

Screen Violence and Youth Behavior

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abstract Violence in screen entertainment media (ie, television, film, video games, and the Internet), defined as depictions of characters (or players) trying to physically harm other characters (or players), is ubiquitous. The Workgroup on Media Violence and Violent Video Games reviewed numerous meta-analyses and other relevant research from the past 60 years, with an emphasis on violent video game research. Consistent with every major science organization review, the Workgroup found compelling evidence of short-term harmful effects, as well as evidence of long-term harmful effects. The vast majority of laboratory-based experimental studies have revealed that violent media exposure causes increased aggressive thoughts, angry feelings, physiologic arousal, hostile appraisals, aggressive behavior, and desensitization to violence and decreases prosocial behavior (eg, helping others) and empathy. Still, to more fully understand the potential for long-term harm from media violence exposure, the field is greatly in need of additional large-sample, high-quality, longitudinal studies that include validated measures of media violence exposure and measures of other known violence risk factors. Also, although several high-quality media violence intervention studies have been conducted, larger-scale studies with more comprehensive and longer-term assessments are needed to fully understand long-term effects and to inform the development of tools that will help to reduce problems associated with aggression and violence. The evidence that violent screen media constitutes a causal risk factor for increased aggression is compelling. Modern social-cognitive theories of social behavior provide useful frameworks for understanding how and why these effects occur.

Adolescents spend ~9 hours per day consuming some form of entertainment media, which includes television, Internet, and computer and video games (including those played on handheld devices such as cellular phones).¹ Video games in particular have increased in popularity, with some teenagers reporting that they play ≥ 40 hours per week. The sheer number of hours that

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The analysis, conclusions, and recommendations contained in each paper are solely a product of the individual workgroup and are not the policy or opinions of, nor do they represent an endorsement by Children and Screens: Institute of Digital Media and Child Development or the American Academy of Pediatrics.

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some youth spend playing video games has led policy makers, parents, teachers, and researchers alike to question the potential negative and positive effects that video games can have on players. Thus, our report not only highlights research involving violent video games but also includes research involving other types of violent screen media.

We emphatically state from the outset that video games are not inherently “bad.” There are many potential cognitive and social benefits of video game play; some have received empirical support.² Well-designed video games are excellent teachers (highly motivating, engaging, and responsive to the player’s skills). However, violent video games can also have negative effects on players.

Some additional preliminary information is useful to provide a context for the current review. First, the terms “aggression” and “violence” as understood by behavioral scientists must be clarified. Aggression is defined as any action that is intended to cause harm to another who is motivated to avoid being harmed; violence is an extreme form of aggression that has the potential to produce severe physical harm, such as injury or death, to another. Not all aggressive behavior is violent, but all violent behavior is aggressive. The effects of violent media on aggressive behavior have been the subject of intense public debate and, to a lesser extent, scientific debate. Although debate is a healthy component of the scientific process, the vast majority of media effects scholars, pediatricians, and all major scientific panel reports agree: evidence supporting theoretically well-founded hypotheses linking violent media to aggressive and violent behavior is considerably more voluminous and convincing than the rare contradictory finding.^{3,4} Science is a cumulative endeavor, and therefore evidence is not expected

to uniformly and unfailingly support or refute any hypothesis. Thus, the fact that some studies fail to find effects of media exposure on relevant outcomes, such as aggression, must be considered alongside the many studies that do report such effects. From a logical standpoint, if we accept that exposure to violence in the home, school, and community can harm children, as research suggests it does,^{5,6} it seems inconsistent to suggest that exposure to violence in media would have no harmful effects.⁷ Similarly, if we agree that video games have the potential to teach positive behaviors, it again seems inconsistent to suggest that video games do not have the potential to also teach negative behaviors.

It is also important to understand that no single risk factor causes a child or adolescent to behave aggressively or violently. Instead, it is the accumulation of risk factors and the relative lack of protective factors that lead to aggressive and violent acts.^{8–10} We do not contend that media violence is the only or, in most cases, even the primary causal risk factor for aggressive or violent behavior in youth. However, the research consistently supports the hypothesis that it is one of the risk factors and that it is not the smallest of them. Importantly, it is one of the few risk factors that can be modified with little cost to parents or to society in general.

CURRENT STATE

Since Albert Bandura’s classic Bobo doll study,¹¹ which illustrated that children will imitate physical attacks on inanimate objects that they view on television, social learning theories have provided a convincing theoretical framework to understand violent media effects.¹² A large body of evidence reveals that violent media can increase aggression.¹² Indeed, the effects

of screen violence on increased aggressive behavior have been reviewed and affirmed by numerous major scientific organizations, including the American Academy of Pediatrics, the American Academy of Child and Adolescent Psychiatry, the American Medical Association, the American Psychiatric Association, the American Psychological Association, the US Surgeon General, the Society for the Psychological Study of Social Issues, and the International Society for Research on Aggression.¹³ A comprehensive meta-analysis found that exposure to violent video games increases aggressive thoughts, angry feelings, physiologic arousal, hostile appraisals, and aggressive behavior and decreases prosocial behavior (eg, helping others) and empathy (Fig 1).¹² A recent meta-analysis also revealed that exposure to violent media increases hostile appraisals (ie, judgments of the hostile actions or intentions of others).¹⁴ A 2015 American Psychological Association report by a panel of experts on child development and meta-analysis techniques revealed similar findings.¹⁵ Effects on aggressive behavior occur after brief 1-time exposures (as in laboratory experiments) and after repeated exposure over time (as in longitudinal studies) (Fig 2). These effects occur for male and female subjects of all ages studied, in both Western and Eastern countries.¹²

The fact that violent video games increase aggressive thoughts, angry feelings, and physiologic arousal can help explain why they can also increase aggressive behavior. These are the 3 routes to aggression proposed by several social-cognitive information processing models (Fig 3)^{16,17}: people who (1) have aggressive ideas and thoughts, (2) feel angry, and (3) are physiologically aroused and stressed are especially likely to behave aggressively. Violent media also increase hostile appraisals.^{16,17}

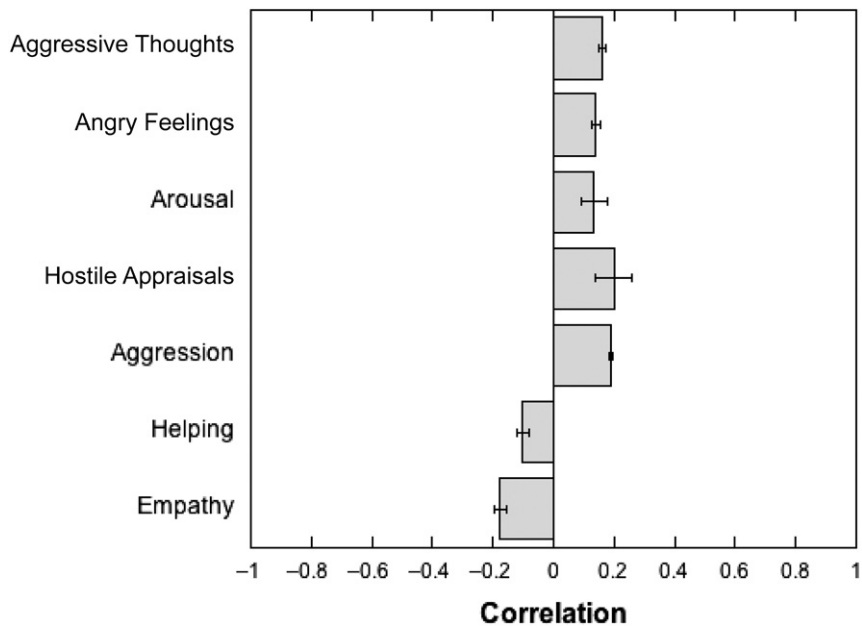


FIGURE 1 Meta-analysis of 381 effects from violent video game studies involving 130 295 participants published in 136 articles on aggressive thoughts ($k = 95$, $N = 24\,533$), angry feelings ($k = 62$, $N = 17\,370$), physiologic arousal ($k = 29$, $N = 1906$), aggression ($k = 140$, $N = 68\,313$), prosocial behavior (eg, helping; $k = 23$, $N = 68\,313$), and empathy and/or desensitization ($k = 32$, $N = 8528$),¹² along with a meta-analysis of 37 independent studies involving 10 410 participants on the relation between violent media exposure and hostile appraisals.¹⁴ Capped horizontal bars are 95% confidence intervals.

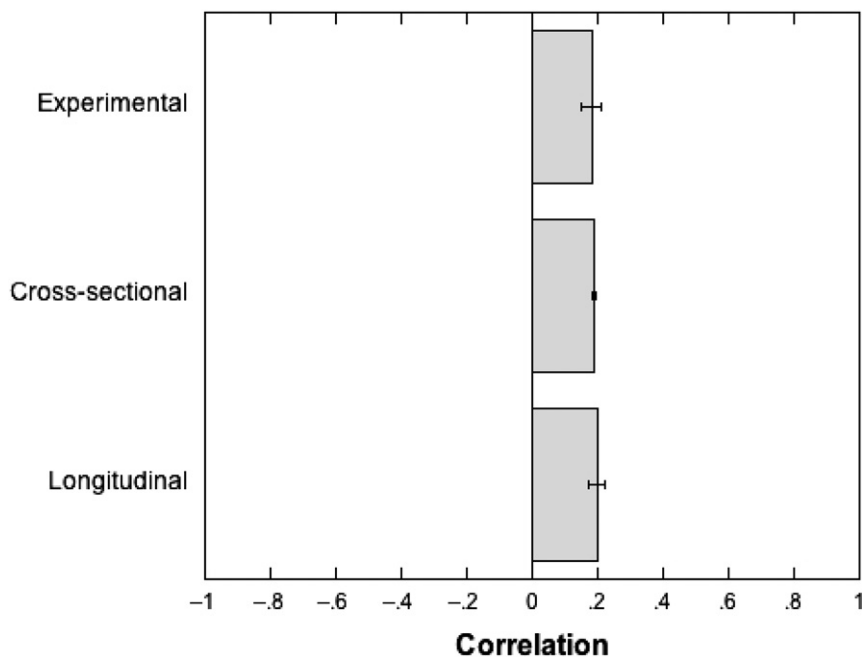


FIGURE 2 Effects of violent video games on aggression in experimental studies ($k = 45$, $N = 3464$), cross-sectional studies ($k = 81$, $N = 59\,336$), and longitudinal studies ($k = 14$, $N = 5513$).¹² Capped horizontal bars are 95% confidence intervals.

Violent media also can desensitize people to violence, making them less sensitive to the pain and suffering of others. Desensitization is a normal and protective phenomenon that occurs automatically over time in response to difficult experiences, such as soldiers killing enemies in war and surgeons performing operations. In the case of desensitization to media violence, the process is likely gradual and unconscious, occurring as a result of repeated presentations of violence as necessary, justified, and fun.¹⁸

Exposure to violence in media does not solely affect aggressive behavior. Although most research has focused on the effects of media violence on aggression, researchers have recently examined other outcomes of, for example, violent video game play. Violence in games is often heavily associated with other game mechanics and themes that can lead to harmful effects. Some of these effects appear to be related to violent video game play in particular, whereas others may be related to high media consumption in general. For example, attentional problems have become an important area of focus in research on negative outcomes of screen media in children and adolescents.¹⁹ In 1 longitudinal study, the amount of exposure to television at 1 and 3 years of age predicted attention problems at 7 years of age.²⁰ The authors of other studies similarly have identified decrements in attention abilities in youth after high television viewing and habitual video game play.^{21–23} Recent research suggests that exposure to violent media may also interfere with academic performance²⁴ and with learning a foreign language.²⁵ This finding accords with data revealing that screen media exposure, especially exposure to violent media, is associated with executive control impairments and that this effect

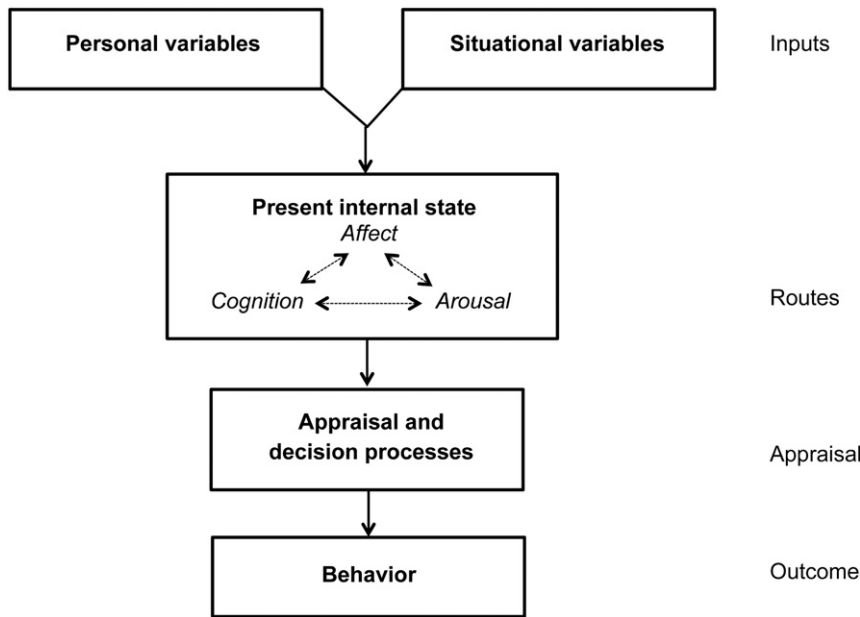


FIGURE 3
A representative social-cognitive information processing model: the General Aggression Model.¹⁶

predicts high levels of impulsive aggression.²⁶

Another body of research reveals that playing action video games results in enhancements in basic visual sensory processing, selective visual attention, and some higher cognitive skills.²⁷ Although many action video games are violent, the violence does not appear to be a necessary characteristic to produce such enhancements. For example, certain car driving games and children’s games (which retain the fast pace, the need to identify targets from among distracting clutter, and the requirement to produce quick and accurate decisions) lead to similar effects despite their lack of violence.²⁸

FUTURE RESEARCH

To address remaining scientific questions related to this topic, we believe that there are 2 major and somewhat interrelated needs, each of which requires large-scale, multisite, preferably multinational, long-term studies. The first is a large-scale (ie, at least 50 000

participants) developmental study that incorporates state-of-the-art measures of all known major child and adolescent risk and resilience factors for the development of aggressive and violent behavior tendencies. The study should follow the same large sample of children from an early age (eg, 2 years) through early adulthood (eg, 30 years), and should include known biological, environmental, and social prenatal and postnatal factors that affect the development of healthy, productive adults (versus unhealthy, unproductive, antisocial adults). The study should oversample from high-risk populations. We emphasize the need for state-of-the-art measures because previous large-scale, long-term studies of child development have included weak and/or incomplete measures of media habits. Work of such an extensive scope would undoubtedly require a multisite, federally funded effort, such as that currently being undertaken by scientists funded by the National Institutes of Health to study the neural bases of drug use and related disorders in adolescence and early adulthood.²⁹

Second, a similarly large-scale, multisite, multiyear study is needed to further develop and test media exposure interventions to ascertain what works as well as to provide better evidence-based options for public policy makers and consumers to implement. There have been several media violence intervention studies over the past 40 years, some of which have shown promise in reducing future aggressive or violent behavior. For example, an intervention built into a 4-wave longitudinal study with a sample of over 1600 adolescents in Germany revealed sustained effects of a 5-week intervention to reduce media violence use and promote an understanding of the processes linking media violence use to aggressive thoughts, feelings, and behavior.³⁰ Participants assigned to the intervention group used violent media to a lesser extent up to 30 months postintervention, and there was an indirect effect of the intervention via reduced media violence on aggressive behavior up to 18 months postintervention. However, there have been no truly large-scale (eg, 20 000 children), long-term (eg, 30 years) intervention studies that have focused specifically on modifying children’s and adolescents’ media diet, both in terms of content and amount and that have included other known risk and resilience factors for long-term development as well as extensive assessments of midlife achievement, both good and bad.

RECOMMENDATIONS

The most common question we hear from educators and policy makers (“Are video games good or bad for children and adolescents?”) is much too simplistic. Rather, it is more helpful to think in terms of a healthy media diet that incorporates similar properties to a healthy food diet: moderation in amount, consuming

more of the helpful and less of the harmful content, and having regard for the age of the consumer.³¹ Pediatricians are in a unique position to begin counseling parents about a healthy media diet. Well-care visits, which occur with relative frequency in the first few years of life, present ideal opportunities for discussing how parents should help children deal with the abundance of media that they will encounter, and why this is important. It is important that pediatricians, policy makers, and educators know what media

children are consuming. The best way to do this is to watch, play, and listen to the media youth are consuming. Thus, we recommend that pediatricians, educators, and other professionals who work with children suggest to parents that they do this, preferably at the same time their children are engaging with them. Just as important, pediatricians and other professionals working with youth should suggest to parents that they have an ongoing dialogue with their children about what they are seeing and hearing.³² It is also

useful for pediatricians and others working with families to recommend that parents consider setting time and content limits on the electronic media that their children consume. The American Academy of Pediatrics recommends no screen time for children <18 months old and 1 hour of screen time per day for youth <5 years old; for children ages 6 and older, consistent limits on screen time and the types of media should be enforced, and media should never take the place of adequate sleep or physical activity.¹³

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REFERENCES

1. Common Sense Media; VJR Consulting. The Common Sense census: media use by tweens and teens. 2015. Available at: https://www.commonsensemedia.org/sites/default/files/uploads/research/census_researchreport.pdf. Accessed August 24, 2016
2. Prot S, Anderson CA, Gentile DA, Brown SC, Swing EL. The positive and negative effects of video game play. In: Jordan A, Romer D, eds. *Media and the Well-being of Children and Adolescents*. New York, NY: Oxford University Press; 2014:109–128
3. Anderson CA, Andrighetto L, Bartholow BD, Bègue L, Boxer P. Consensus on media violence effects: comment on Bushman, Gollwitzer, and Cruz. *Psychol Pop Media Cult*. 2015;4(3):215–221
4. Bushman BJ, Gollwitzer M, Cruz C. There is broad consensus: media researchers agree that violent media increase aggression in children, and pediatricians and parents concur. *Psychol Pop Media Cult*. 2015;4(3):200–214
5. Guerra NG, Huesmann LR, Spindler A. Community violence exposure, social cognition, and aggression among urban elementary school children. *Child Dev*. 2003;74(5):1561–1576
6. Mohammad ET, Shapiro ER, Wainwright LD, Carter AS. Impacts of family and community violence exposure on child coping and mental health. *J Abnorm Child Psychol*. 2015;43(2):203–215
7. Bushman BJ, Huesmann LR. Twenty-five years of research on violence in digital games and aggression: reply to Elson & Ferguson (2014). *Eur Psychol*. 2014;19(1):47–55
8. Berkowitz L. *Aggression: Its Causes, Consequences, and Control*. Philadelphia, PA: McGraw-Hill; 1992
9. Eron LD, Huesmann LR, Lefkowitz MM, Walder LO. How learning conditions in early childhood—including mass media—relate to aggression in late adolescence. *Am J Orthopsychiatry*. 1974;44(3):412–423
10. Krahé B. *The Social Psychology of Aggression*, 2nd. London: Psychology Press; 2013
11. Bandura A. Influence of models’ reinforcement contingencies on the acquisition of imitative responses. *J Pers Soc Psychol*. 1965;1(6):589–595
12. Anderson CA, Shibuya A, Ihori N, et al. Violent video game effects on aggression, empathy, and prosocial behavior in eastern and western countries: a meta-analytic review. *Psychol Bull*. 2010;136(2):151–173
13. Iowa State University. Statements on media violence effects by major scientific groups. Available at: <http://public.psych.iastate.edu/caa/StatementonMediaViolence.html>. Accessed August 24, 2016
14. Bushman BJ. Violent media and hostile appraisals: a meta-analytic review. *Aggress Behav*. 2016;42(6):605–613
15. American Psychological Association. APA review confirms link between playing violent video games and aggression [press release]. Available at: <http://www.apa.org/news/press/releases/2015/08/violent-video-games.aspx>. Accessed November 9, 2015
16. Anderson CA, Bushman BJ. Human aggression. *Annu Rev Psychol*. 2002;53(1):27–51
17. Huesmann LR. An information processing model for the development of aggression. *Aggress Behav*. 1988;14(1):13–24
18. Brockmyer JF. Playing violent video games and desensitization to violence. *Child Adolesc Psychiatr Clin N Am*. 2015;24(1):65–77

19. Nikkelen SW, Valkenburg PM, Huizinga M, Bushman BJ. Media use and ADHD-related behaviors in children and adolescents: a meta-analysis. *Dev Psychol*. 2014;50(9):2228–2241
20. Christakis DA, Zimmerman FJ, DiGiuseppe DL, McCarty CA. Early television exposure and subsequent attentional problems in children. *Pediatrics*. 2004;113(4):708–713
21. Gentile D. Pathological video-game use among youth ages 8 to 18: a national study. *Psychol Sci*. 2009;20(5):594–602
22. Christakis DA, Garrison MM, Herrenkohl T, et al. Modifying media content for preschool children: a randomized controlled trial. *Pediatrics*. 2013;131(3):431–438
23. Landhuis CE, Poulton R, Welch D, Hancox RJ. Does childhood television viewing lead to attention problems in adolescence? Results from a prospective longitudinal study. *Pediatrics*. 2007;120(3):532–537
24. Çetin Y, Lull RB, Çelikbaş M, Bushman BJ. Exposure to violent and sexual media content undermines school performance in youth. *Adv Pediatr Res*. 2015;2(6):1–7
25. Lull RB, Çetin Y, Bushman BJ. Violent and sexual media impair second-language memory during encoding and retrieval. *J Exp Soc Psychol*. 2015;56:172–178
26. Swing EL, Anderson CA. The role of attention problems and impulsiveness in media violence effects on aggression. *Aggress Behav*. 2014;40(3):197–203
27. Green CS, Bavelier D. Learning, attentional control, and action video games. *Curr Biol*. 2012;22(6):R197–R206
28. Wu S, Spence I. Playing shooter and driving videogames improves top-down guidance in visual search. *Atten Percept Psychophys*. 2013;75(4):673–686
29. National Institutes of Health. NIH launches landmark study on substance use and adolescent brain development [press release]. Available at: <https://www.nih.gov/news-events/news-releases/nih-launches-landmark-study-substance-use-adolescent-brain-development>. Accessed September 28, 2015
30. Krahé B, Busching R. Breaking the vicious cycle of media violence use and aggression: a test of intervention effects over 30 months. *Psychol Violence*. 2015;5(2):217–226
31. Warburton WA. Growing up fast and furious in a media saturated world. In: Warburton WA, Braunstein D, eds. *Growing Up Fast and Furious: Reviewing the Impacts of Violent and Sexualised Media on Children*. Sydney: The Federation Press; 2012:1–33
32. Children CA; COUNCIL ON COMMUNICATIONS AND MEDIA. Adolescents, and the Media. *Pediatrics*. 2013;132(5):958–961

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