated with prejudice and discrimination (Costello & Hodson, 2010; Vaes, Paladino, Castelli, Leyens, & Giovanazzi, 2003) and partly account for intergroup aggression (Struch & Schwartz, 1989). Moreover, playing violent video games appears to be associated with intergroup dehumanization (Greitemeyer & McLatchie, 2011), in that an outgroup, but not an ingroup, member was perceived as possessing fewer human qualities after violent video game play. Hence, playing violent video games may increase intergroup aggression through the denial of humanness to outgroup members.

The present research aimed to provide initial evidence for the notion that violent video game play increases intergroup bias. The measurement of underlying variables primes the concept for all participants and thus may affect subsequent measures of intergroup bias (Lindsay & Anderson, 2000; Spencer et al., 2005). Thus, intergroup bias was measured, but no variables that may account for the relation between violent video game play and intergroup bias. Future research

may assess possible mediators (such as angry feelings and dehumanization) as well as intergroup bias in one study.

Violent video game play appears to increase intergroup bias. But video games may also be employed to decrease intergroup bias. One way might be to employ cooperative video games. Cooperative video game play is characterized by goals that are positively linked, in that players only attain their goals when their teammates also attain their goals. Recent research has shown that playing video games cooperatively in a team increases subsequent cooperative behavior (Ewoldsen et al., 2012; Greitemeyer & Cox, 2013; Greitemeyer, Traut-Mattausch, & Osswald, 2012). Abundant research has also found that cooperative interdependence reduces intergroup conflict (Sherif, Harvey, White, Hood, & Sherif, 1961; for a review, Dovidio & Gaertner, 2010). Taken together, it is well conceivable that playing video games cooperatively with members of an outgroup is an effective approach to reduce intergroup bias.

Concluding Remarks

Playing video games has become an important part of the lives of many people. A recent national survey revealed that 88% of American youth between ages 8 and 18 play video games (Gentile, 2009). Content analyses show that most video games contain violence (Smith, Lachlan, & Tamborini, 2003). Thus, violent video game play may not only increase aggression on a societal level (Anderson & Bushman, 2002b), but, as the present research suggests, it may also contribute to intergroup hostility.

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Notes

1. The short version of the Buss and Perry aggression questionnaire can be used to obtain an overall dispositional aggression score. It can also be used to obtain measures of four subtraits of aggression, namely, physical aggression, verbal aggression, anger, and hostility. It was thus further tested whether the effect of violent video game exposure on ethnocentrism remained significant when controlling for each of the subscales separately. In all analyses, violent video game exposure was still significantly related to ethnocentrism.
2. In a multiple regression predicting ethnocentrism, the interaction between sex of participants and violent video game exposure was also not significant, $\beta = .12$, $p = .681$.
3. As noted in the main text, planned comparisons are more adequate than an overall analysis of variance to test a priori predictions. Nevertheless, for the sake of completeness, a 2 (type of video game: violent vs. neutral) × 2 (target member: ingroup vs. outgroup) analysis of variance was also performed on the data. Results revealed significant main effects of type of video game, $F(1, 95) = 4.97$, $p = .028$, $\eta^2 = .05$ (participants who had played the aggressive video game were more aggressive than participants who had played the neutral video game), and target member, $F(1, 95) = 4.21$, $p = .043$, $\eta^2 = .04$ (participants were more aggressive against the outgroup member than against the ingroup member). The interaction was marginally significant, $F(1, 95) = 2.86$, $p = .094$, $\eta^2 = .03$. Aggressive behavior against the outgroup member was more pronounced than against the ingroup member after violent video game play, $t(46) = 2.12$, $p = .040$, $d = 0.62$. In contrast, after neutral video game play, aggressive behavior against the outgroup member and against the ingroup member was relatively similar, $t(49) = 0.36$, $p = .729$, $d = 0.10$. When using the average across the 25 trials as a measure of aggressive behavior, the pattern of findings was similar (i.e., aggression was most pronounced after violent video game play and when it was targeted against an outgroup member). However, the main a priori contrast was not significant.
4. Note, however, that ratings of frustration did not significantly differ as a function of video game conditions. Perhaps this was due to the fact that frustration was measured with only one item, which may have compromised measurement reliability.

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