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Letter from the Editor

The *Oxford Research Encyclopedia of Communication* is an entirely online, digital research encyclopedia that will ultimately cover the large and diverse scholarly world of Communication research. Its essays will be based on the latest, most impactful research written by the most respected scholars within the discipline. This encyclopedia builds upon and will join a distinguished tradition at Oxford University Press of publishing authoritative reference works in fields such as Linguistics, American History, Sociology, and Religion.

The *Oxford Research Encyclopedia of Communication* will be developed for researchers, teachers, and students interested in all facets of the study of communication. Conceived as a scholarly alternative to Wikipedia, it will be a dynamic and constantly evolving research tool that aims to fill the demand for high-quality, up-to-date scholarly reference materials online. It will combine the high standards of Oxford scholarly publishing with the flexibility of a digital environment.

One unique factor of this online encyclopedia will be an emphasis on research and its focus on the needs of researchers. Essays will examine the evolution and/or structure of research programs and their dynamics; the questions, tensions, and puzzles that drive research; and the interaction between theory and empirics. The aim is to engage readers and stimulate research by discussing motivations, unresolved questions, and possible directions of new research. The website will be attractive and intuitive, facilitating multiple paths for the researcher to find related material, whether within the ORE, in OUP's ecosystem, or directly linking to cited sources.

It is my intent to make the *ORE of Communication* a focal point for both scholarly knowledge dissemination and scholarly conversation. To that end, an Advisory board of highly respected and influential Communication researchers from throughout the world has been assembled and has initiated a taxonomy of close to 20 research categories that will serve as our foundation.

We are in the midst of the greatest shift in the publishing environment since the advent of the printing press. The exciting possibilities afforded by this shift to online, electronic publishing as a rapid, dynamic format will help the *Oxford Research Encyclopedia of Communication* play a significant role in shaping the future of the field of Communication.

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Communication: Oxford Research Encyclopedias

Violent Media Content and Effects

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Summary and Keywords

In our modern age, electronic media usage is prevalent in almost every part of the world. People are more connected than ever before with easy access to highly portable devices (e.g., laptops, smartphones, and tablets) that allow for media consumption at any time of day. Unfortunately, the presence of violence in electronic media content is almost as prevalent as the media itself. Violence can be found in music, television shows, video games, and even YouTube videos. Content analyses have shown that nearly all media contain violence, irrespective of age rating (Linder & Gentile, 2009; Thompson & Haninger, 2001; Thompson, Tepichin, & Haninger, 2006; Yokota & Thompson, 2000). It is therefore important to ask: What are the consequences of pervasive exposure to screen violence? One consequence of media violence exposure, hotly debated by some in the general public, is increased aggressive behavior. This relationship was investigated in many studies using experimental, longitudinal, or cross-sectional design. These studies are summarized in meta-analyses, which support the notion that media violence increase the likelihood of acting aggressively. This link can be explained by an increase in aggressive thoughts, a more hostile perception of the environment, and less empathic reaction to victims of aggressive behavior. However, the often debated notion that media violence allows one to vent off steam, leading to a reduced likelihood of aggressive behavior, has failed to receive empirical support. The effect of media violence is not limited to aggressive behavior; as a consequence of violent media usage attentional problems arise and prosocial behavior decreases.

Keywords: Media violence, aggressive behavior, computer games, prosocial behavior, attention, empathy, normative beliefs

What Constitutes Aggression and Violence?

Aggression can be defined as any behavior intended to harm another person who is motivated to avoid that harm (Anderson & Bushman, 2002A). This definition includes a few

key characteristics that distinguish aggression from other actions. First, aggression is a behavior. Although it is possible to think aggressively or feel like acting in an aggressive way, these phenomena—though related—are not considered aggression (rather, they often are precursors). First, aggressive behavior is not limited to direct and overt physical behavior, like punching or kicking (*physical aggression*). It is also possible to behave aggressively by spreading rumors (*relational aggression*), writing offending electronic messages (*cyberaggression*), or using abusive language (*verbal aggression*). Second, aggression is intentional and is intended to cause harm, meaning that causing accidental harm (e.g., unintentionally running over your neighbor’s cat) is not considered aggression. Similarly, behavior that harms another but is intended to benefit that person (e.g., administering a painful vaccination) is not considered aggression. The focus on intentions also overrides the consequences of an aggressive action. For example, shooting at someone with the intent to kill is an aggressive behavior even if the shots miss and cause no harm. Third, the individual being harmed must be motivated to avoid that harm. This means that masochism (i.e., deriving pleasure from pain) and suicide are not considered aggression unless the action was intended to harm someone else (e.g., suicide as a means of punishing someone else).

Violence is defined as an extreme form of aggression that has severe physical harm (e.g., injury serious enough to require medical attention or death) as its primary goal. All acts of violence constitute aggression, but not all acts of aggression constitute violence. For example, pushing another child away from a favored toy is considered aggression but not violence. While aggression is not limited to overt physical behavior, violence is limited to physical behavior. Relational or verbal means cannot inflict severe harm, which is a central component of violence.

Violence in the Media

Media violence is defined as any media depiction of “intentional attempts by individuals to inflict harm on others” (Anderson & Bushman, 2001, p. 354). Any depicted character can engage in aggression. This means that it is not only aggressive behavior between humans that meets the definition of media violence but also the aggressive behavior of nonhuman animated characters such as the Road Runner, the Mutant Teenage Ninja Turtles, or Transformers. It also is important to note that blood and gore are not part of the definition of media violence. Thus, many children’s cartoons and most E10-rated games (in the United States) are considered violent media, even when there is no screaming, spurting blood, severed body parts, or death.

Across many different forms, genres, and cultural contexts, violence is very common in media. One content analysis has shown that, on average, 42.5 aggressive acts per hour are depicted in the most commonly watched TV shows (Coyne, Robinson, & Nelson, 2010). Although physical aggression is often the most noticeable form of aggression, verbal and relational aggression are also very common (Lindner & Lyle, 2011). During the last four decades the amount of violence in prime time TV shows has slightly increased (Hetsroni, 2007). Additionally, violence is not limited to the TV shows themselves; it is also very common in advertisements (Blackford, Gentry, Harrison, & Carlson, 2011). A similar picture emerges for movies. Violence is very common in top-grossing movies and has steadily increased during the last 40 years (Bleakley, Jamieson, & Romer, 2012; Monk-Turner et al., 2004). Moreover, the perpetrators in violent movies are commonly displayed as more attractive and more intelligent than average (McIntosh, Murray, Murray, & Manian, 2003).

Violence is also common in video games. Around 98% of computer games that have an age rating for mature audiences contain violence (Thompson, Tepichin, & Haninger, 2006). However, even computer games without age restrictions contain significant amounts of violence. One study found that violence was present in 97% of teen-rated games and 64% of games rated as suitable for all ages (Thompson & Haninger, 2001). Violence is often an important part of the game; acting violently within the game is in most cases rewarded or is necessary to advance (Thompson et al., 2006).

Empirical Results Linking Media Violence Exposure to Aggressive Behavior

During the last 50 years many studies have been conducted investigating the link between media violence and aggressive behavior. These studies have used a range of different methods. These methods, as well as their advantages and disadvantages, are explained in the next section.

Experimental Studies

One of the most common approaches to investigating the link between media violence and aggression is the usage of brief laboratory experiments. One good example would be the study by Barlett, Branch, Rodeheffer, and Harris (2009). They randomly assigned 69 male participants to play either a violent video game (e.g., *Mortal Kombat*) or a

nonviolent video game (e.g., *Hard Hitter Tennis*). Afterward, they assessed aggressive behavior using the “hot-sauce” paradigm, in which people are asked to choose an amount of hot sauce to be given to another person who explicitly states that he or she dislikes hot and spicy food. The participants who played the violent game chose to administer significantly more hot sauce than those who played the nonviolent game.

Assessing aggressive behavior in the laboratory is often difficult, since many forms of aggression (e.g., punching, kicking, or insulting) cannot be ethically manipulated in experimental settings. For this reason several different ways of ethically assessing aggressive behavior in the laboratory have been developed, such as the aforementioned hot-sauce paradigm. Other methods include, for example, the presentation of loud noise to an opponent (Arriaga, Esteves, Carneiro, & Monteiro, 2008) or the assignment of difficult puzzles to ensure another person’s failure (Saleem, Anderson, & Gentile, 2012). In field studies, other options are available. For example, one can experimentally manipulate exposure to violent or nonviolent videos prior to a sports game (e.g., field hockey) and then observe how aggressively the participants behave while playing the game (Josephson, 1987). Others have done similar field experiments with children by manipulating video game play prior to observing their behavior on the playground. Although at first glance these methods may appear to be measuring very different things, conceptually each of these methods assesses the extent to which participants purposefully harm another person who is motivated to avoid that harm, the essence of aggressive behavior. Moreover, research has established the validity of many traditional laboratory aggression paradigms (for reviews, see Anderson & Bushman, 1997; Carlson, Marcus-Newhall, & Miller, 1989)

One of the greatest advantages of experimental studies is that random assignment of participants to different experimental conditions can control for potential confounding variables. Randomly assigning participants to experience either violent or nonviolent media creates two equivalent groups that differ only in their level of media violence exposure, subject to known vagaries of chance. This approach allows for strong causal claims. Experimental designs also provide researchers with a great degree of control over factors that may influence the relationship between media violence and aggression. For example, in one study the experimenters manipulated the similarity between the player and the player’s video game character (or avatar). Players who were similar to their game character showed more aggressive behavior after playing a violent game than did players who were dissimilar to their game character (Fischer, Kastenmüller, & Greitemeyer, 2010).

There are, however, two important disadvantages of experimental studies. One is that experiments are typically limited to short-term effects, since the time that participants can stay in the laboratory is limited. In other words, most experimental studies provide a

good window through which one can view the immediate consequences of experimental manipulations. Those consequences (e.g., increased aggressive thinking) give us insight into what the long-term consequences might be. They allow tests of causal theories concerning short-term effects, but other designs are often used to test theoretically derived predictions concerning long-term effects of repeated exposure to violent media. The other major limitation is that, due to ethical constraints, it is impossible to investigate violence, e.g., assault, robbery, or murder.

Cross-Sectional Studies

Another approach to investigating the relationship between media violence exposure and aggressive behavior uses cross-sectional studies, which measure all variables of interest at one point in time. One study of this type was conducted by McLeod, Atkin, and Chaffe (1972). They gave 698 adolescents a list of the most common prime-time television programs and asked them how frequently they watched these programs. Each of the television programs was assigned a violence score by independent raters, and the violence score of each program was multiplied by each participant's frequency score. At the same time, the adolescents were also asked about different aspects of their own aggressive behavior (e.g., physical aggression or delinquency). The researchers then predicted aggressive behavior using the media violence scores. They found that the adolescents who watched more violent television shows also reported more aggressive behavior. Similar results have been shown for video games (e.g., Anderson, Gentile, & Buckley, 2007, Study 2), and results of this nature appear in other cultural contexts as well (e.g., China: Wei, 2007; Germany: Krahe & Möller, 2011).

One major advantage of cross-sectional studies is that even extreme outcomes like assault, robbery, or murder can be investigated (e.g., Ybarra et al., 2008), since the extreme outcomes are not being unethically created by the researchers. Using this design it is also possible to test many alternative explanations for the media violence-aggression link simultaneously by including additional covariates. For example, Anderson and Dill (2000, Study 1) found that the association between violent video game exposure and aggressive behavior was significant even after controlling for total amount of time spent on any type of video game. Alternative explanations and additional covariates in cross-sectional designs are theoretically unlimited. Unfortunately, since it is impossible to include all potential confounding variables in any one study, it is risky to make causal claims based on purely cross-sectional data, especially in a single study.

Longitudinal Studies

In longitudinal studies the same persons are repeatedly asked about their media diet as well as their amount of aggressive behavior over extended periods of time. For example, Huesmann, Moise-Titus, Podolski, and Eron (2003) asked 450 children about their media habits and aggressive behavior. Fifteen years later they asked the same persons about the same topics once more. They found that aggressive behavior as an adult could be predicted by the amount of violence the participant watched as a child, even after controlling for how aggressive the person was as a child. In contrast, the amount of childhood aggressive behavior did not predict the amount of violent media consumed as an adult. These results support the notion that media diet influences aggressive behavior but aggressive behavior does not influence media diet. That is, it does not appear that the link between media violence and aggression can be explained by aggressive individuals choosing to consume more violent media. Similar results have been shown in Japan (Anderson et al., 2008), Singapore (Gentile, Li, Khoo, Prot, & Anderson, 2014), and Germany (Krahé, Busching, & Möller, 2013).

Since aggressive behavior is often considered socially unacceptable, it is likely that at least some participants underreport their own aggressive behavior. To avoid this, many studies obtain assessments from additional observers to increase the reliability of the data (e.g., parents: Huesmann et al., 2003; peers and teachers: Anderson, Gentile, & Buckley, 2007; teachers: Gentile, Mathieson, & Crick, 2011). Since these persons are less inclined to “sugarcoat” the behavior, asking them for additional information increases the reliability of the measurements. These studies show that although people may underreport their own aggressive behavior, the relationship between media violence and aggressive behavior is stable across different sources.

Compared to laboratory studies these longitudinal studies can better investigate the causal influence of violent media over long spans of time. Adding extra measurements gives the additional possibility of observing complex usage patterns. For example, Krahé et al. (2013) showed that adolescents who stopped using violent media also showed less aggressive behavior later on. In this study, since the same persons were investigated multiple times, all time-invariant confounding variables were controlled for. With appropriate statistical methodology, especially controlling for individual differences in the key outcome variable (e.g., aggression) that existed in the first wave of measurements, longitudinal studies can also provide more compelling evidence for causality than can cross-sectional correlational studies (although caution is still warranted in making causal claims). The strength of relationships between two variables (such as media violence exposure and aggression) can also be assessed with destructive testing (Anderson & Anderson, 1996), in which additional covariates are added to

statistical models until the relationship between the two variables of interest disappears. The more covariates it takes to break the link between two variables, the stronger the relationship.

Meta-Analyses

During the last 50 years a large number of studies have investigated the link between media violence and aggressive behavior. Since all studies yield slightly different results, it is necessary to somehow integrate or combine these studies to understand the research literature as a whole. A meta-analysis allows researchers to combine the results of many studies of the same hypothesis to obtain a measure of the strength of relationships across a large and very diverse sample, with different measurements, experimental stimuli, methodologies, and participants.

Often, meta-analyses present multiple effect sizes for different study designs; however, in the media violence domain it turns out that the effect sizes across study designs are fairly similar. The results of the most recent meta-analyses in the media violence domain are displayed in Table 1. The effect sizes of these meta-analyses range from .15 to .25, which can be interpreted as a small- to medium-sized effect (Cohen, 1992). While some authors disregard “small” effect sizes (e.g., Ferguson & Kilburn, 2009), they are important for multiple reasons. First, since the consumption of media violence is so very common and frequent it has a strong cumulative effect across a large population. Second, since aggressive behavior has a large number of causes (Kirsh, 2012; Krahé, 2013), it is unreasonable to assume that any single cause of aggressive behavior should have a large influence. Finally, unlike other risk factors for aggressive behavior (e.g., gender, genetics, poverty) media diet is something that can be changed, and this can be done by parents without large cost. Therefore, even though the effect sizes are modest, they have a high degree of practical importance.

Table 1. Summary of the Different Meta-Analyses

Study	Number of Studies Included	Included Media Types	Effect Size (<i>r</i>)
Anderson (2004)	32	Video games	.20*
Anderson and Bushman (2001)	33	Video games	.19*
Anderson and Bushman (2002B)	124 ¹	Video games, movies, and TV shows	.23*
Anderson et al. (2010)	79	Video games	.24*
Bushman and Huesmann (2006)	262	Video games, movies, and TV shows	.19*
Ferguson (2007A)	9	Video games	.15*
Ferguson (2007B)	17	Video games	.14*
Ferguson and Kilburn (2009)	27	Video games	.13*
Greitemeyer and Mügge (2014)	43	Video games	.19*
Hogben (1998)	14	Movies and TV shows	.24*
Paik and Comstock (1994)	<217 ²	Movies and TV shows	.33*
Sherry (2007)	25	Video games	.16 ³

(¹) No overall coefficient is reported, therefore the coefficient of experimental studies is reported in this table.

(²) The authors do not report the number of studies included in the coefficient relating media violence and aggressive behavior, only the total number of studies included in the analysis.

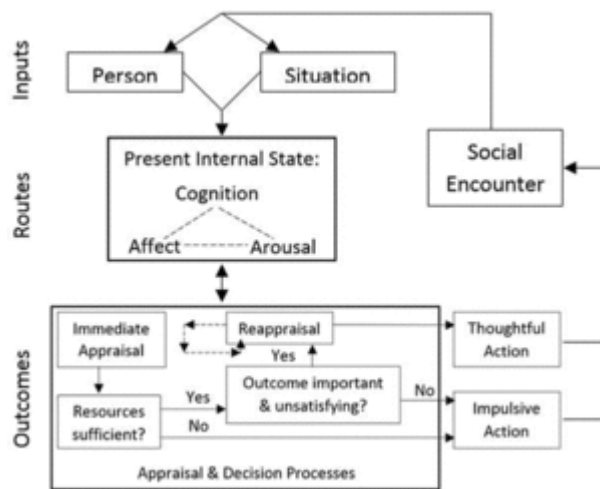
(³) The author does not report any significance testing.

(*) $p < .05$.

One problem with meta-analysis is that if studies of questionable quality are included, the overall effect size obtained will be of questionable accuracy. To avoid this problem, two approaches are used. One is to define quality requirements for the inclusion of a study. The other is to compare the effect size from all studies with the effect size from the studies that meet a methodological “gold standard.” In the most comprehensive meta-analysis of violent video game effects, Anderson et al. (2010) showed that the effect size obtained using only best-practice studies is larger than the effect size obtained when poor quality studies are included. Nonetheless, that meta-analysis showed that even including all relevant studies resulted in significant effects.

Processes Linking Media Violence Exposure to Aggressive Behavior

There are multiple theoretical explanations for the link between media violence and aggressive behavior. One of the most recent and comprehensive explanations is the General Aggression Model (GAM; Anderson & Bushman, 2002A), which integrates many older, domain-specific theories into a unified framework for understanding human aggression. The GAM describes short-term as well as long-term processes. The short-term processes (see Figure 1) are described as an episodic and cyclical pattern, where situational (e.g., provocation) and personological (e.g., aggressive personality) input variables affect one’s present internal state. This present internal state is characterized by three main types of variables: cognition, affect, and arousal. Any input variable can affect any and all of the three present internal state variables. For example, a homicide shown on television can lead to aggressive cognitions, increased physiological arousal, and feelings of anger or hostility. The three present internal state variables also influence each other. For example, the feeling of hostility is likely to increase arousal. At the next stage, the individual’s present internal state influences the decision process. Increases in aggressive cognition, aggressive affect, and arousal all increase the likelihood of aggressive behavior. This aggressive behavior then influences the situation and the cycle starts over again.



Click to view larger

Figure 1. Short-term, episodic processes of the General Aggression Model (GAM).

(Adapted from Anderson and Bushman, 2002A.)

The effect of violent media is not limited to short-term effects; there is also a range of long-term processes linking media violence to aggressive behavior. The basic notion behind most of these long-term processes is that consuming violent media alters an individual's mental concepts (or knowledge structures). In other words, people learn. Individuals then apply these concepts outside of the media context. The

acquired concepts as well as the basic processes will be presented in the next sections.

Aggressive Scripts and Normative Beliefs

The basic tenet of Huesmann's (1988) script theory is that human behavior is largely governed by scripts, much like actors playing a role follow a script. These scripts consist of distinct, simple actions as well as normative beliefs, which contain the information about when the execution of the scripts is acceptable. Media often portray violence as rewarding and acceptable behavior. Consuming violent media therefore leads individuals to be more accepting in their beliefs regarding the execution of aggressive scripts. Longitudinal studies have shown that the normative beliefs act as a mediator between exposure to media violence and aggressive behavior, supporting script theory. People who consume more violent media show a higher level of aggression endorsing normative beliefs and later more aggressive behavior (Huesmann & Guerra, 1997; Krahe & Möller, 2010).

Aggressive Expectation and Perceptual Schemata

Another process involves the development of aggressive expectation and perceptual schemata. Cognitive schemata are patterns of thought that structure information processing to ease cognitive processing. These cognitive schemata are used to interpret situations that are either unclear or do not contain enough information. Since media

often portray the environment as hostile and dangerous, people add this information into their schemata about how the world works. An ambiguous situation is then more likely to be interpreted as hostile, which can lead to aggressive or defensive behavior (Crick & Dodge, 1994).

This process was investigated in an experimental study conducted by Kirsh (1998). He asked 52 children to play either a violent or nonviolent video game. Afterwards the children read a story about negative events caused by a peer. Children who had played the violent video game assumed more often that the negative events were caused intentionally than the children who had played nonviolent games, who tended to assume that the negative events were caused by accident. Other research has found that undergraduates show the same pattern (Bushman & Anderson, 2002). Further support for the role of perceptual schemata in explaining the link between media violence exposure and aggressive behavior has been shown outside the laboratory in longitudinal studies covering time frames of between 5 and 12 months (Gentile, Coyne, & Walsh, 2011; Möller & Krahé, 2009). However, even concepts without a direct relation to aggression can be charged with aggressive meaning after playing a violent video game and trigger aggressive thoughts (Busching & Krahé, 2013).

It is also worth noting that of the different cognitive processes described here, no single explanation is favored as the main route to developing aggressive behavior. Aggressive behavior can develop through changes in one or all of the processes just discussed. In fact, one three-year, three-wave longitudinal study with a large sample of Singaporean children and adolescents found that a composite measure of aggressive cognitions (including normative beliefs, hostile attribution bias, and aggressive fantasizing) served as the primary mediator (over empathy) for the development of aggressive behavior over time (Gentile, Li, Khoo, Prot, & Anderson, 2014).

Desensitization to Aggression

In addition to influencing cognitive processes, the consumption of media violence also influences affective processes. Normally people show a strong negative affective reaction toward violence. However, clinical psychology has shown that people who repeatedly experience a situation eliciting a negative affective reaction get used to this situation, and the negative affect associated with this situation is reduced (Funk, 2005). Moreover, the decline in negative affect should be more pronounced if positive affect is included in the situation. Media violence fulfills both conditions: violence is presented repeatedly and associated with positive affect (e.g., the hero wins and the villain gets his punishment). A

reduction of negative affect toward violence leads to an increased probability of acting aggressively and a reduced probability of helping victims.

Laboratory studies have shown that chronic players of violent video games report not only less negative affect toward violence (Bartholow, Bushman, & Sestir, 2006B) but also less negative affect, as indicated by EEG recordings. Similar results have been found elsewhere (Arriaga, Esteves, Carneiro, & Monteiro, 2008; Funk, Buchman, Jenks, & Bechtoldt, 2003; Krahe et al., 2011). Experimental studies have shown that even brief exposure to violent video games can lead to physiological desensitization (e.g., Carnagey, Anderson, & Bushman, 2007), which in turn leads to decreases in the likelihood of helping a victim of violence (Bushman & Anderson, 2009).

The Case Against Catharsis

Although hundreds of studies show that increased exposure to media violence leads to more aggression, there is still a common belief that playing violent video games allows people to “vent steam” and reduces the likelihood of aggressive behavior. Players often state this as a reason for playing video games (Bushman & Whitaker, 2010; Ferguson, Olson, Kutner, & Warner, 2014) but at the same time show a higher level of aggressive behavior compared to their peers who use violent media less frequently.

The basic idea behind this catharsis theory goes back to Aristotle’s dramatic theory (Aristotle & Fuhrmann, 1982). He suggested that the pity and fear experienced by the audience of a drama performance cleansed the human soul. Freud (1920) stated that this kind of cleansing is necessary; otherwise the aggression drive steadily increases until aggressive behavior occurs. While these theories may seem convincing at first glance, there are at least three large problems: (1) Aggression is not a drive. Unlike true drives such as thirst and hunger, no negative biological consequence arises if one does not act aggressively. (2) Aristotle required a very specific manner of storytelling for his concept of catharsis, which is rarely seen in modern violent media. Finally, (3) as this article has presented, there is a great deal of evidence regarding the link between media violence and aggression that directly contradicts the theory of catharsis (for an extensive review and discussion, see Anderson et al., 2007, pp. 144–149; Geen, 2001; Geen & Quanty, 1977; Gentile, 2013).

The fact that the catharsis theory is so popular despite all the evidence against it can be explained by multiple psychological processes. First, playing violent video games often improves people’s mood. Since people normally do not associate good mood with

aggression, they think that they have reduced the probability they will act aggressively. However, learning that acting aggressively improves their mood may mean people are more, not less likely to be aggressive. There is also evidence that using violent media leads to increased physical arousal. After playing, our body needs rest to return to its baseline state, which is felt as tiredness. This tiredness may be misinterpreted as a reduction of the likelihood to act aggressively. In each of these cases, the layperson's theory concerning catharsis and the scientific account of catharsis are at odds (with the scientific account winning out).

Effects of Violent Media on Outcomes Other Than Aggression

Effects on Attention, Impulsivity, and Executive Functioning

Although not as extensively researched as the link between violent media and aggression, there is a growing body of research on the effects of violent media on attention and executive functioning. It is important to note here the multiple uses of the word "attention." Attention has been used in the literature to describe visual attention (e.g., noticing things on a screen), executive functions, and real-world attention skills (e.g., paying attention during a lecture) and problems (e.g., ADHD). Generally, positive effects of a specific type of violent media—e.g., fast-paced first-person shooter video games—have been found for visual attention. However, for all of the other types of attention, screen media in general and violent media have been associated with poorer executive function and real world attention. Playing action-based video games (which are most often violent) has been experimentally linked to improvements in visuo-spatial attention (e.g., better ability to identify targets on a cluttered screen), number of attentional objects (e.g., being able to keep track of extra objects), and speed/efficiency of visual processing (e.g., being able to quickly identify objects; Achtman, Green, & Bavelier, 2008; Green & Bavelier, 2003, 2006).

Unfortunately, other research has shown that despite the potential for some media (i.e., action games) to improve visual attention skills, the same media may lead to attention problems, impulsivity, and deficits in executive functioning. One longitudinal study found that viewing violent television before the age of three was associated with attention problems five years later (Zimmerman & Christakis, 2007). There was also a weaker association between nonviolent, noneducational television viewing and later attention problems. Similar links have been established for violent video games. One cross-

sectional study found that for 6- to 10-year-olds, playing violent video games was significantly associated with attention problems, but total play time (ignoring content type) was not (Hastings et al., 2009). Not all studies find stronger effects for exposure to violent media as compared to total media exposure, however. A more recent three-year longitudinal study with a sample of Singaporean children and adolescents found that although exposure to violent video games was uniquely associated with impulsivity and attention problems, total play time was a more consistent predictor (Gentile, Swing, Lim, & Khoo, 2012). The effects of violent media on attention and impulsivity may also partially explain the impact of violent media on aggression. A recent cross-sectional study found unique relationships between media exposure (both overall media exposure and violent media exposure) and a factor combining attention problems and impulsiveness (Swing & Anderson, 2014). The attention problems/impulsiveness factor was also uniquely associated with impulsive aggression (a relatively strong relationship) and premeditated aggression (a relatively weak relationship).

Other research has linked violent media exposure to deficits in executive functioning. For example, it has been found that individuals with high media violence exposure show reduced frontal lobe activation during a counting Stroop task (Mathews et al., 2005) as well as poorer executive functioning as measured by self-report, parent-report, and lab-based measures (i.e., the Stroop Color and Word Test and Connors' Continuous Performance Test; Kronenberger et al., 2005). Other studies have found that individuals with high consumption of violent action games exhibit poorer proactive, but not reactive cognitive control (Bailey, West, & Anderson, 2010) and that 30 minutes spent playing a violent video game (as compared to a nonviolent video game) is sufficient to elicit short-term decreases in prefrontal cortical activity (brain areas associated with executive functioning) during a cognitive inhibition task (Hummer et al., 2010). More recently, experimental studies have shown that the same type of fast-paced violent video games that can improve visual attention also cause decrements in executive function (Swing & Anderson, 2012; Hummer et al., 2010).

Effects on Empathy and Prosocial Behavior

There is also a wealth of evidence linking violent media use to decreased empathy and prosocial behavior. One of the best examples of experimental (and quasi-experimental) research on this topic can be found in two studies conducted by Bushman and Anderson (2009). In Study 1, undergraduates were randomly assigned to play a violent or a nonviolent game for 20 minutes. After this, a loud fight was staged within the participant's earshot. At the conclusion of this fight, a confederate supposedly sustained an injury. Participants who had played the violent game were significantly slower to help

the injured victim, taking more than 450% longer to act. In a separate field study a similar effect was found for adult moviegoers. A minor emergency (i.e., a female confederate dropping her crutches and struggling to retrieve them) was staged outside of movie theaters. Moviegoers who had just watched a violent movie took significantly longer to help the confederate than did moviegoers who had just watched a nonviolent movie or had not yet watched a movie of either type. Similar reductions in prosocial behavior after violent video game exposure have been found in experiments with children (Saleem, Anderson, & Gentile, 2012). Other experiments have found that playing a violent game (as compared to a nonviolent game) with a partner reduces cooperative behavior and increases exploitative behavior in a social dilemma with the same partner (Sheese & Graziano, 2005). Similarly, being the victim of aggression in a video game also reduces cooperative behavior in social dilemmas (Rothmund, Gollwitzer, & Klimmt, 2011).

Cross-sectional and longitudinal studies also support the link between violent media exposure and reduced empathy and prosocial behavior. For example, one cross-sectional study found that children's exposure to video game violence (but not exposure to television or movie violence) was negatively associated with empathy (Funk, Baldacci, Pasold, & Baumgardner, 2004). One three-wave longitudinal study conducted over a period of two years using a large sample of Singaporean children and adolescents found that violent video game use at Time 1 negatively predicted prosocial behavior at Time 3 through decreases in empathy at Time 2 (Gentile et al., 2014). Another three-wave, three-year longitudinal study (also using a large sample of Singaporean children and adolescents), however, found that empathy was no longer a significant mediator of the relationship between violent video game exposure and aggressive behavior two years later when a composite measure of aggressive cognitions was included in the model (Gentile et al., 2014). This suggests that changes in aggressive cognitions have a larger impact on the development of aggressive behavior than changes in empathy, but further research is necessary to support this suggestion. Although empathy was not supported as a mediator in Gentile et al.'s (2014) study, there was still a significant negative relationship between violent video game play and empathy. Negative associations between violent media use and empathy have also been found over a period of 12 months in a longitudinal study utilizing a large sample of German adolescents (Krahé & Möller, 2010).

Finally, and most compellingly, meta-analytic evidence further supports the link between violent media exposure and reductions in empathy and prosocial behavior—at least for video games (Anderson et al., 2010; Greitemeyer & Mügge, 2014)

Conclusion

To summarize, media violence exposure leads to higher levels of aggression. This finding is supported by a large number of studies utilizing a wide variety of methodological approaches. The connection between media violence and aggressive behavior is explained by many different mediational processes. Violent media exposure can change what is considered socially acceptable, how the environment is perceived, and how we feel about violence. All these processes combined lead a higher levels of aggressive behavior. Although an appealing explanation, there is almost no evidence for the opposite argument (i.e., the catharsis theory), that violent media help people to “vent steam” and thus reduce aggression.

Additionally, the effects of violent media are not limited to aggressive behavior. There is also substantial evidence linking violent media exposure to problems with attention, impulsivity, and executive functioning as well as reductions in empathy and prosocial behavior.

Further Reading

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