Personality and Social Psychology Bulletin
37(1) 107–119

DOI: 10.1177/0146167210391103
http://pspb.sagepub.com
SAGE

Of Virtual Victims and Victimized Virtues: Differential Effects of Experienced Aggression in Video Games on Social Cooperation

Tobias Rothmund[1], Mario Gollwitzer[2], and Christoph Klimmt[3]

Abstract

Two experimental studies were used to investigate how interacting with aggressive virtual characters in video games affects trust and cooperation of players. Study 1 demonstrates that experiencing virtual aggression from a victim's perspective can impair players' investments in a subsequent common goods dilemma situation. This effect is mediated by reduced expectations of trust in the cooperativeness of interaction partners. In Study 2 the same effect was replicated by using a different cooperation task and by investigating the moderating role of justice sensitivity from a victim's perspective as a dispositional factor. Participants transferred less money to an unknown partner in a trust game after exposure to aggressive nonplayer characters in a video game. This effect was stronger for people high in victim sensitivity. Results of both studies can be interpreted in line with the sensitivity to mean intentions model and add to the body of research on violent media effects.

Keywords

violent video games, hostile information processing, trust, social cooperation, sensitivity to mean intentions, social dilemmas

Received February 26, 2010; revision accepted September 3, 2010

The use of video games for entertainment purposes has rapidly increased during the past decades, and in many of today's most popular games, harming, fighting, or killing is a main feature of game play (Dietz, 1998; Hanninger & Thompson, 2004; Smith, Lachlan, & Tamborini, 2003). Accordingly, a substantial body of empirical studies has investigated the detrimental effects of exposure to media violence in video games during the last 20 years. Recent meta-analyses report effects on physiological, emotional, cognitive, and behavioral outcomes (Anderson, 2004; Anderson & Bushman, 2001; Anderson et al., 2010; Ferguson, 2007; Sherry, 2001).

One of the most robust and consistent findings is that exposure to video game violence can enhance hostile information processing. For example, some studies investigated effects on person perception. Kirsh and colleagues (Kirsh & Mounts, 2007; Kirsh, Mounts, & Olczak, 2006; Kirsh, Olczak, & Mounts; 2005) show that game violence induced a negative affect-perception bias. Other studies show that violent game content enhances hostile expectations (Anderson, Anderson, & Deuser, 1996; Bushman & Anderson, 2002; Eastin & Griffiths, 2006) or hostile attributions (Anderson & Murphy, 2003; Funk, Buchman, Jenks, & Bechtoldt, 2003; Kirsh, 1998; Möller & Krahé, 2009). These findings are in accordance with influential social-cognitive theories, including cognitive neoassociation theory (Berkowitz, 1993; Jo & Berkowitz, 1994), the social information processing model of social adjustment (Crick & Dodge, 1994; Dodge, 1980), and social cognitive theory (Bandura, 2001).

However, important questions remain unaddressed in this line of research. First, there is a lack of research linking effects of video game violence on hostile information processing with behavioral outcomes. More precisely, recent studies show that hostile expectations and hostile attributions can mediate the effects of violent media on aggressive behavior (Bartholow, Sestir, & Davis, 2005; Möller & Krahé, 2009). However, no published study has addressed the question of whether hostile information processing also mediates effects of violent video games on prosocial behavior. Exposure to violent video games can decrease helping behavior (Bushman & Anderson, 2009) and cooperation in social

[1]University of Koblenz-Landau, Koblenz and Landau, Germany
[2]Philipps University Marburg, Marburg, Germany
[3]Hannover University of Music, Drama, and Media, Hannover, Germany

Corresponding Author:
Tobias Rothmund, Department of Psychology, University of Koblenz-Landau, Fortstraße 7, 76829 Landau, Germany
Email: rothmund@uni-landau.de

dilemma situations (Sheese & Graziano, 2005). However, we know little about the underlying psychological processes of these effects. In the present article, a theoretical model is introduced that links the effects of playing violent video games on hostile information processing with decreased social cooperation.

Second, only little empirical and theoretical work has addressed the question of how elements of interactivity in video games are related to the effects of video game violence on subsequent hostile information processing and behavior. Some researchers have presented theoretical arguments that interactivity might enhance psychological effects of media violence (Carnagey & Anderson, 2004; Klimmt & Trepte, 2003). Interactivity enables the player to actively engage in aggressive interactions through a virtual character that is controlled by the player. Whereas violent content on TV and in films is perceived from the perspective of an observer, players *actively* participate in aggressive interactions in video games. In other words, players can be both perpetrators and victims of aggressive acts within a video game. Research on aggression and social justice indicates that the perspective in which aggression- or injustice-related episodes are perceived is related to distinct cognitive, emotional, and behavioral reactions (Mikula, 1994; Mikula, Petri, & Tanzer, 1990; Rosen, Milich, & Harris, 2007). Hence, the effects of media violence on hostile information processing and subsequent social cooperation may depend on the perspective from which it is experienced.

Third, we know little about differential effects of video game violence on hostile information processing. Knowledge about dispositional moderators can add to the understanding of the underlying psychological processes. For example, in a study by Markey and Scherer (2009), psychoticism enhanced the effects of game violence on the accessibility of aggressive cognitions after the game. This finding supports the assumption that video game violence activates knowledge structures related to aggression and violence. However, the amount of empirical work on effects of dispositional moderators is limited. In the present research, we investigate differential effects of video game violence on social cooperation.

Two experimental studies are presented that address these topics. We suggest that experiencing media violence and aggression from the perspective of a victim can decrease trust and cooperation because of hostile information processing and that this effect is more pronounced among people who are sensitive to injustice from a victim's perspective (Gollwitzer, Schmitt, Schalke, Maes, & Baer, 2005; Schmitt, Gollwitzer, Maes, & Arbach, 2005). These hypotheses are derived from the sensitivity to mean intentions (SeMI) model (Gollwitzer & Rothmund, 2009), which is outlined in the following.

SeMI Model

Gollwitzer and Rothmund (2009) introduced the SeMI model to explain how fear of victimization can promote egoistic and uncooperative behavior. The SeMI model predicts a "synergistic" interaction between a personality disposition (justice sensitivity from a victim's perspective, or simply "victim sensitivity") and situational cues (contextual cues that contain information regarding other people's untrustworthiness). This interaction is assumed to (a) trigger a suspicious mind-set, (b) enhance hostile information processing, and (c) decrease cooperative behavioral tendencies in subsequent socially uncertain situations.

According to the SeMI model, victim sensitivity indicates a particular readiness to respond to contextual cues, suggesting that other people harbor egoistic or mean intentions and that there is a danger of being exploited. The model posits that cues of untrustworthiness can evoke a state of suspiciousness and that people who are sensitive to mean intentions (i.e., those who score high in victim sensitivity) have a lower threshold for the activation of a suspicious mind-set. A suspicious mind-set reflects the activation of immoral person schemas (Fiske & Taylor, 2008) and an avoidance-related motivational state (Carver, 1996; Elliot & Friedman, 2007), which jointly enhance hostile information processing (e.g., mistrust expectations and attribution of malicious intent) in socially uncertain situations. When a suspicious mind-set is activated, people are more likely to behave uncooperatively and antisocially to prevent being exploited (Deutsch, 1958; Vohs, Baumeister, & Chin, 2007; Yamagishi & Sato, 1986). Taken together, because of hostile information processing, victim-sensitive persons are expected to behave uncooperatively when confronted with cues that indicate meanness, hostility, and untrustworthiness of potential interaction partners. In line with this reasoning, Gollwitzer, Rothmund, Pfeiffer, and Ensenbach (2009) found that people high in victim sensitivity reacted more strongly to base-rate information about the number of free-riders in a common goods dilemma situation: The higher the base rate of free-riders, the less people themselves invested in the public good. This effect was stronger for people high in victim sensitivity.

The SeMI model suggests that victim-sensitive persons react to all kinds of contextual cues that are associated with untrustworthiness of others; aggressiveness of virtual characters in a video game can be regarded such a cue. Thus, the SeMI model predicts that the exposure to virtual aggression in a video game should activate a suspicious mind-set, enhance mistrust expectations, and decrease social cooperation in victim-sensitive persons.

Virtual Aggression and Cues of Untrustworthiness

Computer-generated representations of aggressive acts in video games are conducted by virtual characters, which can be categorized as player characters (or "avatars") or nonplayer characters (NPCs or "agents"). In video games, avatars represent human players, and agents are NPCs behaving

in accordance with preprogrammed algorithms[1] (Bailenson & Blascovich, 2004). We hypothesize that the aggressiveness of NPCs in video games can serve as a cue of untrustworthiness and activate features of a suspicious mind-set in players. This activation outlasts the media exposure situation and thus impairs cooperation even after playing the game. Support for this assumption can be drawn from empirical findings showing that interacting with virtual agents triggers similar psychological reactions as does interacting with humans (Donath, 2007; Garau, Slater, Pertaub, & Razzaque, 2005; Slater et al., 2006). Furthermore, we argue that virtual aggression of NPCs is perceived from a victim's perspective in interactive game play: Players do not merely watch aggressive NPCs doing harm to third parties (as in movie consumption); rather, they directly experience this aggression toward their own avatar. Consequently, a suspicious mind-set should be triggered more directly in video games than in other screen-based media (e.g., movies).

In conclusion, applying the SeMI model to research on the effects of playing violent video games leads us to propose that the exposure to aggressive NPCs in video games can decrease subsequent social cooperation of players because of the activation of a suspicious mind-set. Furthermore, this effect should be enhanced (a) when the aggressiveness of NPCs is perceived from a victim's perspective compared to an observer's perspective and (b) when players are dispositionally victim sensitive. In Study 1 we manipulated the social perspective from which virtual aggression of NPCs in video games is perceived. In Study 2 we investigated victim sensitivity (Gollwitzer et al., 2005, Schmitt et al., 2005) as a dispositional moderator of effects of NPC aggressiveness on cooperative behavior.

Study 1

The aim of the first study was threefold. The primary aim was to test the hypothesis that exposure to aggressive NPCs decreases cooperation in a subsequent social dilemma situation. We manipulated the amount of aggressive NPC behavior in a video game sequence by randomly assigning participants to one of two game conditions. In one condition, the game sequence contained little aggressive behavior displayed by NPCs toward the player's avatar in the game, whereas in the other condition, the game sequence contained a substantial amount of aggressive behavior displayed by NPCs toward the player's avatar in the game. As we see later, the amount of aggression displayed by the player (or, more precisely, by his avatar) was held constant across the two sequences. Thus, an effect of the game sequence manipulation could not be attributed to a difference in the amount of aggression *committed* by the player but rather to differences in the numbers of aggressive encounters with NPCs.

The second aim was to test the hypothesis that cooperation is reduced more strongly if NPC aggression against an avatar is experienced from a victim's perspective (rather than from an observer's perspective). Therefore, we compared a condition in which participants actively *played* the respective game sequence and thus experienced NPC aggression from a victim's perspective with a condition in which participants passively *watched* the (prerecorded) respective game sequence and thus experienced NPC aggression from an observer's perspective.

After playing (or watching) the game sequence, all participants entered a social dilemma situation in which they could display more or less cooperative (vs. egoistic) behavior. Social dilemmas contain interdependence between two or more parties (in the sense that a person's own outcome is influenced by the actions of others), and they typically provide a binary choice between cooperative and competitive behavior (for reviews, see Dawes, 1980; Komorita & Parks, 1995; Weber, Kopelman, & Messick, 2004). The degree of cooperation was the central dependent variable in this study.

The third aim of this study was to test the assumption that the effect of exposure to virtual aggression on subsequent cooperative behavior is mediated by the activation of a suspicious mind-set. Participants' expectations regarding the cooperativeness of potential partners in the social dilemma situation were measured to directly test this hypothesis.

Method

Sample. One hundred male undergraduates (age: $M = 23$, $SD = 2.7$ years) participated in this experiment in return for 6 euros. All participants spoke German fluently. The study used a 2 (aggressiveness of NPCs in the game: high vs. low) × 2 (reception mode: player vs. spectator) between-subjects design in which participants were randomly assigned to the experimental conditions. Participants were told that different screen-based games would be evaluated in the study and that all participants were randomly assigned to one of these games.

Game sequences. Two game sequences of a third-person action-adventure game[2] named "Bully" (Rockstar Games, 2006; outside North America the title of this game was changed to "Canis Canem Edit") were used. The action takes place at Bullworth Academy, a fictional boarding school. The protagonist in this game is Bullworth's new student, Jimmy Hopkins. As he advances through his academic career, Jimmy Hopkins can interact with the school's students and teachers, as well as with people from the neighborhood.

In the low-NPC-aggression sequence, the protagonist Jimmy Hopkins must find his way to the school building where he attends two classes, an arts lesson, and a fighting class. In the fighting class, the protagonist has the opportunity to practice his fighting skills. This game sequence contains a substantial amount of physical aggression (fist fighting and kicking) performed by the *player* character but little aggression performed by *NPC*. In the high-NPC-aggression sequence, Jimmy Hopkins is asked for help by his "friend"

Gary and follows him to the school's basement. On their way, Jimmy and Gary are attacked by fellow students and have to master some challenges together. At the end of the sequence, it turns out that Gary has lured Jimmy into a trap. The player character has to enter combat with the school's strongest and most violent bully, whom Gary has set against him. This game sequence contains physical aggression (fistfighting and kicking) perpetrated by both the player character and the NPCs. Additionally, the game sequence contains relational aggression (e.g., bad words and laughing at others) and betrayal of confidence displayed by NPCs toward the player character. These two situations obtained from a commercial game with violent content allowed manipulating the amount of aggression performed by NPCs while holding constant the amount of aggression performed by the player character.

Procedure. Upon giving informed consent, participants were randomly assigned to one of the four experimental conditions. First, they received some background information about the video game and the respective game sequence. Participants who actually played the game were instructed how to control the protagonist in the video game. At the beginning of the sequence, players were given the opportunity to become familiar with the controls for 3 min. All game sequences were recorded and used as experimental stimuli in the spectator condition (for a similar procedure, see Klimmt, Vorderer, & Ritterfeld, 2007; Polman, Orobio de Castro, & van Aken, 2008). In the spectator condition, each participant watched one of the game sequences from the player condition. Each game sequence was watched by 1 participant in the spectator condition. In all conditions, a 30-in. television screen was used. In the player condition, the screen was connected to a Sony Playstation II console.

After playing (or watching) the game sequence, participants were informed that they would now take part in two investment decision tasks. Participants learned that they would receive an inital endowment of 1 euro in each task and that both tasks would entail an opportunity to increase this amount. Thus, depending on participants' choices, the final payoff could be higher or lower than the initial endowment of 1 euro. Participants were further told that one of the two situations would be played with real money and that the amount of money they accumulated would be added to their payment at the end of the study. Which one of the two situations was played with real money and which was played with fake money would be randomly determined at the end of the study (for a similar procedure, see Fetchenhauer & Dunning, 2009). Participants were made to believe that their interaction partner had played (or watched) a different game than they did. This procedure was introduced to rule out an alternative explanation for detrimental effects of NPC aggression on trust and cooperation. If participants had believed that their cooperation partner played the same game as they did, trust expectations could have been affected by their subjective beliefs about detrimental effects of violence in video games.

Dependent variable: Cooperation. The first investment situation reflected a common goods dilemma situation. Participants received 1 euro from the experimenter; they were given the opportunity to invest any fraction of this amount in a common investment pool. Every amount that was invested in the common pool was tripled by the experimenter. The amount that was not invested in the common pool would be kept by participants and added to their final payoff. Additional to investing in this pool, each participant could randomly draw an investment from this pool that was made by one of the previous participants in the experiment. The tripled investment of this person would also be added to the participant's payoff. No deception was involved; that is, participants actually drew another person's investment decision by chance. This setup resembles a common goods dilemma situation that entails an implicit social contract: Investing money in the common pool would be the right thing to do to increase the payoff for all participants. However, investing money only pays off if other participants also invested money in the pool. Moreover, each participant could maximize his personal payoff by profiting from others' investments while not investing himself. A participant's final payoff in this first situation depended on two factors: (a) the amount of money the participant did not invest and kept for himself and (b) an unknown partner's investment in the common pool, which was tripled by the experimenter.

In addition to their own investment decision ("Which amount of your 1 euro do you want to invest in this situation?"), participants were asked about their expectations regarding other participants' investments in general ("How much do you think other people invest in this situation?"). Participants' responses to this second question reflected the degree to which they trusted in the cooperativeness of other participants in this situation. The order in which these two questions were asked was counterbalanced across participants. Investment decisions were fully anonymous: Participants did not receive information about each other's identity.

Risk tolerance. The second investment situation was introduced as a lottery game. Participants again received 1 euro from the experimenter. They could either keep this amount for themselves or use it to buy a lottery ticket. If they won that lottery, their investment would be tripled and they would receive 3 euros; if they lost, they would receive nothing. Participants were informed that the lottery was decided by blindly drawing a lot from a basket containing "win" and "lose" lots. Participants were asked to indicate the minimum number of the 100 lots in the basket that would have to be "win" lots for them to buy a lottery ticket and to participate in the lottery. To rule out the possibility that participants' investment decisions merely reflected differences in risk-taking behavior, this number was used as a measure of a participant's level of risk tolerance (for a similar procedure, see Fetchenhauer & Dunning, 2009).

Table 1. Content Analysis and Mean Ratings of Game Sequences in Study 1

	Content analysis				Ratings									
	Victim of aggressive acts		Perpetrator of aggressive acts		Game violence[a]		Aggressiveness of NPCs[a]		Aggressiveness of player character[b]		Game enjoyment[a]		Game difficulty[a]	
Game sequence	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
High NPC aggression	40**	19	134	54	4.24**	0.99	4.37**	0.80	3.43	1.34	2.37	1.20	1.27	1.03
Low NPC aggression	14**	10	115	78	3.59**	1.33	3.67**	1.03	3.48	1.20	2.50	1.43	1.52	1.30

Note: Means in content analysis reflect the average amount of aggressive acts (experienced as a victim or committed as a perpetrator by the player character) counted in a single game sequence. Ratings were made on a 6-point scale (0 = *not agree at all*, 5 = *fully agree*). NPC = nonplayer character.
[a]Ratings of players and spectators.
[b]Ratings of spectators.
**$p < .01$ (one-tailed).

Additional measures. After participants had made both decisions, they were given a questionnaire in which they were asked to rate the video game sequence on several dimensions including game violence (one item: "The game sequence was violent"), aggressiveness of NPCs in the game (one item: "Other characters in the game were aggressive"), aggressiveness of the player character in the game[3] (one item: "The main character in the game was aggressive"), game enjoyment (one item: "The game sequence was fun"), and game difficulty (one item: "The game sequence was difficult"). Mean ratings for the game sequences are presented in Table 1. Finally, all participants were informed that the first of the two investment situations would be played with real money. They then randomly drew another person's investment decision out of the pool of former participants' investments; received their payment, including their payoff from the experimental game; added their personal investment decision to the investment pool; and were finally probed for suspicion and fully debriefed.

Results

Manipulation checks. Eight participants suspected the study to be related to research on violent video games. Their data were excluded from further analyses.

Game sequences with aggressive NPCs ($M = 16.1$, $SD = 3.9$) and game sequences with nonaggressive NPCs ($M = 14.6$, $SD = 2.8$) did not differ with regard to total playing time $t(44) = 1.42$, $p = .16$, $d = 0.44$. All game sequences were both content-analyzed by a student coworker and rated by participants. Content analyses were conducted as follows: Aggressive acts in the recorded game sequences were counted and categorized depending on whether the player acted aggressively (perpetrator role) or experienced aggressiveness by NPCs (victim role). As expected, the video game sequences differed with respect to the number of aggressive acts experienced by the player character as a victim, $t(43) = 5.73$, $p < .001$, $d = 1.71$, but not by the amount of aggression performed by the player character as a perpetrator, $t(43) = 0.94$, $p = .35$, $d = 0.28$ (see Table 1).

Participants' ratings of the respective sequences were analyzed via 2 (low vs. high NPC aggression) × 2 (player vs. spectator) ANOVAs. As expected, the sequences differed in perceived game violence, $F(1, 88) = 7.20$, $p < .01$, $\eta^2 = .07$, and aggressiveness of NPCs, $F(1, 88) = 13.02$, $p < .001$, $\eta^2 = .12$. There were no significant differences in perceived game enjoyment, $F(1, 88) = 0.27$, $p = .61$, $\eta^2 = .01$, and game difficulty, $F(1, 88) = 1.18$, $p = .27$, $\eta^2 = .02$. None of these ratings depended on whether the rater was playing or watching the video game (all ps > .05). Furthermore and consistent with the results of our content analyses, spectator ratings of the player character's aggressiveness did not differ between the game sequences, $t(44) = 0.12$, $p = .91$, $d = 0.04$. Thus, game sequences differed with regard to the aggressiveness of NPCs but not with regard to the number of aggressive acts performed by the player character.

Cooperative behavior and trust. To analyze the effects of the experimental manipulation on cooperative behavior and expectations of trust, participants' investment and participants' expectation regarding other players' cooperation were analyzed via 2 (NPC aggression: low vs. high) × 2 (reception mode: player vs. spectator) × 2 (order of appearance of dependent variables) factorial between-subjects ANOVAs. The only significant effect was the two-way interaction between NPC aggression and reception mode, $F(1, 84) = 4.54$, $p = .04$, partial $\eta^2 = .05$ (see Figure 1). In the high-NPC-aggression condition, players invested less money ($M = 45.4$ euro cent, $SD = 28.8$) than in the low-NPC-aggression condition ($M = 66.1$ euro cent, $SD = 31.1$), $t(44) = –2.34$, $p = .02$, $d = 0.69$. However, when participants merely watched the sequences, their investment decisions did not differ between the two game sequence conditions, $t(44) = –0.50$, $p = .62$, $d = 0.12$.

Similar results were found for participants' expectations regarding other persons' investment decisions. Again, the only significant effect was the two-way interaction between

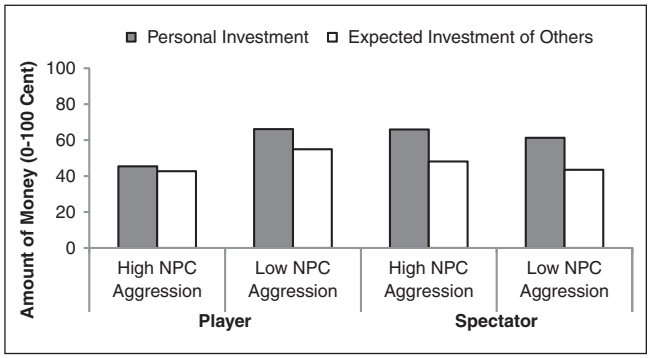

Figure 1. Mean personal investment and mean expected investment of other participants in the common goods dilemma depending on nonplayer character (NPC) aggression (high vs. low) and reception mode (player vs. spectator) in Study 1 (n = 23 in all four experimental conditions)

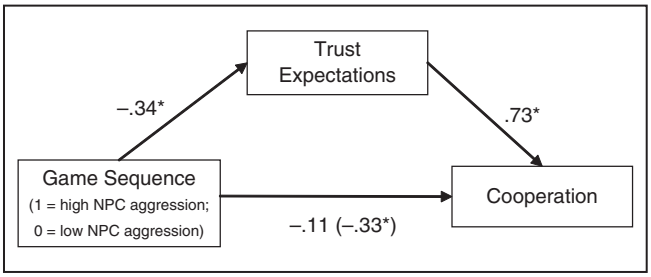

Figure 2. Test of the indirect effect of nonplayer character (NPC) aggression on cooperative behavior mediated by expectations of trust in Study 1
Note: Values are standardized regression weights.
*p < .05.

NPC aggression and reception mode, $F(1, 84) = 4.11$, $p < .05$, partial $\eta^2 = .05$ (see Figure 1). Participants who played the game sequence with high NPC aggression expected others to invest less money (M = 42.7 euro cent, SD = 18.6) than participants who played the game sequence with low NPC aggression (M = 54.9 euro cent, SD = 21.1), $t(44) = –2.09$, $p = .04$, $d = 0.61$. However, when participants merely watched the sequences, their expectations about other peoples' investments did not differ between the two game sequence conditions, $t(44) = –0.77$, $p = .44$, $d = 0.18$.

Risk tolerance. We submitted our genuine risk tolerance measure to a 2 (low vs. high NPC aggression) × 2 (player vs. spectator) factorial between-subjects ANOVA. No main or interaction effects were significant (all ps > .23). Thus, the aforementioned effects on participants' investment decisions are likely to reflect effects on cooperation but not on risk-taking behavior.

Mediation analysis. Finally, we tested whether the detrimental effect of NPC aggression on cooperation in the player condition is mediated by reduced trust in potential cooperation partners. The significance of this conditional indirect effect was tested by inspecting confidence intervals with standard errors that were estimated via bootstrapping (Preacher, Rucker, & Hayes, 2007). Indirect effects were modeled and tested in both conditions of reception mode (player and spectator condition). As expected, the indirect effect of NPC aggression on cooperation via reduced trust expectations was significant in the player condition, $\beta = –.18$; $SE(\beta) = 0.09$; 95% CI [–.006, –.378], but not in the spectator condition, $\beta = .08$; $SE(\beta) = 0.09$; 95% CI [–.098, .275]. To further analyze the indirect effect in the player condition, mediation analyses were computed based on Baron and Kenny's (1986) three-step procedure. Aggressiveness of NPCs in the video game stimulus was dummy coded (0 = low NPC aggression, 1 = high NPC aggression). The total effect of the game sequence manipulation on cooperation, $\beta = –.33$, $t(44) = –2.34$, $p = .02$, was substantially reduced by adding trust expectations into the regression equation, $\beta = –.11$, $t(43) = –1.11$, $p = .27$ (see Figure 2).

Discussion

Study 1 demonstrated that experiencing virtual aggression of NPCs in video games can decrease players' subsequent cooperative behavior. This effect only occurred when participants interacted with the aggressive agents by means of an avatar and thus experienced virtual aggression from a victim's perspective. No such effect occurred when participants watched the same game sequences from an observer's perspective. After playing a video game with highly aggressive NPCs, participants invested less money in a common pool than after playing a video game with low aggressiveness of NPCs. This effect was mediated by reduced trust in the cooperativeness of potential partners in the investment decision. The impact of virtual aggression on cooperative behavior could not be traced back to a mere increase in risk-taking behavior, since there was no effect of the experimental conditions on our risk tolerance measure.

Taken together, the results of Study 1 are in line with the SeMI model and support our reasoning that (a) players experience aggressiveness of NPCs toward their avatar in video games from a victim's perspective and (b) experiencing NPC aggression from a victim's perspective impairs trust and cooperation in subsequent situations.

An alternative explanation for the present findings has to be outlined at this point. Interactivity not only changes the perspective from which aggression of NPCs is perceived, but it also affects other psychologically relevant parameters: Game play, for example, requires a higher level of attention than watching a movie (Carnagey & Anderson, 2004). Players must typically focus their attention on the video game, whereas attention from television or movies can shift more easily. Thus, players should be focused more strongly on any potential act of aggression that is displayed on the screen and should process this information more deeply than spectators. Hence, although Study 1 shows that interactivity is a relevant precondition for effects of virtual aggression by NPCs

on cooperative behavior, there are at least two explanations for this effect. First, the effect could be due to heightened attention and more thorough information processing in the player condition. Second, this effect might reflect psychological processes that are related to experiencing virtual aggression from a victim's perspective in video games. The latter explanation is in line with the SeMI model. In Study 2 this interpretation is tested with a different approach.

Another limitation of Study 1 concerns the measurement of mistrust expectations as an indicator of a suspicious mind-set. Asking participants about their expectations of trust in the cooperativeness of other persons might have created an artificial demand effect on participants' own cooperation decisions, and vice versa. Although the order in which these two measures were assessed influenced neither cooperation nor expectation scores, it cannot be ruled out that the proximity of measurement artificially increased the correlation between expectations of trust and personal investment. Thus, we pursued a different rationale for measuring the underlying psychological process in Study 2.

Study 2

The aim of Study 2 was twofold. First, the underlying psychological processes of the effects found in Study 1 were investigated using a different method. Instead of measuring mediator variables and testing the mediation model using regression analyses, the dependent variable was measured in such a way that would allow for the inference of the relevant psychological processes. More specifically, different forms of cooperative behavior indicating different motivations for noncooperation were investigated simultaneously. In line with the SeMI model, we argue that the experience of NPC aggression impairs subsequent cooperation only if cooperation requires trust in the benevolence of a potential cooperation partner. Thus, we used a "trust game" (Berg, Dickhaut, & McCabe, 1995; Fetchenhauer & Dunning, 2009) in Study 2.

The second aim of Study 2 was to the test the assumption that victim sensitivity as a personality disposition moderates the effects of virtual aggression by NPCs on trust and cooperation. Testing this assumption is important for two reasons. First, the SeMI model predicts that people differ in their sensitivity to mean intentions and that victim sensitivity is an indicator of interindividual differences in sensitivity to mean intentions (Gollwitzer et al., 2005; Gollwitzer et al., 2009; Gollwitzer & Rothmund, 2009; Schmitt et al., 2005). In terms of the SeMI model, virtual aggression functions as a cue of untrustworthiness that activates a suspicious mind-set among victim-sensitive persons. Thus, the effects of exposure to NPC aggression should be stronger for people high in victim sensitivity.

Second, we argue that the effects of NPC aggression on trust impairment and reduced cooperation in video games are enhanced when NPC aggression is perceived from a victim's perspective. Empirical support for this notion was found in Study 1. NPC aggression reduced trust in cooperation partners and cooperative behavior after game play only when participants played the video game sequence and thus experienced NPC aggression from a victim's perspective. Another way to test this assumption is to use victim sensitivity as a dispositional moderator. A synergistic interaction between victim sensitivity and NPC aggression could be regarded as indirect evidence for our notion that NPC aggression in video games actually evokes cognitive and motivational processes related to a victim's perspective.

Method

Sample and design. Fifty-five male undergraduates (age: $M = 22.4$, $SD = 2.6$ years) participated in this experiment in return for 6 euros. All participants spoke German fluently. The study used a one-way (aggressiveness of NPCs: high vs. low) between-subjects design, and participants were randomly assigned to the experimental conditions.

Procedure and material. Participants played the same game sequences as in Study 1. All participants actually played the game (i.e., there was no "spectator" condition). Victim sensitivity was assessed approximately 10 days before the experiment (10 items; $\alpha = .80$; e.g., "I can't easily bear it when others profit unilaterally from me" and "It makes me angry when I am treated worse than others"). Response scales ranged from 0 (*totally disagree*) to 5 (*totally agree*). More information on this scale, its construction, and its measurement properties can be found in Schmitt et al. (2005).

After playing one of the two game sequences, participants were faced with a trust game (Berg et al., 1995; Fetchenhauer & Dunning, 2009) in which participants received 1 euro from the experimenter and could increase this amount of money depending on their investment decision and the investment decision of an unknown "partner." Participants received instructions for the trust game and were asked to make investment decisions in two roles (the truster and the trustee). Participants were further told that they played this investment situation with real money in one of the two roles and that the amount of money they accumulated would be added to their payment at the end of the study. Which of the two roles was played with real money and which was played with fake money would be randomly determined at the end of the study. Depending on the role in which they played with real money, a complementary partner's decision would then be randomly chosen out of the pool of former participants. Thus, participants who played the trust game with real money in the role of the truster randomly drew a trustee's decision and vice versa.

Dependent variables: Trust game. Trust games are asymmetrical two-person cooperation situations in which greed and fear of being exploited can be disentangled as potential motivations not to cooperate in social dilemma situations (see Kuwabara, 2005). The trust game we used was arranged as follows: One person (the "truster") could choose to transfer

money (any fraction between 0 and 1 euro) to another person (the "trustee"). The transferred amount was tripled by the experimenter. Without knowing his partner's investment, the trustee could decide to (a) keep the transferred money for himself or (b) divide the whole sum (i.e., his own 1 euro plus the transferred money plus the fraction that the truster did not transfer and kept for himself) equally between himself and his partner. This situation is structured so that noncooperation of the truster can be motivated only by fear of being exploited and not by greed, whereas noncooperation of the trustee can be motivated only by greed and not by fear of being exploited.

First, all participants had to decide how much money (0-100 euro cent) they wanted to transfer to their unknown partner if they were in the role of the truster. Depending on their partner's cooperativeness they could gain additional money by transferring money. Subsequently, they had to decide if they were willing to share the investment gain in case they happened to be in the role of the trustee.

Additional measures. Next, participants were asked to rate the video game sequence on several dimensions including game violence, aggressiveness of NPCs, game enjoyment, and game difficulty. The items were the same as in Study 1. Finally, participants themselves randomly drew lots for the role in which they would play the trust game with real money, and they drew their partner's decision out the pool of former participants' decisions. Finally, participants received their payment including their payoff from the experimental game, and they were probed for suspicion and debriefed.

Results

Manipulation check. Six participants suspected the study to be related to research on violent video games. Their data were excluded from further analyses. Participants' ratings of the game sequences were comparable to the pattern of results obtained in Study 1. Video game sequences differed in perceived game violence, $t(47) = 2.27$, $p = .03$, $d = 0.65$, and aggressiveness of NPCs, $t(47) = 3.01$, $p < .01$, $d = 0.86$. More precisely, in the high-NPC-aggression condition, the game was rated as more violent ($M = 4.79$, $SD = 1.06$) and NPCs were perceived as more aggressive ($M = 5.38$, $SD = 1.14$) than in the low-NPC-aggression condition (violence: $M = 3.84$, $SD = 1.77$; aggressiveness: $M = 4.20$, $SD = 1.56$). There were no significant differences in perceived game enjoyment, $t(47) = -1.49$, $p = .14$, $d = 0.38$, or game difficulty, $t(47) < -.01$, $p > .99$, $d = 0.06$.

Cooperative behavior. Separate analyses were calculated to investigate the effects of NPC aggression on participants' investment decisions in the role of a truster and in the role of a trustee. As expected, participants in the high-NPC-aggression condition transferred less money to their partners in the role of a truster ($M = 71.4$ euro cent, $SD = 28.0$) than participants in the low-NPC-aggression condition ($M = 86.4$ euro cent, $SD = 19.9$). This difference was significant, $t(47) = 2.18$, $p = .04$, $d = 0.62$. Participants' willingness to share their payoff with their partner did not differ between the two conditions, $\chi^2(1, N = 49) = 0.67$, $p = .67$. In the high-NPC-aggression condition 91.7% of the participants decided to share their payoff, whereas in the low-NPC-condition 84.0% decided to do so. Exposure to NPC aggression thus enhanced fear of being exploited (game effect on initial transfer of money as truster) but did not enhance greed (willingness to share payoff as trustee).

Victim sensitivity as a personality moderator. We hypothesized that the effect of NPC aggression on cooperation is moderated by individual differences in victim sensitivity. According to the SeMI model, people high in victim sensitivity should react more strongly to the experience of aggression by NPCs than people low in victim sensitivity. This hypothesis was tested via moderated regression analyses. Victim sensitivity was *z*-standardized (cf. Aiken & West, 1991), and the experimental condition was contrast coded such that a value of –1 indicated the low-NPC-aggression condition and a value of +1 indicated the high-NPC-aggression condition. Victim sensitivity, experimental condition, and their respective interaction term were entered into the regression model.

The entire model explained 22% of the variance in cooperation (i.e., money transferred in the role of the truster), $F(3, 45) = 4.17$, $p = .01$. The main effect of experimental condition, $\beta = -.31$, $t(45) = -2.24$, $p = .03$, was qualified by a significant Victim Sensitivity × Condition interaction effect, $\beta = -.35$, $t(45) = 2.38$, $p = .02$, $\Delta R^2 = .10$. In line with our hypotheses, exposure to high NPC aggression reduced trustees' investment only among people high in victim sensitivity (+1 *SD*), $t(45) = 3.55$, $p = .001$, but not among people low in victim sensitivity (–1 *SD*), $t(45) = 0.18$, $p = .86$. Moreover, simple slope analyses revealed that in the high-NPC-aggression condition participants high in victim sensitivity transferred less money to their unknown partner than participants low in victim sensitivity, $\beta = -.46$, $t(45) = 2.77$, $p = .01$. In the low-NPC-aggression condition, however, victim sensitivity was unrelated to the amount of money transferred, $\beta = .05$, $t(45) = 0.24$, $p = .81$ (see Figure 3).

Discussion

The findings from Study 1 were replicated and further qualified in Study 2: Virtual aggression by NPCs in video games decreased cooperative behavior in a subsequent socially uncertain situation. In Study 2, a trust game was used to assess cooperative behavior, which provided the opportunity to disentangle two motivations for noncooperation: greed and fear of being exploited. Participants were faced with two cooperation decisions, reflecting two roles in the trust game. One decision (i.e., the role of the truster) reflected a situation in which a participant's cooperation could be exploited by an unknown partner. Thus, noncooperation of trusters would indicate the motivation to avoid being exploited in this

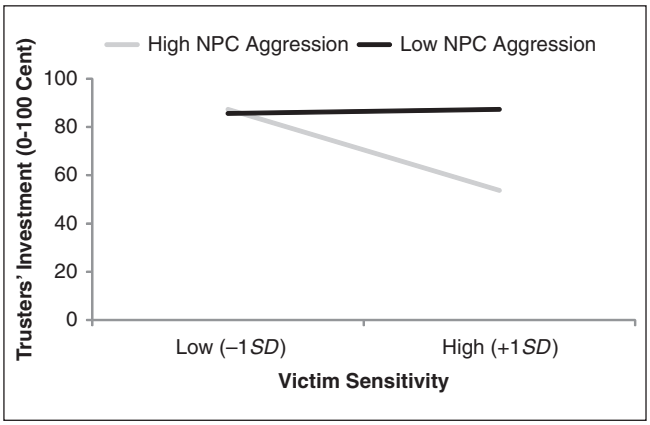

Figure 3. Interaction of Nonplayer Character (NPC) Aggression × Victim Sensitivity on trusters' investment in the trust game in Study 2

situation. The complementary decision (i.e., the role of the trustee) reflected a situation in which participants themselves could exploit the cooperativeness of an unknown partner. Noncooperation of trustees would thus indicate greed or the motivation to gain as much money as possible.

Playing the video game sequence with highly aggressive NPCs reduced subsequent cooperation of *trusters,* but not of *trustees.* Two conclusions can be drawn from this result: First, the finding that virtual aggression reduced cooperation of *trusters* suggests that the link between experienced virtual aggression in the video game sequence and reduced cooperation is related to increased mistrust in potential cooperation partners. This interpretation is in line with Study 1, in which reduced expectations of trust mediated the effect of NPC aggression on cooperation. Second, the finding that virtual aggression did not reduce cooperation of *trustees* indicates that the effect is not due to a general process of moral desensitization (Funk, 2005; Funk, Baldacci, Pasold, & Baumgardner, 2004; Funk, Buchman, et al., 2003). However, one might argue that the greed measure may not have been powerful enough to detect effects of the experimental manipulation since it was merely measured in a binary fashion (sharing vs. no sharing). This was done to stick as closely as possible to earlier applications of the same procedure (e.g., Fetchenhauer & Dunning, 2009). Moreover, all participants were first put in the role of a truster and then in the role of a trustee. Thus, sequence effects cannot be entirely ruled out.

Study 2 also shows that the effect of virtual aggression on subsequent cooperation is moderated by victim sensitivity. Trust in a partner's cooperativeness was reduced more strongly after exposure to virtual aggression among people high in victim sensitivity than among people low in victim sensitivity. This finding is in line with predictions from the SeMI model and related results (Gollwitzer et al., 2005, 2009; Gollwitzer & Rothmund, 2009). It also supports the assumption that players experience aggressiveness of NPCs toward their avatar in video games from a victim's perspective and that experiencing NPC aggression from a victim's perspective enhances hostile information processing and fear of being exploited.

General Discussion

The present studies address the question whether experiencing NPC aggression from a victim's perspective can impair subsequent cooperation in socially uncertain situations because of enhanced hostile information processing. Our empirical assumptions are drawn from applying the SeMI model (Gollwitzer & Rothmund, 2009) to research on the effects of violent video games.

In Study 1, interacting with aggressive NPCs in video games reduced cooperative behavior in a subsequent common goods dilemma situation. As predicted, these effects were stronger when participants actually experienced virtual aggression from a victim's perspective than when they merely watched the same interactions on screen. Reduced expectations of trust mediated this effect, indicating that the underlying psychological process was related to hostile information processing. In Study 2, this assumption was tested more directly by using the same video game sequences but a different dependent variable. Findings from Study 2 show that trusting behavior was impaired by the interaction with aggressive NPCs in the game sequence and that this effect was moderated by victim sensitivity. Both findings are in line with the SeMI model.

The present studies add to the body of research on violent media effects. More precisely, they enrich the empirical literature on effects of video game violence on hostile information processing and subsequent behavior. A substantial number of studies demonstrate that exposure to violence in video games can enhance hostile information processing (e.g., a hostile expectation bias) and thus increases the likelihood of aggressive conduct. Our studies expand this line of research in a threefold manner.

First, it has been demonstrated that hostile information processing not only mediates effects of game violence on aggressive behavior (Bartholow et al., 2005; Möller & Krahé, 2009) but also accounts for effects of virtual aggression on social cooperation. Both studies indicate that exposure to aggressive agents in video games can impair subsequent cooperation because of enhanced mistrust and fear of being exploited. Hostile information processing thus provides a theoretical explanation for detrimental effects of virtual violence on prosocial behavior in socially uncertain situations. This explanation complements other theoretical models that account for effects of violent media on prosocial behavior (e.g., moral desensitization; Funk, 2005; Funk et al., 2003, 2004).

Second, both studies indicate that detrimental effects of virtual aggression can be enhanced when players perceive NPC aggression from a victim's perspective in interactive media. Study 1 demonstrated that virtual aggression against

the player's character in the game decreased participants' trust in potential cooperation partners only when they actively controlled the avatar in the game sequence. There were no such effects when participants watched the same amount of virtual aggression on screen from the perspective of an observer. This finding corresponds with other studies indicating that there are perspective-related psychological reactions to aggression and injustice (Mikula, 1994; Mikula et al., 1990; Rosen et al., 2007). In line with this interpretation, Study 2 showed that detrimental effects of experienced virtual aggression from a victim's perspective are stronger for persons who are dispositionally victim sensitive. To the best of our knowledge, this is the first empirical research that demonstrates how detrimental effects of virtual violence exposure are connected to players' experience of victimization and threat in video games. The present findings indicate that focusing on the player's perspective as a victim of aggression increases our understanding of how interactivity can enhance effects of media violence in video games.

Third, although prominent theories such as the general aggression model (Anderson & Carnagey, 2004; Anderson & Huesmann, 2003) propose differential effects of media violence, little empirical research has been done in this area. The present studies demonstrate that people who are sensitive to mean intentions react more strongly to experienced aggressiveness in a video game. According to social cognitive approaches in research on personality (Cervone, 2004; Cervone & Shoda, 1999; Mischel, 1973), this finding can be interpreted such that suspicious cognitive and motivational structures are chronically accessible in persons who are high in victim sensitivity and thus can be triggered more easily by virtual aggression in video games. Moreover, the present findings direct attention toward personality dispositions that have been neglected in past research on violent media effects. Dispositional accessibility of suspicious cognitive structures can reflect an important moderator of violent media effects, especially in interactive media.

In the present studies we used an experimental design to demonstrate causal effects of virtual aggression on hostile information processing and social cooperation. However, there are some weaknesses connected to this approach that need to be addressed. First, a prominent criticism of experimental studies on violent media effects regards a lack of external validity of the empirical findings. In the present studies we only used male participants. This was done because pretests indicated that a substantial proportion of women were not experienced with the controls in the video game. To decrease error variance due to problems with controlling the avatar, only male participants were included in the study. Thus, future research needs to show that our effects can be generalized to females. Second, we do not know how long these effects outlast exposure to virtual violence. Detrimental effects were measured directly after video game exposure. Thus, we cannot rule out the possibility that the duration of effects is very short. Third, this experimental approach does not allow for predictions regarding the effects of repeated and long-term exposure to violent video games. The present studies show that exposure to NPC aggression can enhance the activation of a suspicious mind-set and decreases cooperation immediately after game play. However, we do not know whether long-term exposure to NPC aggression can change relevant personality dispositions. Thus, an important question for future research regards the question of whether chronic exposure to NPC aggression affects trust and victim sensitivity in the long run. Interestingly, different predictions can be derived from prominent theoretical accounts in media violence research. According to social learning theory (Bandura, 2001), chronic exposure to NPC aggression should enhance mistrust expectations and decrease generalized trust expectations (Rotter, 1971). Thus, long-term exposure to NPC aggression should decrease social cooperation because of heightened accessibility of suspicious cognitive and motivational structures. On the other hand, research on moral desensitization (Funk, 2005; Funk et al., 2003, 2004) indicates that repeated exposure to media violence can lead to habituation and desensitization toward aggressive stimuli. Consequently, one can assume that frequent exposure to aggressive and hostile agents in video games might lead to (a) desensitization toward NPC aggression as cues of hostility or (b) desensitization toward cues of untrustworthiness in general and thus to decreased victim sensitivity. We are currently planning longitudinal studies to test these contradictory hypotheses.

On a broader level, our studies reaffirm empirical findings that interacting with virtual agents can trigger similar moral reactions as interactions with humans do (e.g., Hartmann & Vorderer, 2010; Reeves & Nass, 1997). In the case of video game violence, it is noteworthy that players enter these virtual environments and the confrontation to victimization voluntarily and for the purpose of enjoyment (Vorderer & Bryant, 2006). Although users certainly do not strive for the detrimental effects found in the present and many other studies, an important research perspective is how the fun of playing is related to experiences of being victimized by aggressive NPCs. Many violent video games offer opportunities to take revenge or restore justice after such NPC violence, which potentially has consequences for both video game appreciation and the subsequent game violence effects on cooperation behavior. A further integration of concepts from social psychology (e.g., the SeMI model) and media psychology (e.g., models of media enjoyment; cf. Vorderer, Klimmt, & Ritterfeld, 2004) thus emerges as a promising pathway for further research on violent video game effects.

Authors' Note

We thank Friederike Krümke, Tobias Hartmüller, Judith Götz, Jens Bender, Maxim Egorov, Luise Hamann, and Christine Roser for

their help in planning and conducting the studies. Furthermore, we thank Anna Baumert and Jane Thompson for important comments on an earlier version of this article.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interests with respect to the authorship and/or publication of this article.

Financial Disclosure/Funding

The authors disclosed receipt of the following financial support for the research and/or authorship of this article: A German Research Foundation (Deutsche Forschungsgemeinschaft) grant to Mario Gollwitzer and Christoph Klimmt.

Notes

1. Although in single-player video games all characters (except for the player's avatar) are nonplayer agents, in multiplayer video games a player can encounter both other players' avatars and nonplayer agents. In the present studies, single-player video games were used. Accordingly, there were no player characters besides the avatars that were controlled by the participants of the experiments.
2. Action-adventure games represent a popular class of video games. Although violence and aggression are main features of game play, these games typically allow for multiple forms of social interactions. In other words, avatars and agents are not restricted to fighting actions. A famous example of this class of video games is the Grand Theft Auto series (which has been released by the same company that also produced Bully, i.e., Rockstar Games). Grand Theft Auto IV, the latest product of this series, has been sold more than 15 million times around the globe (Take-Two Interactive Software Inc., New York, NY).
3. Aggressiveness of main characters was rated by spectators but not by players.

References

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.

Anderson, C. A. (2004). An update on the effects of playing violent video games. *Journal of Adolescence, 27*, 113-122.

Anderson, C. A., Anderson, K. B., & Deuser, W. E. (1996). Examining an affective aggression framework: Weapon and temperature effects on aggressive thoughts, affect, and attitudes. *Personality and Social Psychology Bulletin, 22*, 366-377.

Anderson, C. A., & Bushman, B. J. (2001). Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature. *Psychological Science, 12*, 353-359.

Anderson, C. A., & Carnagey, N. L. (2004). Violent evil and the general aggression model. In A. Miller (Ed.), *The social psychology of good and evil* (pp. 168-192). New York, NY: Guilford.

Anderson, C. A., & Huesmann, L. R. (2003). Human aggression: A social-cognitive view. In M. A. Hogg & J. Cooper (Eds.), *The handbook of social psychology* (Rev. ed., pp. 296-326). Thousand Oaks, CA: Sage.

Anderson, C. A., & Murphy, C. R. (2003). Violent video games and aggressive behavior in young women. *Aggressive Behavior, 29*, 423-429.

Anderson, C. A., Shibuya, A., Ihori, N., Swing, E. L., Bushman, B. J., Sakamoto, A., . . . , Saleem, M. (2010). *Psychological Bulletin, 136*, 151-173.

Bailenson, J. N., & Blascovich, J. (2004) Avatars. In Claude Ghaoui (Ed.), *Encyclopedia of human-computer interaction* (pp. 64-68). Great Barrington, MA: Berkshire.

Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology. 52,* 1-26.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182.

Bartholow, B. D., Sestir, M. A., & Davis, E. B. (2005). Correlates and consequences of exposure to video game violence: Hostile personality, empathy, and aggressive behavior. *Personality and Social Psychology Bulletin, 31*, 1573-1586.

Berg, J., Dickhaut, J., & McCabe, K. (1995). Trust, reciprocity and social history. *Games and Economic Behavior, 10*, 122-142.

Berkowitz, L. (1993). *Aggression. Its causes, consequences, and control*. Philadelphia, PA: Temple University Press.

Bushman, B. J., & Anderson, C. A. (2002). Violent video games and hostile expectations: A test of the general aggression model. *Personality and Social Psychology Bulletin, 28*, 1679-1686.

Bushman, B. J., & Anderson, C. A. (2009). Comfortably numb: Desensitizing effects of violent media on helping others. *Psychological Science, 20*, 273-277.

Carnagey, N. L., & Anderson, C. A. (2004). Violent video game exposure and aggression: A literature review. *Minerva Psichiatrica, 45*, 1-18.

Carver, C. S. (1996). Emergent integration in contemporary personality psychology. *Journal of Research in Personality, 30*, 319-334.

Cervone, D. (2004). The architecture of personality. *Psychological Review, 111*, 183-204.

Cervone, D., & Shoda, Y. (1999). *The coherence of personality*. New York, NY: Guilford.

Crick, N., & Dodge, K.A. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin, 115*, 74-101.

Dawes, R. (1980). Social dilemmas. *Annual Review of Psychology, 31*, 169-193.

Deutsch, M. (1958). Trust and suspicion. *Journal of Conflict Resolution, 2*, 265-279.

Dietz, T. L. (1998). An examination of violence and gender role portrayals in video games: Implications for gender socialization and aggressive behavior. *Sex Roles, 38*, 425-442.

Dodge, K. A. (1980). Social cognition and children's aggressive behavior. *Child Development, 51*, 162-170.

Donath, J. (2007). Virtually trustworthy. *Science*, *317*, 53-54.

Eastin, M. S., & Griffiths, R. P. (2006). Beyond the shooter game: Examining presence and hostile outcomes among male game players. *Communication Research, 33*, 448-466.

Elliot, A. J., & Friedman, R. (2007). Approach-avoidance: A central characteristic of personal goals. In B. R. Little, K. Salmela-Aro, & S. D. Phillips (Eds.), *Personal project pursuit* (pp. 97-118). Mahwah, NJ: Lawrence Erlbaum.

Ferguson, C. J. (2007). Evidence for publication bias in video game violence effects literature: A meta-analytic review. *Aggression and Violent Behavior, 12*, 470-482.

Fetchenhauer, D., & Dunning, D. (2009). Do people trust too much or too little? *Journal of Economic Psychology, 30*, 263-276.

Fiske, S. T., & Taylor, S. E. (2008). *Social cognition: From brains to culture*. Boston, MA: McGraw-Hill.

Funk, J. B. (2005). Children's exposure to violent video games and desensitization to violence. *Child and Adolescent Psychiatric Clinics of North America, 14*, 387-404.

Funk, J. B., Baldacci, H. B., Pasold, T., & Baumgardner, J. (2004). Violence exposure in real-life, video games, television, movies, and the Internet: Is there desensitization? *Journal of Adolescence, 27*, 23-39.

Funk, J. B., Buchman, D. D., Jenks, J., & Bechtoldt, H. (2003). Playing violent video games, desensitization, and moral evaluation in children. *Journal of Applied Developmental Psychology, 24*, 413-436.

Garau, M., Slater, M., Pertaub, D.-P., & Razzaque, S. (2005). The responses of people to virtual humans in an immersive virtual environment. *PRESENCE: Teleoperators and Virtual Environments, 14*, 104-116.

Gollwitzer, M., & Rothmund, T. (2009). When the need to trust results in unethical behavior: The sensitivity to mean intentions (SeMI) model. In D. De Cremer (Ed.), *Psychological perspectives on unethical behavior and decision making* (pp. 135-152). Charlotte, NC: Information Age.

Gollwitzer, M., Rothmund, T., Pfeiffer, A. & Ensenbach, C. (2009). Why and when justice sensitivity leads to pro- and antisocial behavior. *Journal of Research in Personality, 43*, 999-1005.

Gollwitzer, M., Schmitt, M., Schalke, R., Maes, J., & Baer, A. (2005). Asymmetrical effects of justice sensitivity perspectives on prosocial and antisocial behavior. *Social Justice Research, 18*, 183-201.

Haninger, K., & Thompson, K. M. (2004). Content and ratings of teen-rated video games. *Journal of the American Medical Association, 291,* 856-865.

Hartmann, T., & Vorderer, P. (2010). It's okay to shoot a character. Moral disengagement in violent video games. *Journal of Communication, 60*, 94-119.

Jo, E., & Berkowitz, L. (1994). A priming effect analysis of media influences: An update. In J. Bryant & D. Zillmann (Eds.), *Media effects: Advances in theory and research* (pp. 43-60). Hillsdale, NJ: Erlbaum.

Kirsh, S. J. (1998). Seeing the world through Mortal Kombat-colored glasses: Violent video games and the development of a short-term hostile attribution bias. *Childhood: A Global Journal of Child Research, 5*, 177-184.

Kirsh, S. J., & Mounts, J. R. W. (2007). Violent video game play impacts facial emotion recognition. *Aggressive Behavior, 33*, 353-358.

Kirsh, S. J., Mounts, J. R. W., & Olczak, P. V. (2006). Violent media consumption and the recognition of dynamic facial expression. *Journal of Interpersonal Violence, 21*, 571-584.

Kirsh, S. J., Olczak, P. V., & Mounts, J. R. W. (2005). Violent Video games induce an affect processing bias. *Media Psychology, 7*, 239-250.

Klimmt, C., & Trepte, S. (2003). Theoretical and methodological shortcomings of research in media psychology about the effects of violent video games on aggression. *Zeitschrift fur Medienpsychologie, 15*(4), 114-121.

Klimmt, C., Vorderer, P., & Ritterfeld, U. (2007). Interactivity and generalizability: New media, new challenges. *Communication Methods and Measures*, *1*(3), 169-179.

Komorita, S. S., & Parks, C. D. (1995). Interpersonal relations: Mixed-motive interaction. *Annual Review of Psychology, 46,* 183-207.

Kuwabara, K. (2005). Nothing to fear but fear itself: Fear of fear, fear of greed and gender effects in two-person asymmetric social dilemmas. *Social Forces, 84*, 1257-1272.

Markey, P. M., & Scherer, K. (2009). An examination of psychoticism and motion capture controls as moderators of the effects of violent video games. *Computers in Human Behavior, 25*, 407-411.

Mikula, G. (1994). Perspective-related differences in interpretations of injustice by victims and victimizers: A test with close relationships. In M. J. Lerner & G. Mikula (Eds.), *Entitlement and the affectionate bond* (pp. 175-203). New York, NY: Plenum.

Mikula, G., Petri, B., & Tanzer, N. K. (1990). What people regard as unjust: Types and structures of everyday experiences of injustice. *European Journal of Social Psychology, 20*, 133-149.

Mischel, W. (1973). Toward a cognitive social learning reconceptualization of personality. *Psychological Review, 80*, 252-283.

Möller, I., & Krahé, B. (2009). Exposure to violent video games and aggression in German adolescents: A longitudinal analysis. *Aggressive Behavior, 35*, 75-89.

Polman, H., Orobio de Castro, B. O., & van Aken, M. A. G. (2008). Experimental study of the differential effects of playing versus watching violent video games on children's aggressive behavior. *Aggressive Behavior, 34*, 256-264.

Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Assessing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research, 42*, 185-227.

Reeves, B., & Nass, C. (1997). *The media equation. How people treat computers, television and new media like real people and places*. Stanford, CA: Center for the Study of Language and Information (CSLI) Publishing.

Rosen, P., Milich, R., & Harris, M. (2007). Victims of their own cognitions: Implicit social cognitions, emotional distress, and peer victimization. *Journal of Applied Developmental Psychology*, *28*, 211-226.

Rotter, J. B. (1971). Generalized expectancies for interpersonal trust. *American Psychologist, 26,* 443-452.

Schmitt, M., Gollwitzer, M., Maes, J., & Arbach, D. (2005). Justice sensitivity: Assessment and location in the personality space. *European Journal of Psychological Assessment, 21*, 202-211.

Sheese, B. E., & Graziano, W. G. (2005). Deciding to defect: The effects of video-game violence on cooperative behavior. *Psychological Science, 16*, 354-357.

Sherry, J. L. (2001). The effects of violent video games on aggression: A meta-analysis. *Human Communication Research, 27*, 409-431.

Slater, M., Guger, C., Edlinger, G., Leeb, R., Pfurtscheller, G., Antley, A., . . . Friedman, D. (2006). Analysis of physiological responses to a social situation in an immersive virtual environment. *PRESENCE: Teleoperators and Virtual Environments, 15*, 553-569.

Smith, S. L., Lachlan, K., & Tamborini, R. (2003). Popular video games: Quantifying the presentation of violence and its context. *Journal of Broadcasting and Electronic Media, 47*, 58-76.

Vohs, K. D., Baumeister, R. F., & Chin, J. (2007). Feeling duped: Emotional, motivational, and cognitive aspects of being exploited by others. *Review of General Psychology, 11*, 127-141.

Vorderer, P., & Bryant, J. (Eds.). (2006). *Playing video games: Motives, responses, and consequences*. Mahwah, NJ: Erlbaum.

Vorderer, P., Klimmt, C., & Ritterfeld, U. (2004). Enjoyment: At the heart of media entertainment. *Communication Theory, 14*, 388-408.

Weber, J. M., Kopelman, S., & Messick, D. M., (2004). A conceptual review of decision making in social dilemmas: Applying a logic of appropriateness. *Personality and Social Psychology Review, 8*, 281-307.

Yamagishi, T., & Sato, K. (1986). Motivational bases of the public goods problem. *Journal of Personality and Social Psychology, 50*, 67-73.