



Causal effects of violent sports video games on aggression: Is it competitiveness or violent content?

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ABSTRACT

Three experiments examined the impact of excessive violence in sport video games on aggression-related variables. Participants played either a nonviolent simulation-based sports video game (baseball or football) or a matched excessively violent sports video game. Participants then completed measures assessing aggressive cognitions (Experiment 1), aggressive affect and attitudes towards violence in sports (Experiment 2), or aggressive behavior (Experiment 3). Playing an excessively violent sports video game increased aggressive affect, aggressive cognition, aggressive behavior, and attitudes towards violence in sports. Because all games were competitive, these findings indicate that violent content uniquely leads to increases in several aggression-related variables, as predicted by the General Aggression Model and related social-cognitive models.

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In 2002, ESPN aired an investigative piece examining the impact of excessively violent sports video games on youth's attitudes towards sports (ESPN, 2002). At the time, Midway Games produced several sports games (e.g., NFL Blitz, MLB Slugfest, and NHL Hitz) containing excessive and unrealistic violence, presumably to appeal to non-sport fan video game players. These games were officially licensed by the National Football League, Major League Baseball, and the National Hockey League, which permitted Midway to implement team logos, players' names, and players' likenesses into the games. Within these games, players control real-life athletes and can perform excessively violent behaviors on the electronic field. The ESPN program questioned why the athletic leagues would allow their license to be used in this manner and what effect these violent sports games had on young players. Then in December 2004, the NFL granted exclusive license rights to EA Sports (ESPN.com, 2005). In response, Midway Games began publishing a more violent, grittier football game based on a fictitious league. The new football video game, which is rated appropriate only for people seventeen and older, features fictitious players engaging in excessive violent behaviors on and off the field, drug use, sex, and gambling (IGN.com, 2005).

Violence in video games has been a major social issue, not limited to violence in sports video games. Over 85% of the games on

the market contain some violence (Children Now, 2001). Approximately half of video games include serious violent actions toward other game characters (Children Now, 2001; Dietz, 1998; Dill, Gentile, Richter, & Dill, 2005). Indeed, Congressman Joe Baca of California recently introduced Federal legislation to require that violent video games contain a warning label about their link to aggression (Baca, 2009).

Since 1999, the amount of daily video game usage by youth has nearly doubled (Roberts, Foehr, & Rideout, 2005). Almost 60% of American youth from ages 8 to 18 report playing video games on "any given day" and 30% report playing for more than an average of an hour a day (Roberts et al., 2005). Video game usage is high in youth regardless of sex, race, parental education, or household income (Roberts et al., 2005).

Competition-only versus violent-content hypotheses

Recent meta-analyses (e.g., Anderson et al., 2004, submitted for publication) have shown that violent video game exposure increases physiological arousal, aggressive affect, aggressive cognition, and aggressive behavior. Other studies link violent video game play to physiological desensitization to violence (e.g., Bartholow, Bushman, & Sestir, 2006; Carnagey, Anderson, & Bushman, 2007). Particularly interesting is the recent finding that violent video game play can increase aggression in both short and long term contexts.

Besides the empirical evidence, there are strong theoretical reasons from the cognitive, social, and personality domains to expect

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violent video game effects on aggression-related variables. However, currently there are two competing hypotheses as to how violent video games increases aggression: the violent-content hypothesis and the competition-only hypothesis.

General Aggression Model and the violent-content hypothesis

The General Aggression Model (GAM) is an integration of several prior models of aggression (e.g., social learning theory, cognitive neoassociation) and has been detailed in several publications (Anderson & Bushman, 2002; Anderson & Carnagey, 2004; Anderson, Gentile, & Buckley, 2007; Anderson & Huesmann, 2003). GAM describes a cyclical pattern of interaction between the person and the environment. Input variables, such as provocation and aggressive personality, can affect decision processes and behavior by influencing one's present internal state in at least one of three primary ways: by influencing current cognitions, affective state, and physiological arousal. That is, a specific input variable may directly influence only one, or two, or all three aspects of a person's internal state. For example, uncomfortably hot temperature appears to increase aggression primarily by its direct impact on affective state (Anderson, Anderson, Dorr, DeNeve, & Flanagan, 2000). Of course, because affect, arousal, and cognition tend to influence each other, even input variables that primarily influence one aspect of internal state also tend to indirectly influence the other aspects.

Although GAM is a general model and not specifically a model of media violence effects, it can easily be applied to media effects. Theoretically, violent media exposure might affect all three components of present internal state. Research has shown that playing violent video games can temporarily increase aggressive thoughts (e.g., Kirsh, 1998), affect (e.g., Ballard & Weist, 1996), and arousal (e.g., Calvert & Tan, 1994). Of course, nonviolent games also can increase arousal, and for this reason much prior work has focused on testing whether violent content can increase aggressive behavior even when physiological arousal is controlled. This usually is accomplished by selecting nonviolent games that are equally arousing (e.g., Anderson et al., 2004).

Despite's GAM's primary focus on the current social episode, it is not restricted to short-term effects. With repeated exposure to certain types of stimuli (e.g., media violence, certain parenting practices), particular knowledge structures (e.g., aggressive scripts, attitudes towards violence) become chronically accessible. Over time, the individual employs these knowledge structures and occasionally receives environmental reinforcement for their usage. With time and repeated use, these knowledge structures gain strength and connections to other stimuli and knowledge structures, and therefore are more likely to be used in later situations. This accounts for the finding that repeatedly exposing children to media violence increases later aggression, even into adulthood (Anderson, Sakamoto, Gentile, Iori, & Shibuya, 2008; Huesmann & Miller, 1994; Huesmann, Moise-Titus, Podolski, & Eron, 2003; Möller & Krahe, 2009; Wallenius & Punamaki, 2008). Such long-term effects result from the development, automatization, and reinforcement of aggression-related knowledge structures. In essence, the creation and automatization of these aggression-related knowledge structures and concomitant emotional desensitization changes the individual's personality. For example, long-term consumers of violent media can become more aggressive in outlook, perceptual biases, attitudes, beliefs, and behavior than they were before the repeated exposure, or would have become without such exposure (e.g., Funk, Baldacci, Pasold, & Baumgardner, 2004; Gentile, Lynch, Linder, & Walsh, 2004; Krahe & Möller, 2004; Uhlmann & Swanson, 2004).

In sum, GAM predicts that one way violent video games increase aggression is by the violent content increasing at least one

of the aggression-related aspects of a person's current internal state (short-term context), and over time increasing the chronic accessibility of aggression-related knowledge structures. This is the violent-content hypothesis.

The competition hypothesis

The competition hypothesis maintains that competitive situations stimulate aggressiveness. According to this hypothesis, many previous short-term (experimental) video game studies have found links between violent games and aggression not because of the violent content, but because violent video games typically involve competition, whereas nonviolent video games frequently are noncompetitive.

The competitive aspect of video games might increase aggression by increasing arousal or by increasing aggressive thoughts or affect. Previous research has demonstrated that increases in physiological arousal can cause increases in aggression under some circumstances (Berkowitz, 1993). Competitive aspects of violent video games could also increase aggressive cognitions via links between aggressive and competition concepts (Anderson & Morrow, 1995; Deutsch, 1949, 1993). Thus, at a general level such competition effects are entirely consistent with GAM and with the violent-content hypothesis. However, a strong version of the competition hypothesis states that violent content has no impact beyond its effects on competition and its sequela. This strong version, which we call the *competition-only hypothesis*, has not been adequately tested.

Testing the competition-only hypothesis

There has been little research conducted to examine the violent-content hypothesis versus the competition-only hypothesis (see Carnagey & Anderson, 2005 for one such example). To test these hypotheses against each other, one must randomly assign participants to play either violent or nonviolent video games, all of which are competitive. The use of sports video games meets this requirement and has other benefits. Excessively violent sports games still obey the basic rules of the sport that they simulate. For example, MLB Slugfest utilizes the basic rules of baseball (e.g., three outs per half inning, one run scored for each player who crosses home plate). However, it includes violence in the game that would not be found in a regulation Major League Baseball event (e.g., assaulting other players without penalty, throwing baseballs covered in fire). Thus, excessively violent sports games and their same-sport counterparts allow a clean test of the competition-only versus the violent content hypotheses. The competition-only hypothesis predicts that violent and nonviolent sports game groups of participants will not differ on any aggression-related variables measured after gameplay, because both types of games are competitive. However, the violent-content hypothesis predicts that participants who play excessively violent sports video games will display higher levels of at least one aggression-related internal state variable (aggressive cognition, aggressive affect, or physiological arousal) and aggressive behavior, relative to participants who play a nonviolent, simulation-based sports game. Although GAM does not specify which internal states are affected by a particular aggression-enhancing stimulus, prior research suggests that violent video games (relative to matched nonviolent games) can differentially increase both aggressive cognition and aggressive affect even when physiological arousal is controlled.

Overview

Three experiments tested the violent-content hypothesis versus the competition-only hypothesis by examining the impact of

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