

Playing Prosocial Video Games Increases Empathy and Decreases Schadenfreude

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Past research provided abundant evidence that exposure to violent video games increases aggressive tendencies and decreases prosocial tendencies. In contrast, research on the effects of exposure to prosocial video games has been relatively sparse. The present research found support for the hypothesis that exposure to prosocial video games is positively related to prosocial affect and negatively related to antisocial affect. More specifically, two studies revealed that playing a prosocial (relative to a neutral) video game increased interpersonal empathy and decreased reported pleasure at another's misfortune (i.e., schadenfreude). These results lend further credence to the predictive validity of the General Learning Model (Buckley & Anderson, 2006) for the effects of media exposure on social tendencies.

Keywords: media effects, video games, schadenfreude, empathy

Video game exposure is becoming more and more important in daily life. Recent estimates indicated that 87% of U.S. American children play video games regularly (Walsh, Gentile, Gieske, Walsh, & Chasco, 2003), and the amount of time adolescents spend playing video games even surpasses the consumption of TV programs (Huston, Wright, Marquis, & Green, 1999). Inasmuch as most video games contain violence (Dietz, 1998), there has been growing concern about the consequences of video game play. In fact, the frequency of video game play is negatively related to measures of prosocial behavior and positively related to measures of antisocial behavior (Van Schie & Wiegman, 1997). Experimental studies showed that exposure to violent video games causally increases aggressive thoughts, affect, and behavior and decreases prosocial tendencies (for a summary, see Anderson et al., 2010). On the other hand, recent research revealed that playing prosocial video games increases prosocial cognitions and behavior (Gentile et al., 2009; Greitemeyer & Osswald, 2010) and decreases aggressive cognitions (Greitemeyer & Osswald, 2009). However, whereas the evidence for the effects of playing violent video games is abundant, investigating the effects of playing prosocial video games is still in its infancy. In particular, to the best of our knowledge, no research has addressed the effects of playing prosocial video games on prosocial and antisocial affect. This was done in the present research. We hypothesized that playing a prosocial

(relative to a neutral) video game would increase prosocial affect and decrease antisocial affect. More specifically, it was tested whether playing a prosocial (relative to a neutral) video game would increase empathic concern toward suffering others and decrease the pleasure at another's misfortune (schadenfreude).

Research on Video Game Effects

Most research so far has addressed the effects of exposure to violent video games: playing violent (relative to neutral) video games has been shown to increase aggressive thoughts (Anderson & Dill, 2000), the hostile expectation bias (Bushman & Anderson, 2002), state hostility and anxiety levels (Anderson & Ford, 1986), desensitization to violence (Bartholow, Bushman, & Sestir, 2006; Carnagey, Anderson, & Bushman, 2007), and to decrease empathy (Funk, Buchman, Jenks, & Bechtoldt, 2003). Exposure to antisocial games is also linked to increased aggression and decreased helping behavior: participants who had played an antisocial (relative to a neutral) video game set higher levels of noise punishment (Bartholow & Anderson, 2002) and were less likely to intervene in an emergency (Bushman & Anderson, 2009). Longitudinal evidence revealed that exposure to violent media had long-term consequences in that children who played more violent video games early in a school year became more aggressive and less helpful later in the school year (Anderson, Gentile, & Buckley, 2007). Meta-analytic evidence confirms that exposure to violent video games causes an increase in aggression-related variables while decreasing prosocial tendencies (e.g., Anderson et al., 2010).

When explaining the effects of exposure to violent video games on pro- and antisocial tendencies researchers have mainly referred to the General Aggression Model (GAM) proposed by Anderson and colleagues (e.g., Anderson & Bushman, 2002). According to this model, the aggressive content of violent media may affect a person's present internal state, consisting of cognition, affect, and

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arousal. The present internal state, in turn, determines a chosen behavioral reaction. As described above, this model has received considerable empirical support.

But clearly not all video games contain violence. To address not only the effects of antisocial but also prosocial video games, Buckley and Anderson (2006) recently expanded the GAM into a General Learning Model (GLM). The GLM is identical to the GAM in that media exposure is assumed to affect a person's internal state, which in turn may instigate behavioral reactions. It extends the GAM, however, in that it highlights the importance of the video game content: According to the GLM, exposure to antisocial video games increases aggression-related variables and decreases prosocial tendencies, whereas prosocial video games are assumed to decrease aggression-related variables and to increase prosocial tendencies.

However, in contrast to the well-documented effects of exposure to violent video games, empirical studies concerning the effects of exposure to prosocial video games have been relatively sparse. There is some evidence that playing a prosocial (relative to a neutral) video game reduces aggressive cognitions (Greitemeyer & Osswald, 2009), increases the accessibility of prosocial cognitions (Greitemeyer & Osswald, 2010), and promotes helping behavior (Gentile et al., 2009; Greitemeyer & Osswald, 2010). Although the results of these studies are encouraging, our knowledge about the predictive validity of the GLM for the effects of video games with prosocial content on social tendencies is still limited. In particular, whereas the just described investigations showed that exposure to prosocial video games has an impact on the player's cognitions and behavior (while controlling for arousal), no study so far has examined the effects of exposure to prosocial video games on affective measures. Thus, it is unknown whether prosocial video game exposure activates not only the cognitive route of the GLM but also the affective route. This was tested in the present research. We hypothesized that playing prosocial (relative to neutral) video games would increase prosocial affect (empathy) and decrease antisocial affect (schadenfreude).

The Present Research

Seeing other people befalling a misfortune often leads to empathic reactions in that one feels sorry for the suffering person, which in turn may instigate helping behavior (Batson, 1991). However, another's misfortune does not always evoke these sympathetic emotions. Just in contrast, people may even feel pleasure at another's misfortune; an emotional reaction described by the German word "schadenfreude." In stark contrast to the emotion of empathy, which improves the quality of social interactions, schadenfreude is a malicious pleasure that is harmful to social relations (Heider, 1958).¹ Thus, we felt it an important endeavor to examine how to increase empathy and to diminish the pleasure at another's misfortune. In the present two experiments, we test the notion that empathy may be increased by exposure to prosocial (relative to neutral) video games, whereas schadenfreude may be decreased.

Experiment 1

Method

Participants and design. Participants were 56 students (28 women, 28 men) of a German university (mean age 29 years), who

were randomly assigned to one of two video game conditions (prosocial vs. neutral). There were 28 participants in the prosocial condition and 28 participants in the neutral condition. All participants were tested individually. The same applies to Experiment 2.

Procedure and materials. At the onset, participants learned that they would take part in two unrelated studies, one about the enjoyment factor of classical computer games and the other about impression formation. Then, as in previous investigations into the effects of prosocial video games (Greitemeyer & Osswald, 2009, 2010), participants played either *Lemmings* as the prosocial video game or *Tetris* as the neutral one for 10 min. In *Lemmings*, the player guides groups of small beings ("Lemmings") through different worlds. The goal is to take care of the Lemmings and to save them by leading them to the exit. In *Tetris*, falling geometrical figures must be correctly positioned. Greitemeyer and Osswald (2009, 2010) employed these video games and found that the content of *Lemmings* was perceived as being more prosocial than the content of *Tetris*. In addition, they made sure that the video games were matched on mood and arousal dimensions. Thus, any effects of playing the video games are unlikely to be due to differences in general mood or arousal.

After participants completed playing the video game, they were thanked and told that the first study was over. They then received an adapted vignette with the title: "Paris Hilton has to go to jail: At the end of February, the party girl drove with high speed and without light through Hollywood, although she had no driver's license." This vignette appeared on the fifth of May, 2007 in "spiegel online," which is the Internet website of the most popular German political magazine. The vignette read:

Hotel heiress and actress Paris Hilton (26) has to go behind bars because of violating her probation. As reported in the US-magazine "People," the party-girl began her jail term on the 5th of June in an all-female jail in Los Angeles. At the end of February, Hilton was caught driving with high speed and without having her headlights on although it was dark. The officers detected that Hilton's driver's license was suspended after a previous driving offense. In January, Hilton received a 36 months' probation fine for driving under the influence of alcohol. "I feel really sorry," the tearful blonde stammered in the court room. She came with her parents and a large entourage with a 10 minute delay to the hearing and took the witness stand. She claimed that she was not aware that her driving license was suspended. According to Paris Hilton, her agent did not enlighten her. The judge reprimanded Hilton and countered that he did not believe her. She had signed a document acknowledging that she was not permitted to drive. The state's attorney accused her of a gross violation of her probation and traffic regulation. As a maximum sentence, the judge could have ordered her to go to jail for 90 days. However, at the same time, it would have been possible for Hilton to get away with a warning or with the fulfillment of social service.

After reading the vignette, participants responded to three items measuring feelings about Paris Hilton; schadenfreude, relief, and happiness. These items were adapted from Leach, Spears, Branscombe, and Doosje (2003) and Leach and Spears (2009),

¹ It is important to point out that schadenfreude is not simply the mirror image of empathy. Although schadenfreude is negatively related to empathy (e.g., Hareli & Weiner, 2002), empathy involves a prosocial orientation that is absent from the prediction of schadenfreude (Feather & Sherman, 2002).

were highly correlated, and thus pooled in a schadenfreude scale ($\alpha = .80$).

Then, participants learned that another study was being conducted in which participants were asked to read two essays from other participants. Presumably because the individual who was supposed to read the essays had not shown up, the experimenter asked the participant to read and respond to the essays. The essays were adapted from DeWall and Baumeister (2006). In the first essay, participants learned that the author of the essay had separated from his girlfriend. In the second essay, the author broke his leg during an intramural game. In both essays, it was apparent that the author of the essay severely suffered from his current predicament. Directly after each essay, participants indicated how sympathetic, compassionate, and soft-hearted they felt toward the author of the essay (see Maner & Gailliot, 2007). These items were pooled in an empathy scale (romantic relationship: $\alpha = .47$; broken leg: $\alpha = .82$).²

As a manipulation check, participants rated to what extent the content of the video game was prosocial. In addition, they indicated how much they liked the video game, how difficult they perceived the video game to be, and to what extent the content of the video game was antisocial. All items were assessed on a 7-point Likert-type scale (0 = *not at all*, 6 = *absolutely*). Finally, participants answered demographic questions, were thanked, and were asked what they thought the study was about. None of the participants noted our hypotheses that playing a prosocial video game increases empathy and decreases schadenfreude. The same applies to Experiment 2.

Results and Discussion

The manipulation check was successful: The prosocial video game was perceived as being more prosocial ($M = 2.29$, $SD = 1.90$) than the neutral video game ($M = 1.21$, $SD = 1.48$), $t(54) = 2.36$, $p < .05$.

As expected, those participants who had played the prosocial video game ($M = 2.13$, $SD = 1.46$) experienced less schadenfreude than those participants who had played the neutral video game ($M = 3.35$, $SD = 1.39$), $t(54) = 3.19$, $p < .01$. Also as expected, playing a prosocial video game increased empathy toward others in need. A 2 (type of video game) \times 2 (essay: romantic vs. broken leg) analysis of variance (ANOVA) with repeated measures on the latter factor revealed a significant main effect for type of video game, $F(1, 54) = 8.56$, $p < .01$, $\eta^2 = .14$. Participants who had played a prosocial video game (weighted $M = 7.00$) felt more empathy than those who had played a neutral video game (weighted $M = 6.04$). The interaction was not significant, $F(1, 54) = 1.14$, $p = .29$, $\eta^2 = .02$. Empathy was negatively associated with schadenfreude, $r(56) = -.23$, but this effect was only marginally significant: $p = .09$.

No differences emerged for liking of the video game, $t(54) = 0.87$, $p = .39$; perceived difficulty of the video game, $t(54) = 0.84$, $p = .40$; and aggressive content, $t(54) = 0.95$, $p = .35$. When we controlled for liking of the video game, perceived difficulty of the video game, prosocial content, aggressive content, and participant sex, type of video game still significantly predicted schadenfreude, $\beta = .45$, $t(49) = 3.40$, $p < .01$.³ The relationship between prosocial content and schadenfreude was marginally significant, $\beta = .26$, $t(49) = 1.90$, $p = .06$, whereas all other predictors had

nonsignificant regression weights, all β s $< .16$, all t s < 1.14 , all p s $> .16$. Finally, when controlling for the same variables, type of video game still significantly predicted empathy, $\beta = .39$, $t(49) = 2.93$, $p < .01$. Participant sex was also a significant predictor of empathy (female participants reported more empathy than male participants), $\beta = .36$, $t(49) = 2.82$, $p < .01$, whereas all other variables were not, all β s $< .17$, all t s < 1.32 , all p s $> .19$.

In sum, our main hypotheses received initial support from the data: playing a prosocial (relative to a neutral) video game increased interpersonal empathy and decreased reported schadenfreude. These effects appeared to be unaffected by a host of other variables. Although encouraging, some limitations of Experiment 1 should be also noted. First, one could argue that our target person (Paris Hilton) deserved her misfortune in that she was responsible for her misdeed. Previous research has shown that empathy was less likely to occur whereas schadenfreude was more likely to occur if the misfortune was deserved rather than undeserved (e.g., Feather, 1994; Feather & Sherman, 2002). So perhaps exposure to prosocial video games only affects empathy and schadenfreude if the misfortune is well-deserved but not if the misfortune is undeserved. Thus, in Experiment 2, we examined whether exposure to prosocial video games would increase empathy and diminish schadenfreude if the misfortune was undeserved. Second, participants in Experiment 1 reported their schadenfreude toward one target (Paris Hilton) and their empathy toward other targets (the authors of the essays). It could be that the weak relationship between these two constructs is due to the variety of targets. Third, it is noteworthy that measuring of schadenfreude and empathy was not counterbalanced. That is, all participants responded first to the schadenfreude vignette and then to the empathy vignette. Thus, it may be that the schadenfreude responses have affected later empathy responses. These shortcomings were addressed in Experiment 2.

Experiment 2

Experiment 2 was a conceptual replication of Experiment 1, with the following modifications. In Experiment 2, we measured schadenfreude and empathy toward the same target. Moreover, measuring of schadenfreude and empathy was counterbalanced. Finally, rather than responding to the misfortune of a female U.S. American (Paris Hilton), participants' empathic concern and schadenfreude toward a male German (Dieter Bohlen) were as-

² The reliability of the empathy scale in the romantic relationship vignette was low because compassionate ratings were not significantly correlated to the other two ratings. Averaging only sympathetic and soft-hearted ratings increased the reliability of the scale ($\alpha = .66$) but did not affect the main findings.

³ When using only the schadenfreude item, rather than pooling happiness, relief, and schadenfreude into a schadenfreude scale, the results were similar. Participants who had played a prosocial video game ($M = 3.57$, $SD = 1.81$) experienced less schadenfreude than those who had played a neutral video game ($M = 4.61$, $SD = 1.52$), $t(54) = 2.31$, $p < .05$. Moreover, this effect remained significant, $\beta = .34$, $t(49) = 2.34$, $p < .05$, when controlling for liking of the video game, perceived difficulty of the video game, prosocial content, aggressive content, and participant sex.

sessed.⁴ Whereas Paris Hilton was arguably responsible for her actions and thus her misfortune can be seen as well-deserved, Dieter Bohlen was not responsible for his predicament (see below) and thus the misfortune can be seen as undeserved. However, because of Dieter Bohlen being a highly divisive person (see Footnote 4), we would still expect some reported *schadenfreude* in the neutral video game condition, which we expected to be diminished in the prosocial video game condition.

Finally, we wanted to contrast the effects of prosocial video games not only to those of neutral video games but also to those of antisocial video games. There has been accumulative evidence that exposure to antisocial video games increases antisocial affect and decreases prosocial affect. For instance, playing a violent (relative to a neutral) video game increases state hostility and anxiety levels (Anderson & Dill, 2000; Anderson & Ford, 1986) and diminishes empathy (Funk et al., 2003). Likewise, we expected exposure to an antisocial (relative to a neutral) video game to decrease empathy (which is a replication of previous research) and to increase *schadenfreude* (which has not been shown before).

Method

Participants and design. Participants were 61 students (39 women, 22 men) of a German university (mean age 23 years), who were randomly assigned to one of the three video game conditions (prosocial vs. neutral vs. antisocial). Two participants (one woman, one man) were discarded due to missing responses, leaving a total sample of 59 participants. There were 20 participants in the prosocial condition, 19 participants in the neutral condition, and 20 participants in the antisocial condition.

Procedure and materials. As in Experiment 1, participants learned that they would take part in two unrelated studies that dealt with the enjoyment factor of classical computer games and impression formation. Then, participants played either Lemmings as the prosocial video game, Tetris as the neutral video game, or Lamers as the antisocial video game for 10 min. Lamers is the aggressive version of Lemmings: all creatures must be killed and the goal is that no one reaches the exit. Greitemeyer and Osswald (2010) showed that the content of Lamers was perceived as being more antisocial than the content of Tetris and Lemmings, respectively. In addition, there were no differences among the video games in terms of general mood and arousal.

After playing the video game, participants read an adapted vignette with the title: "Dieter Bohlen robbed." This vignette appeared on the twentieth of December, 2006, on the Internet website of "Der Tagesspiegel." The vignette read:

On the eleventh of December, 2006, two men entered Dieter Bohlen's villa and fettered the 53 year-old and his 23 year-old girlfriend. After the robbers forced him to give them 60.000 Euro, they fled. The music producer could free himself and alarmed the police. Not even two hours after the crime had happened, Bohlen was interviewed by tabloid "Bild" and TV network RTL. Answering the question why he had so much money in his villa, Bohlen said he was about to make some purchases.

Schadenfreude was assessed as in Experiment 1. In addition, among other items, participants indicated how empathetic they felt toward Dieter Bohlen. The order in which *schadenfreude* and empathic concern was assessed was varied but did not affect our

main findings. Finally, the same video game ratings were employed as in Experiment 1. All items were assessed on scales ranging from 0 (*not at all*) to 6 (*absolutely*).

Results and Discussion

The manipulation checks were successful: The prosocial video game was perceived as being more prosocial ($M = 3.20$, $SD = 2.09$) than the neutral video game ($M = 1.32$, $SD = 1.80$) and the antisocial video game ($M = 0.65$, $SD = 1.14$), $F(2, 56) = 11.79$, $p < .001$, $\eta^2 = .30$. Moreover, the antisocial video game was perceived as being more antisocial ($M = 3.55$, $SD = 2.06$) than the neutral video game ($M = 1.79$, $SD = 2.18$) and the prosocial video game ($M = 1.60$, $SD = 1.79$), $F(2, 56) = 5.72$, $p < .01$, $\eta^2 = .17$.

Table 1 reports means and standard deviations for the responses to the Dieter Bohlen vignette. With regard to *schadenfreude*, a contrast analysis in which the prosocial condition was compared to the neutral and the antisocial condition revealed the expected significant pattern that playing a prosocial video game decreased reported *schadenfreude*, $t(56) = 2.06$, $p < .05$. In contrast, playing an antisocial video game did not increase *schadenfreude* when compared to the neutral video game condition, $t(56) = 0.38$, $p = .71$.

With regard to empathic concern toward Dieter Bohlen, when contrasting the prosocial condition with the neutral and the antisocial condition, playing a prosocial video game significantly increased empathic concern, $t(56) = 2.24$, $p < .05$. In contrast, playing an antisocial video game did not affect empathic concern when compared to the neutral video game condition, $t(56) = 0.30$, $p = .76$. Empathic concern was not significantly related to *schadenfreude*, $r(59) = .16$, $p = .23$.

Among the video game conditions, the perceived difficulty of the video games was relatively similar, $F(2, 56) = 1.50$, $p = .23$, $\eta^2 = .05$. In contrast, liking of the video games significantly differed, $F(2, 56) = 6.22$, $p < .01$, $\eta^2 = .18$: Liking of the antisocial video game ($M = 2.30$, $SD = 1.78$) was lower than liking of the prosocial ($M = 4.05$, $SD = 1.43$) and the neutral video game ($M = 3.84$, $SD = 1.89$). However, when we controlled for liking of the video game, perceived difficulty of the video game, prosocial content, aggressive content, and participant sex, type of video game (dummy coded: prosocial = 1, neutral and antisocial = 2) still significantly predicted *schadenfreude*, $\beta = .34$, $t(52) = 2.24$, $p < .05$, whereas none of the other predictors were significantly associated with *schadenfreude*, all β s $< .23$, all t s < 1.43 , all p s $> .16$. In contrast, type of video game did not significantly predict empathy, $\beta = -.18$, $t(52) = 1.21$, $p < .23$, when controlling for the same variables. Aggressive content was a

⁴ Dieter Bohlen is a well-known German entertainer. He is the most successful German songwriter/music producer in German history, with 16 number one hits in Germany. He used to be part of the duo Modern Talking that became the most successful German band of all time. So far, sales of all singles and albums produced by him exceed 165 million units. His autobiography became the year's bestselling book in Germany. He is a controversial juror in the German version of Pop Idol. For instance, he is notorious for his controversial and insulting comments. After he ridiculed some candidates, a German federal agency announced an investigation. Finally, his personal life, such as the relationships to his wives (e.g., one marriage lasted for only 30 days) and girl friends (e.g., his current girl friend is 30 years his junior) is often discussed in German media.

Table 1
*Means and Standard Deviations for Responses to the Dieter Bohlen Vignette as a Function of Type of Video Game (Experiment 2)**

Responses to the vignette	Video game condition		
	Prosocial	Neutral	Antisocial
Schadenfreude	0.73 (0.81)	1.47 (1.62)	1.65 (1.78)
Empathy	2.10 (1.55)	1.11 (1.49)	1.25 (1.45)

* Standard deviations are in parentheses.

significant predictor, $\beta = -.28$, $t(52) = 2.07$, $p < .05$, whereas all other predictors were not significantly associated with empathy, all β s $< .22$, all t s < 1.57 , all p s $> .12$.

To sum up, Experiment 2 replicated and extended Experiment 1 in some important ways. First, the vignettes employed in both experiments differed in that the target person in Experiment 1 was a female U.S. American, but was a male German in Experiment 2. Moreover, it appears that the misfortune befalling to Dieter Bohlen can be seen as less deserved than the misfortune befalling to Paris Hilton. At least, reported schadenfreude to the target person's misfortune was considerably lower in Experiment 2 than in Experiment 1. Despite these modifications, the main findings from Experiment 1 were replicated in that exposure to prosocial video games increased empathy and diminished schadenfreude.

Note, however, that the effect of video game condition (prosocial vs. neutral and antisocial) on empathy was no longer significant when controlling for aggressive content of the video game. Perhaps this was due to the fact that we measured empathy with only one item and that measurement reliability was relatively low. Also unexpectedly, participants in the antisocial (relative to the neutral) video game condition did not report less empathy and more schadenfreude. It is notable that participants played the video games for 10 min, which was considerably shorter than in most previous investigations into the effects of violent video games. Thus, longer exposure to the video games might have yielded significant differences among the neutral and the antisocial video game condition.

General Discussion

The present research shows that playing prosocial video games increases prosocial affect and decreases antisocial affect. More specifically, we found that exposure to prosocial (relative to neutral and antisocial) video games enhanced interpersonal empathy and diminished reported schadenfreude toward a target befalling a misfortune. Note that both experiments revealed that empathy and schadenfreude were only weakly negatively related (see also Feather & Sherman, 2002; Hareli & Weiner, 2002). It thus appears that schadenfreude is not simply the mirror image of empathy, and playing a prosocial video game seems to have separate effects on empathy (increased) and schadenfreude (decreased).

Implications, Limitations, and Future Research

There has been abundant evidence showing that playing violent video games increases aggressive affect and decreases prosocial

affect (Anderson & Dill, 2000; Anderson & Ford, 1986; Funk et al., 2003). Thus, as suggested by the GLM, violent video game exposure may activate affective variables related to game play. In contrast, no study has tested the predictive validity of the GLM for the effects of prosocial video game exposure on affective variables. The present research filled this gap by showing that playing prosocial video games increases empathy and decreases schadenfreude. Thus, these investigations support GLM's notion that the effects of playing video games indeed depend to a great extent on the content of the media being consumed: whereas exposure to antisocial video games increases antisocial affect and decreases prosocial affect, exposure to prosocial video games increases prosocial affect and decreases antisocial affect.

Some important limitations of the present research should be mentioned. First, the sample sizes of the present studies were relatively small. Thus, the statistical power to obtain possible effects was limited. For example, if the sample size was bigger, results might have revealed that playing the antisocial (relative to the neutral) video game significantly decreases empathy and increases schadenfreude. A further limitation of the present studies is that we used only one prosocial, one neutral, and one antisocial video game. Thus, the finding that empathy is increased whereas schadenfreude is decreased after playing a prosocial video game may be due to specific features of the particular games used and are not generalizable to other video games. Note, however, that these video games were extensively pretested and matched in terms of liking, perceived difficulty, arousal, and mood properties. In addition, Greitemeyer and Osswald (2010) showed that the effect of playing prosocial video games on prosocial behavior was not limited to a specific group of prosocial video games. Nevertheless, future research using a different set of video games would definitely improve the generalizability of our findings. In this regard, it is noteworthy that the prosocial game used was *not* rated as particularly prosocial. For instance, in Study 1, the mean rating of Lemmings was 2.29 on a 0–6 scale. Thus, employing a video game that is more prosocial might have revealed even bigger effects of prosocial video game exposure on schadenfreude and empathy. Likewise, it is worth mentioning that the measurement of empathy was not without flaws. In Study 1, the scale reliability was low; in Study 2, empathy was measured with only one item. Future research, employing more reliable empathy measures, may document effects of video game exposure on empathy that are even more pronounced.

It is noteworthy that the schadenfreude vignettes used in the present research involved the misfortune of a well-known individual who can be regarded as a high achiever. That is, as in Feather's tall poppy studies (e.g., Feather, 1994, 1999) where responses to the failure of leading politicians or well-known entertainers were assessed rather than employing hypothetical situations, actual people as well as actual misfortunes were chosen because we assumed participants to be more emotionally involved. Future research that examines the effects of video game exposure on schadenfreude toward ordinary people would help to draw more general conclusions.

The reader should be aware that we examined only short-term effects: immediately after playing the video games participants responded to the misfortune vignettes. However, as pointed out by the GLM, repeated encounters with prosocial media may yield long-term changes in personality through the development and

construction of knowledge structures. In fact, there have been some studies showing that repeated exposure to media affects long-term behavior (e.g., Huesmann & Miller, 1994). Note also that our effects materialized even though participants played the video games for only 10 min. Thus, if people repeatedly play prosocial video games, video game exposure may even increase empathy and diminish schadenfreude to a larger extent. However, this prediction awaits further research.

Future research is also needed to examine why playing prosocial video games increases empathy and decreases schadenfreude. Greitemeyer and Osswald (2010) showed that participants who had played a prosocial (relative to a neutral) video game reported more prosocial thoughts that they had while playing the video game. This greater accessibility of prosocial thoughts in turn evoked helping behavior. Likewise, it is conceivable that the increased accessibility of prosocial thoughts accounts for the effects of playing a prosocial video game on empathy and schadenfreude in that it affects how the befallen misfortune is interpreted. For instance, Batson and colleagues (Batson, Eklund, Chermok, Hoyt, & Ortiz, 2007) suggested that perceived need, imagining the other's perspective, and valuing the other's welfare are antecedents of empathy. With regard to schadenfreude, research has shown that perceivers are more likely to experience schadenfreude if the misfortune is perceived as deserved (Feather & Sherman, 2002), if the misfortune is befalling an envied person (Smith, Turner, Garonzik, Leach, Urch-Druskat, & Weston, 1996), or if the person befalling the misfortune is disliked (Hareli & Weiner, 2002). It thus may be that playing prosocial video games increases the accessibility of prosocial thoughts, which in turn evokes one of these direct antecedents of empathy and schadenfreude. Clarifying these issues is an important endeavor for future research.

Finally, in the present research, we tested the effects of video game play on empathy and schadenfreude. But these effects may not be limited to video game exposure but also extend to other media sources. For instance, it appears that listening to songs with prosocial, relative to neutral, lyrics increases prosocial thoughts, affect, and behavior (Greitemeyer, 2009a, 2009b). Thus, it is conceivable that prosocial music decreases the experience of schadenfreude. Likewise, songs with violent lyrics cause an increase in aggressive thoughts, hostile feelings (Anderson, Carnagey, & Eubanks, 2003), and aggressive behavior (Fischer & Greitemeyer, 2006) and may decrease empathy and increase schadenfreude.

In concluding, we would like to point out that media exposure does not inevitably harm but may also benefit social relations. Whereas empathy evokes helping behavior (Batson, 1991) and reduces the use of stereotypes (Galinsky & Moskowitz, 2000), schadenfreude has been conceived of a malicious emotion (Heider, 1958; Leach et al., 2003) that may hurt interpersonal and intergroup relations. Playing prosocial video games by increasing empathy and diminishing schadenfreude can thus contribute to improved social interactions.

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Received June 17, 2009
 Revision received May 4, 2010
 Accepted May 4, 2010 ■

UNITED STATES POSTAL SERVICE® (All Periodicals Publications Except Requester Publications)

Statement of Ownership, Management, and Circulation

1. Publication Title: *Emotion*

2. Publication Number: 0 2 0 -5 4 2

3. Filing Date: October 2010

4. Issue Frequency: Bimonthly

5. Number of Issues Published Annually: 6

6. Annual Subscription Price: Mfr \$55 Indiv \$100 Inst \$468

7. Complete Mailing Address of Known Office of Publication (Not printer) (Street, city, county, state, and ZIP+4®)

750 First Street, N.E., Washington, D.C. 20002-4242

8. Complete Mailing Address of Headquarters or General Business Office of Publisher (Not printer)

750 First Street, N.E., Washington, D.C. 20002-4242

9. Full Name and Complete Mailing Address of Publisher (Name and complete mailing address)

American Psychological Association
 750 First Street, N.E.
 Washington, D.C. 20002-4242

10. Owner (Do not leave blank. If the publication is owned by a corporation, give the name and address of the corporation immediately followed by the names and addresses of all stockholders owning or holding 1 percent or more of the total amount of stock. If not owned by a corporation, give the names and addresses of the individual owners. If owned by a partnership or other unincorporated firm, give its name and address as well as those of each individual owner. If the publication is published by a nonprofit organization, give its name and address.)

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11. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages, or Other Securities. If none, check box None

12. Tax Status (For completion by nonprofit organizations authorized to mail at nonprofit rates) (Check one)

Has Not Changed During Preceding 12 Months
 Has Changed During Preceding 12 Months (Publisher must submit explanation of change with this statement)

14. Issue Date for Circulation Data Below: August 2010

Emotion

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D. Service Center Operations
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