

# Media, Violence, Aggression, and Antisocial Behavior: Is the Link Causal?

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## Scientific Discourse Versus Popular Discourse

### Aggression, Violence, and Media Violence

The terms “aggression” and “violence” mean different things to the general public and to researchers. To the layperson, “aggression” can mean “assertive” (e.g., a pushy salesperson), “competitive” (an athlete determined to win), or “hostile” (a soldier attacking an enemy). In these examples, the salesperson and the athlete are not intending to harm anyone, placing them outside the definition of aggression used by researchers: a behavior intended to harm someone who does not wish to be harmed (Baron & Richardson, 1994).

Most researchers conceptualize aggression along a continuum ranging from mild (e.g., a hurtful remark) to extreme (e.g., shooting), with the term “violence” representing the extreme end of the continuum (Bushman & Anderson, 2001). Violence is always aggression, but not all aggression is violence. This point is important, as many studies of media violence assess its effects on aggressive behavior that, while not severe enough to be called violent, is nevertheless relevant to testing hypotheses about aggression and violence.

Media violence is defined by researchers as *any* media portraying characters deliberately trying to harm others (Anderson, Carnagey, & Eubanks, 2003). Laypersons and researchers would likely agree that a gory horror film constitutes media violence, but mainstream researchers also consider mild aggressive content (e.g., a cartoon plumber jumping on an enemy) to be violent media, a classification laypersons are less likely to make.

### Causality

People like simple answers to complex questions. As such, laypersons often reduce questions about causality to a search for an event’s ultimate cause. In contrast, scientists conceptualize causation probabilistically: Does a factor increase the likelihood of an outcome happening? This distinction is crucial to understanding what researchers mean when they say that violent media *cause* aggression (i.e., a risk factor predicting increased aggression) and to understanding

why laypersons may find such conclusions counterintuitive (e.g., “violent games have not made *me* into a violent criminal”). While laypersons may struggle to understand this view of causation in the domain of media effects, many do understand this view in a medical context: Smoking increases the likelihood of contracting lung cancer but does not guarantee it.

For researchers to claim that media violence *causes* aggressive behavior, they must fulfill three requirements. First, they must show a relationship between violent media consumption and aggression. Second, violent media consumption must be shown to precede aggressive behavior, otherwise several alternative explanations are plausible (e.g., aggression causes violent media consumption). Third, spurious relationships and plausible alternative explanations need to be ruled out, otherwise the observed relationship may be caused by a third variable (e.g., violent games can be more difficult than nonviolent games, and this difficulty, rather than violent content, may be what increases aggression). In other words, a body of research that demonstrates correlation and temporal order and that rules out spurious explanations presents a strong case for causation.

To make the case that violent media cause aggressive and antisocial behavior, evidence demonstrating the three premises of causality will be presented, along with meta-analyses showing that the overwhelming majority of media violence research converges on this conclusion. But, before that, we briefly introduce a theoretical model that provides a rationale for predicting a causal relationship between violent media and aggressive behavior.

### The General Aggression Model

The general aggression model (GAM; Anderson & Bushman, 2002) integrates the major social-cognitive frameworks since the 1960s and has guided much of the early 21st century’s research on the effect of media violence on aggression (e.g., Anderson & Carnagey, 2014). The GAM specifies the person- and situation-level factors and processes that contribute to aggressive behavior. Being a *general* model, the GAM is not limited to explaining only media violence effects, and has been applied to almost all domains of aggression and violence.

The GAM posits that there are short- and long-term processes that contribute to aggression. Short-term processes are represented by a single-episode cycle beginning with a dual input: person-level variables (e.g., biological predispositions, cognitive biases, mood, personality traits), and situation-level variables (e.g., provocation, presence of violent media). Together, person-level and situation-level variables create a person’s present internal state—their affective, cognitive, and physiological arousal state. This internal state feeds into an appraisal process to determine a course of action (or nonaction). After a behavioral response (impulsive or thoughtful), the ongoing situation feeds back into the next cycle. The outcomes of these cycles cumulatively contribute to long-term learning and can lead to changes in beliefs, attitudes, and expectations. For a more detailed explication of the GAM, see Chapter 37; Allen and Anderson, 2017; DeWall, Anderson, & Bushman, 2011.

The GAM provides a theoretical rationale for predicting causal effects of violent media on aggression and antisocial behavior. Insofar as brief violent media exposure affects one’s internal state by increasing aggressive affect, increasing physiological arousal, or influencing aggression-relevant cognitive systems, and insofar as repeated violent media exposure affects person-level variables (e.g., desensitizing people to violence, reducing empathy toward victims, changing beliefs about the acceptability of aggression, instilling hostile attribution bias, creating highly accessible aggressive scripts), we expect violent media exposure to increase a

person's aggressive behavior, both in the minutes following such exposure and over time, through repeated exposure.

We now turn to the empirical literature. First, we turn to cross-sectional studies testing the correlation between long-term violent media exposure and aggression. Second, we look at longitudinal studies showing that media violence precedes aggressive and antisocial behavior. Third, we present experimental evidence designed specifically to rule out spurious associations and alternative hypotheses. Finally, we review a number of meta-analyses that quantify the convergence of evidence on the conclusion that violent media cause aggression.

## **Evidence for a Causal Link**

### **Establishing Correlation: Cross-Sectional Research**

One of the greatest strengths of cross-sectional study designs is their use of naturally occurring feelings, thoughts, and behavior, illustrating the relevance of media violence effects to the real world. Many of the cross-sectional studies we review assess participants' feelings (e.g., emotional response to violence), thoughts and beliefs (e.g., beliefs about frequency of violence), and behavior (e.g., fighting with others), all of which are predicted by the GAM to be related to their habitual media consumption. Additionally, some cross-sectional studies also statistically control for potential third variables and test competing alternative explanations.

#### *Cross-sectional studies involving arousal and affect*

Cross-sectional studies assessing the effects of violent media on arousal and affect involve testing whether habitual violent media consumption predicts responses to violent media exposure. In one study, violent gamers showed a significantly reduced physiological response (assessed through an electroencephalogram) to violent images compared to nonviolent gamers (Bartholow, Bushman, & Sestir, 2006). This reduced physiological response is thought to be associated with reduced anxiety and less inhibition of aggressive behavior (Bartholow, Bushman, & Sestir, 2006). Various event-related potential and functional magnetic resonance imaging (fMRI) studies have yielded comparable results (e.g., Bailey, West, & Anderson, 2011; Weber, Ritterfield, & Mathiak, 2006). For example, in an fMRI study, violent gamers playing a violent game had lower activity in brain areas associated with emotional responses (Gentile, Swing, Anderson, Rinker, & Thomas, 2015). This evidence suggests that regular exposure to violent media is associated with less negative affect in response to violent content. Other studies have shown that frequent exposure to violent media is positively associated with relatively higher levels of trait anger (e.g., Gentile, Lynch, Linder, & Walsh, 2004).

#### *Cross-sectional studies involving thoughts and beliefs*

Researchers have studied the effects of media violence on antisocial attitudes using cross-sectional studies for decades. For example, in a 1972 study, Dominick and Greenberg found that children watching violent television were more likely to believe that violence was an acceptable way to solve a series of hypothetical problems. Researchers have since found, using similar cross-sectional methods, that media violence reinforces beliefs about the appropriateness of violent behavior (Funk, Baldacci, Pasold, & Baumgardner, 2004) and leads to a greater likelihood of interpreting ambiguous situations as hostile (Möller & Krahe, 2009).

Others suggest that exposure to violent media might affect attention and impulse control. Violent video gamers display poorer proactive cognitive control (Bailey, West, & Anderson, 2010), greater impulsivity (Swing, Gentile, Anderson, & Walsh, 2010), and greater attentional difficulties (e.g., Bioulac, Arfi, & Bouvard, 2008). According to the GAM, these faculties contribute to a person's ability or willingness to reevaluate impulsive-aggressive behavior (Anderson, 2014).

#### *Cross-sectional studies involving behavior*

Cross-sectional studies of violent media on behavior are diverse, both in the participants studied and in the examined measures of aggressive behavior. Studies have shown, for example, that exposure to media violence is positively associated with aggressive and antisocial behavior throughout development: Preschoolers who habitually watched violent TV shows played more aggressively with other children (Singer & Singer, 1976), Singaporean middle school students who played violent video games were less likely to share or help others (Gentile et al., 2009), high school students who played violent video games engaged in more violent behavior (Anderson, Gentile, & Buckley, 2007), and incarcerated juvenile delinquents who habitually played violent video games were relatively more likely to commit acts of violence and delinquency, even after levels of psychopathy were statistically controlled (DeLisi, Vaughn, Gentile, Anderson, & Shook, 2013). This last study, in particular, illustrates that violent media effects can include extremely violent behavior (see also, e.g., Ybarra, Huesmann, Korchmaros, & Reisner, 2014).

While cross-sectional studies consistently find that habitual violent media exposure is positively related to aggressive and antisocial feelings, thoughts, and behavior, they do not, by themselves, prove that media exposure *causes* aggression. To establish the temporal order of these effects, we next turn to the longitudinal evidence.

### Establishing Temporal Order: Longitudinal Research

The time and resource costs of running longitudinal studies are offset by one of their greatest strengths: the ability to establish an effect's temporal order. The cross-lagged panel design assesses (at least) two variables of interest (media violence consumption and aggressive behavior) within the same sample at two or more points in time, allowing researchers to test and compare the strength of both directional pathways. Through such analyses, researchers are able to determine not just correlation but also whether one variable precedes, and therefore plausibly causes, the other.

#### *Longitudinal studies involving arousal and affect*

Relatively few longitudinal studies have specifically tested whether exposure to violent media increases aggressive affect, and those that have generally suggest that these effects are very small ( $r = .075$ ; Anderson et al., 2010). In similar research on empathy, researchers assessed the video-gaming habits of more than 2,000 Singaporean primary and secondary school students over two years and measured the frequency with which the students played violent games and their empathy toward others at each wave (Prot et al., 2014). They found that students who played more violent games in the first wave of the study expressed reduced empathy toward the suffering of others in the second wave of the study, even after statistically controlling for baseline levels of empathy. Overall, longitudinal studies show that high levels of violent media exposure precede decreases in empathy.

*Longitudinal studies involving thoughts and beliefs*

Several longitudinal studies have measured hostile attribution bias. For example, in a 2007 study of elementary students, Anderson and colleagues had students nominate aggressive peers, complete a vignette measure of hostile attribution bias, and provide information about their media consumption habits at the start and at the end of the school year. Students who played more violent games at the start of the year showed greater hostile intent in the vignettes at the second wave of the study and were more likely to be described by their peers as aggressive. Other longitudinal studies have conceptually replicated these findings (e.g., Möller & Krahe, 2009). Researchers have found similar longitudinal effects of violent media on other types of thoughts, thought processes, and beliefs, including normative beliefs about aggression and aggressive fantasies (Gentile, Li, Khoo, Prot, & Anderson, 2014) and increases in impulsivity and attention problems (Swing et al., 2010).

*Longitudinal studies involving behavior*

In one of the most extensive longitudinal studies about media violence effects on aggressive behavior, TV consumption habits and peer-rated aggression were assessed in more than 300 children aged between 8 and 10 years (Huesmann, Moise, Podolski, & Eron, 2003). Fifteen years later, researchers found that childhood consumption of violent television predicted peer-reported, self-reported, and archival records of violence and aggression. Similar findings involving time lags as short as 6 months and as long as 3 years have been obtained in North American (e.g., Graber, Nichols, Lynne, Brooks-Gunn, & Botvin 2006), East Asian (e.g., Anderson et al., 2008), and European samples (e.g., Möller & Krahe, 2009). Other researchers have studied aggressive behavior within the context of relationships, as in a longitudinal study of 1,000 students that found that participants who had viewed violent-themed pornography in the first wave of the study were far more likely to engage in sexually aggressive behavior 36 months later, an effect not observed for those viewing nonviolent pornography (Ybarra, Mitchell, Hamburger, Diener-West, & Leaf, 2011).

Taken together, longitudinal research builds upon cross-sectional research by providing evidence that media violence exposure temporally precedes aggressive behavior and not the other way around (e.g., Krahe & Möller, 2010). By statistically controlling for level of aggressiveness as measured at Time 1, such longitudinal studies also control for a host of alternative explanations, such as overall media consumption, parental education, and socioeconomic status. To further examine alternative explanations, we next turn to experimental research.

### Eliminating Spurious Explanations: Experimental Research

Experiments allow researchers to rule out spurious explanations through the process of random assignment of participants to one of several conditions representing different levels of a manipulated variable. Random assignment allows researchers to assume, based on statistical laws, that participants across conditions are equal on all relevant variables except for the one being manipulated. As such, observed differences between conditions on outcome variables must be due solely to the manipulation itself and not to variables such as personality traits or socioeconomic status. Moreover, given that manipulations temporally precede measurement of the outcome variable, differences in the dependent variable can be interpreted as being *caused* by the manipulation. Experiments thus represent the most powerful test of causation in the researcher's arsenal.

Experiments are not without their limitations, however. The highly controlled nature of laboratory experiments can lead to concerns about their generalizability to real-world behavior. Moreover, ethics concerns prevent researchers from conducting experiments involving potential harm (e.g., physical violence). Therefore, media violence experiments rely on carefully crafted measures of aggression that have received considerable study in order to establish their validity, despite seeming unrelated to real-world aggression (e.g., Anderson & Bushman, 1997).

#### *Experimental studies involving arousal and affect*

Experiments often study arousal and affect during, or in the minutes following, violent media exposure. In one such experiment, undergraduate students randomly assigned to listen to a violent song reported stronger feelings of hostility in the minutes following listening than those who listened to a nonviolent song (Anderson et al., 2003). Similar results have been obtained in studies comparing those assigned to play a violent or nonviolent video game (Anderson & Ford, 1986).

Violent media have also been shown to alter physiological responses to aggression. Violent games have been shown to increase both heart rate and galvanic skin response during play (Barlett, Harris, & Bruey, 2008; Jeong, Biocca, & Bohil, 2012). After exposure to violent media, however, people experience *less* physiological arousal when viewing subsequent scenes of actual violence (Carnagey, Anderson, & Bushman, 2007)—evidence that exposure to violent media causes desensitization to violence.

#### *Experimental studies involving thoughts and beliefs*

Experiments have tested several cognitive mechanisms underlying media violence effects, including the increased accessibility of aggressive thoughts. In one study, participants randomly assigned to play a violent or nonviolent video game later completed a task where they had to determine whether strings of letters were words or not (Bushman, 1998). Those who had played the violent game were quicker to identify violent words, suggesting that the violent game had increased the accessibility of aggression-related concepts. Aggressive thought accessibility has been shown in myriad other ways: Participants who play violent games are more likely to complete partial words with aggressive responses (e.g., “explo\_e” with “explode” instead of “explore”; Anderson et al., 2004), to complete story fragments with aggressive conclusions (Anderson et al., 2003), and to rate ambiguous words as more aggressive (Bushman & Anderson, 2002).

Violent media have been shown to have other cognitive effects as well: increasing beliefs about the frequency of violence (Green & Brock, 2000, Study 1), increasing implicit self-associations with aggression (Bluemke, Friedrich, & Zumbach, 2010), and reducing activity in brain areas associated with behavioral control (Hummer et al., 2010). Together, these studies provide evidence that violent media change the way players perceive and process information, which can have downstream effects on aggressive behavior, as the next section illustrates.

#### *Experimental studies involving behavior*

One of the most frequently used paradigms to ethically assess behavioral aggression in the laboratory is the Taylor Competitive Reaction Time Task (TCRTT). Participants in a TCRTT study typically complete this task after playing either a violent or a nonviolent video game. In the task, participants believe they are in a reaction time competition against an opponent in another room and that the winner gets to punish their opponent with a blast of unpleasant noise. Before each round, the participant selects a volume (60–105 dB) and/or a duration

(0.5–5 seconds) of noise to give to their opponent. Variations of this paradigm have been used, showing fairly consistently that participants exposed to violent media prior to the task give louder and longer punitive noise blasts (e.g., Anderson et al., 2007; Bartholow, Sestir, & Davis, 2005). Despite the fact that, on the surface, the TCRTT seems qualitatively different from real-world aggression, it has been well validated by researchers and found to predict real-world aggressive behavior (e.g., Giancola & Parrott, 2008).

The TCRTT is not the only measure of aggressive behavior used in violent media experiments. Studies have similarly found that violent media increase the aggressiveness of children's play (Silvern & Williamson, 1987), increase the duration of painful punishment given to a confederate (Ballard & Lineberger, 1999), and even increase the amount of hot sauce participants give a confederate who detests spicy food (Barlett, Branch, Rodeheffer, & Harris, 2009). Studies of antisocial behavior have found that exposure to media violence in the laboratory makes participants more willing to prevent another person from winning a prize (Saleem, Anderson, & Gentile, 2012), more likely to exploit others (Sheese & Graziano, 2005), and less willing to help a victim of violence (Bushman & Anderson, 2009).

In sum, experimental evidence overwhelmingly shows that exposure to media violence causes aggressive affect, thoughts, beliefs, and behavior while ruling out the alternative explanations of nonexperimental designs. Questions about the generalizability of the experimental findings to real-world aggression are addressed by converging cross-sectional and longitudinal studies assessing real-world aggressive behavior. The next section further examines this converging evidence, considering the media violence literature as a whole, rather than a collection of individual studies.

### Converging Evidence: Meta-analyses

There is no such thing as a perfect study that unambiguously establishes the causality of any risk factor on an outcome variable. Researchers in all areas of science overcome this limitation by relying on replication and converging evidence. As we have seen, the media violence literature is a diverse collection of cross-sectional, longitudinal, and experimental studies using samples from East Asia, Europe, and North America to assess the entire spectrum of aggressive behavior. These studies all point to a common conclusion: Violent media exposure is a causal risk factor for aggressive behavior. As a further test of this assertion, researchers employ meta-analysis, a statistical technique incorporating the results of dozens or even hundreds of individual studies. More than a dozen such meta-analyses have been conducted in the media violence literature (e.g., Anderson et al., 2010; Greitemeyer & Mügge, 2014). For example, in their 1994 meta-analysis, Paik and Comstock concluded, based on more than 250 studies, that exposure to violent television was a risk factor for aggressive and violent behavior.

In the most comprehensive analysis of video game effects to date, researchers looked at the combined results of more than 350 individual studies comprising a combined sample of more than 130,000 participants (Anderson et al., 2010). The researchers drew several conclusions: First, across methodologies (e.g., cross-sectional, longitudinal, experimental), video game violence played a small but significant causal role in aggression ( $r = .189$  overall;  $r = .172$ ,  $.181$ , and  $.148$  for cross-sectional, longitudinal, and experimental studies, respectively); second, violent video game effects were larger in studies that followed best-practice guidelines for conducting research; and, third, violent gameplay reduced prosocial behavior. These findings are all consistent with the GAM and demonstrate the power of converging methodology to show the causal effects of media exposure on aggression. They are also supported by a more

recent meta-analysis of video game effects on aggression, which analyzed only newer studies and yielded virtually identical results ( $r = .18$ ; Greitemeyer & Mügge, 2014).

## Criticisms

Despite overwhelming evidence that violent media cause aggression, a small group of vocal critics challenge these conclusions (e.g., Ferguson, 2007; Ferguson & Kilburn, 2010). Many of their criticisms focus on the details of particular methodologies and have been dealt with in other publications (e.g., Bushman, Rothstein, & Anderson, 2010). For example, one criticism contends that media violence experiments use games that differ in ways beyond their violent content (e.g., frustration), making it impossible to prove that violence, and not another variable, caused the aggression (Ferguson & Kilburn, 2010). Despite these claims, many studies *do* pretest and select games comparable in difficulty, action, and frustration; indeed, this has been a best practice since it was established by Anderson and Dill (2000). Moreover, poorly designed studies usually yield *smaller* effect sizes than do best-practice studies, contradicting the implications of this criticism (Anderson et al., 2010).

Another criticism attacks specific measures, such as the TCRTT, contending that they are used in nonstandardized ways, allowing researchers to select data that favor their hypotheses (Ferguson, 2007). Following this argument, TCRTT studies should yield particularly inflated effect sizes. However, meta-analysis results strongly contradict this claim (Anderson et al., 2010). Moreover, numerous experimental, cross-sectional, and longitudinal studies not employing the TCRTT nevertheless show media violence effects. Put another way, critics focusing on an individual study or measure, dismissing all studies of that type while failing to account for the overwhelming converging evidence, are essentially missing the forest for the trees.

It is worth noting that, while skepticism and critical inquiry are essential to the scientific process, the case has been made for media violence effects beyond a reasonable doubt. Science is never complete, as theories are always subject to review, reconsideration, and revision as new data and new technology become available. Basic findings seldom change, however, and the basic finding of media violence research is that it should be regarded as a causal risk factor for a host of changes in those exposed to it, including aggressive cognition, aggressive affect, and aggressive behavior. Researchers have studied the psychological processes underlying this risk factor for over 20 years and continue to do so. But their work is hindered by the need to devote time and resources to continuously reestablishing this basic finding due to repeatedly debunked criticism from the media industry and a small, vocal minority of researchers. This waste of resources detracts from more important and reasonable work on entertainment media: furthering our understanding of it, limiting its harmful effects, and enhancing its positive effects.

## Conclusion

Throughout this chapter, we have made the case that media violence effects are more nuanced than popular discourse would suggest. Decades of research—cross-sectional, correlational, and experimental—converge on the conclusion that, far from the false dichotomy



of “media violence is the sole cause” and “media violence has no effect,” media violence is a risk factor, contributing its own small, unique part to aggressive and antisocial behavior. The fact that, among American teenagers, 97% play video games (Lenhart et al., 2008) and the average time per day spent in front of some form of media is about 7.5 hours (Rideout, Foehr, & Roberts, 2010) means that these small effects can have a significant impact when applied on a societal scale and, as such, can have important implications for social policy.

We suggest a moderate stance in the media violence debate—a stance that neither encourages fear mongering and censorship of media nor denies the results of decades of scientific study. People have shown a general willingness to entertain such moderate stances with regard to the effects of alcohol and junk food, acknowledging that they can be indulged in with an awareness of their potentially harmful effects. We hope that, in time, attitudes toward media violence effects will be accepted in a similar manner.

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