

The American Psychological Association Task Force Assessment of Violent Video Games: Science in the Service of Public Interest

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A task force of experts was convened by the American Psychological Association (APA) to update the knowledge and policy about the impact of violent video game use on potential adverse outcomes. This APA Task Force on Media Violence examined the existing literature, including the meta-analyses in the field, since the last APA report on media violence in 2005. Because the most recent meta-analyses were published in 2010 and reflected work through 2009, the task force conducted a search of the published studies from 2009–2013. These recently published articles were scored and assessed by a systematic evidentiary review, followed by a meta-analysis of the high utility studies, as documented in the evidentiary review. Consistent with the literature that we reviewed, we found that violent video game exposure was associated with: an increased composite aggression score; increased aggressive behavior; increased aggressive cognitions; increased aggressive affect, increased desensitization, and decreased empathy; and increased physiological arousal. The size of the effects was similar to that in prior meta-analyses, suggesting a stable result. Our task force concluded that violent video game use is a risk factor for adverse outcomes, but found insufficient studies to examine any potential link between violent video game use and delinquency or criminal behavior. Our technical report is the basis of this article.

Keywords: APA Task Force on Violent Media, video game violence, violence, aggression, policy, public interest

Youth violence, including homicide rates, is higher in the United States than in other developed countries, particularly for males (David-Ferdon & Simon, 2014). News commen-

tators often turn to violent video game use as a potential causal contributor to extreme acts of violence, such as those that take place in mass homicides. Media reports point to

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This article is based on the findings and technical report of the American Psychological Association Task Force on Violent Media, which was chaired by Dr. Mark I. Appelbaum. The authors thank Ms. Amani Chatman for her assistance with the technical report.

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perpetrators' gaming habits as either a reason that they have chosen to commit their crimes, or as a method of training (Bushman et al., 2015). This practice extends at least as far back as the Columbine Massacre (1999) and has more recently figured prominently in the investigation and reporting of the Aurora Theater Shootings (2012), Sandy Hook Massacre (2012), and Washington Navy Yard Massacre (2013). Overall, more than 90% of U.S. children, including 97% of adolescents, use video games (NPD Group, 2011; Lenhart et al., 2008), with 98% of video games that are rated as for Teens and 64% of video games that are rated as for Everyone containing violent content (Haninger & Thompson, 2004; Thompson & Haninger, 2001).

Although ongoing concerns have been voiced about the impact of violent video game exposure on youth aggression (i.e., the cognitions, affect, or behaviors that involve harm to another person or animate being, typically with intent to do so, e.g., Coie & Dodge, 1988; VandenBos, 2007), and violence (i.e., an extreme form of physical aggression that has a high likelihood of causing harm, e.g., Anderson, 2000; Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002), there has been heated disagreement in this field about the role that violent video game use actually has on these outcomes. It is interesting that different meta-analyses have demonstrated statistically significant effect sizes of violent video game use on increases in overall levels of aggression, aggressive behavior, aggressive cognitions, aggressive affect, and physiological arousal, as well as decreases in empathy and desensitization to violence (e.g., Anderson et al., 2010; Ferguson, 2007a; Ferguson, 2007b; Ferguson & Kilburn, 2009). All four meta-analyses (Anderson et al., 2010; Ferguson 2007a; Ferguson 2007b; Ferguson & Kilburn, 2009)

reported an effect size greater than zero, and all fell in a relatively narrow range of unadjusted effect sizes. However, the interpretations of these results by the authors varied considerably. In particular, one group of scholars (e.g., Anderson et al., 2010) has argued that their meta analyses yield negative outcomes after youth exposure to violent video games, but other scholars (e.g., Ferguson, 2007a; Ferguson, 2007b; Ferguson & Kilburn, 2009) have interpreted their findings as meaning that these effects are minimal, if not negligible, for the same set of dependent variables and that only extreme acts of violence are really important. The controversy has been: do aggressive effects even exist in this literature, and do those that are typically reported even *matter*?

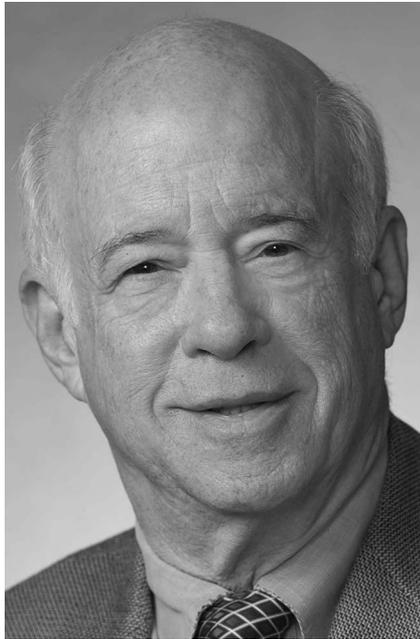
Our task force was charged with updating the literature in this area, focusing to a large extent on the same dependent variables as in prior meta analyses, to determine whether the findings were consistent with more recent data, because those variables are important ones that guide this literature and are the basis of a contentious debate. We were also charged with examining additional variables that have not been adequately examined in the past, but that might shed light on the impact of violent video game use on youth outcomes.

The task force members were selected because of expertise relevant to the examination of the literature and formation of policy on aggression and violent video game use, but were not primary stakeholders in any conclusions that were derived from the outcomes of the review.¹ All task force members disclosed any potential conflict of interests at the first committee meeting, as well as throughout the entire task force review. The review is particularly important given both the amount of new research that has been conducted since the APA last considered this topic in 2005 and the significant changes in gaming technologies, which continue to yield more realistic and engaging games and platforms. Based on its review, empirical examination, and synthesis of the literature, our task force was asked to recommend policies for the APA about youth exposure to violent video games. The task force engaged in a three-step process for its work: (1) identify the relevant literature, (2) review the literature's findings systematically, and (3) synthesize the findings into coherent conclusions and recommendations.

Literature Review Process

To undertake the literature review, the task force adopted a two-pronged approach to identify the literature to be included. First, we conducted a comprehensive search of PsycINFO, MEDLINE, ScienceDirect, Social Science Re-

¹ See <http://www.apa.org/pi/families/violent-media.aspx> for details about the task force members' qualifications.



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search Network, ERIC, Google Scholar, ProQuest, Wilson Social Science Index, and miscellaneous journals and references discovered through the search process. We used the following key words: *violent video games, violence, violent*, aggressive behavior, aggression, aggress*, prosocial*, prosocial behavior, computer games, video*, game*, video games, and media*. The literature to be considered was restricted to research focused on violent video game use separately from other forms of violent media.

Second, based on an initial PsycINFO search, we contacted approximately 130 of the most frequently published researchers in the topic area to request nominations of the 10 strongest empirically based articles addressing violent video game use published between 2000 and 2013. This process yielded four meta-analyses conducted since the last 2005 APA resolution that were directly relevant to the task force's charge to evaluate the literature related to violence in video games.² Given the number of meta-analyses already completed, the task force decided to carefully review those existing meta-analyses to determine what they addressed and how they converged or differed. As mentioned, the four meta-analytic reviews that the task force identified examined the impact of violent video game use on a variety of negative outcomes and all found reasonably similar statistically significant effects, albeit interpreted quite differently (Anderson et al., 2010; Ferguson, 2007a; Ferguson, 2007b; Ferguson & Kilburn, 2009). These meta-analyses reviewed more than 150 research reports, including more than 400 effect sizes. Although the outcomes considered differed somewhat across meta-analyses, a composite aggression score, aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, reduced prosocial

behavior, reduced empathy/desensitization, and criminal violence were included in at least one meta-analysis. Although the four meta-analyses included some different articles and were conducted by investigators who held different perspectives about the impact of violent video game use, our review of the meta-analyses revealed similar significant effect sizes. The task force concluded that they sufficiently covered the existing literature through 2009. A number of questions emerged from our review.

Questions Emerging From the Review of Prior Meta-Analyses

During the review of the meta-analyses, the task force identified seven important issues that were not adequately addressed. These are as follows:

Is this research applicable to children? The early research in this area focused primarily on young adults and more specifically college students (e.g., Anderson & Ford, 1986). Young adults are a group of high interest because they have both a high exposure to violent video games and to other risk factors for aggression and violence. Similar concerns have been voiced about the impact of violent video games on children and adolescents. Implications of this research field are often applied to children, yet relatively few of the studies used in the prior meta-analyses reviewed included children or adolescents younger than age 16 as participants. Given that 71% of eight-to twelve-year-old males report that video games are their favorite media activity (Rideout, 2015), the lack of research on this age group is a major omission.

Does this research address the developmental trajectory of potential effects or the possible course of vulnerability to potential negative effects? Questions have been raised about whether children and adolescents are particularly vulnerable to effects of violent video game use. Prospective longitudinal studies can provide information about the effect of violent video game use on children over time, as they age into adulthood. These kinds of studies would result in a better understanding of how violent video game use affects the lives of participants in ecologically important ways. These studies would also provide estimates of effects and the trajectory of impact as the effects grow or decline across long periods of time. Finally, these studies can inform theory because they can be used to test hypotheses about mediators of impact (i.e., the processes through which effects occur) and moderators (i.e., individual or setting characteristics that alter the impact; McGinnis, Gootman, & Kraak, 2006). However, the meta-analyses we

² The search process yielded a fifth meta-analysis conducted since the 2005 Policy statement (Savage & Yancey, 2008). However, this meta-analysis was not considered to be directly relevant to the Task Force's charge because it did not examine effects of violent video games separately from other forms of violent media.



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reviewed included very few longitudinal studies, and none of those considered enough time points to examine the developmental trajectory of violent video game use and associated outcomes.

Do outcomes for males and females differ? Video game use is typically a male activity (Rideout, 2015). Although nearly all teenagers—99% of boys and 94% of girls ages 12 to 17—are exposed to video games, daily game users are predominantly male (Lenhart et al., 2008). In particular, 38% of preadolescent and 41% of adolescent males use console video games on a given day compared with only 16% of preadolescent and 7% of adolescent females (Rideout, 2015). Moreover, one in 10 preadolescent males and one in seven adolescent males invest more than 4 hours on a given day with video, computer, or mobile games, and these youth fall into a media use pattern known as “gamers” (Rideout, 2015). Adolescent males invest an average of 56 min per day using video games compared with 7 min per day for adolescent females (Rideout, 2015). Males are also at higher risk than are females for perpetrating physical violence (FBI, 2013; Hamby, Finkelhor & Turner, 2013). Including females in participant samples without analyzing potential gender effects may distort group findings. The meta-analyses reviewed typically did not consider gender differences in outcomes or often collapsed across gender after an initial analysis of baseline differences, potentially masking important gender differences.

Does the ethnic background of children matter? The demographics of U.S. culture are rapidly changing, with more ethnic minority children comprising our population than was the case in the past. In 2014, youth who were under age 18 were 52% European American, 14% African

American, 24% Hispanic, 4% Asian, and less than 1% Native American or Native Alaskan (Colby & Norton, 2015). By 2060, the estimate is that 36% of U.S. youth under age 18 will be European American, 13% African, 34% Hispanic, 8% Asian, and less than 1% Native American or Native Alaskan (Colby & Norton, 2015).

Ethnic minority children are more likely to live in concentrated poverty than are their European American peers, with 45% of poor African American children, 35% of poor Hispanic children, and 12% of poor Caucasian children living in concentrated poverty (Austin, 2013). Children who live in poor neighborhoods are also more likely to experience social and behavioral issues (Austin, 2013). Hispanic and African American children are heavy users of video games. In a national sample of *all* youth who were ages 8–18 years of age, African American (38 min) and Hispanic (30 min) preadolescents spent significantly more time each day using video games than did their European American peers (26 min); adolescents, by contrast, used video games about the same amount of time (about a half an hour per day), regardless of ethnicity (Rideout, 2015). However, preadolescent gamers, who devoted extensive time to video game play, were more likely to be European American (53%) than Hispanic (16%) or African American youth and were overwhelmingly male (68%). That same pattern held for adolescent gamers, who again were more likely to be European American (66%) than Hispanic (15%) or African American (9%) and were overwhelmingly male (70%). African American males are also more likely to be involved in violence (Bushman et al., 2015). Based on these data, we found it interesting that relatively few studies, let alone meta-analyses, had considered children’s ethnic background.

Does the degree of exposure matter? Some questions of policy importance focus on the issue of dose (e.g., Dunn, Trivedi, Kampert, Clark, & Chambliss, 2005). A question of concern to our task force was whether individuals with greater exposure to violent video games are more likely to demonstrate increased aggressive outcomes. A second question is whether there is some level or threshold of exposure that marks a point of potential concern. In many of the experimental studies, a single dose of exposure is administered to every participant. In studies of violent video game habits, by contrast, it is more likely that exposure is indexed as a continuous measure based upon the reported frequency of exposure to violence and magnitude of violence in video games. The meta-analyses did not adequately address questions related to degree of exposure.

What is the role of other known risk factors for aggression in moderating or mediating the effects of violent video game use? Research has identified a number of risk factors for the development of aggression, including factors at the level of the individual (e.g., aggressive traits, neurobiological features, academic achievement), the fam-



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ily (e.g., low socioeconomic status [SES], harsh disciplinary practices), peers (e.g., peer rejection, bullying), school (e.g., exclusionary disciplinary practices), and the neighborhood or community (e.g., poor urban settings; see Dodge, Coie, & Lynam, 2006; Eisner & Malti, 2015). Children who experience multiple risk factors are more likely to engage in aggression (Dodge et al., 2006; Herrenkohl et al., 2000). Most of these factors were not tested in the meta-analyses that we reviewed because an insufficient number of studies had included these other aggression risk factors. Other moderation factors were included in at least one meta-analysis, such as duration of game use, and Eastern versus Western cultures (Anderson et al., 2010).

What is the role of other game characteristics? In addition to the violent content in video games that may be related to aggressive behavior by game users, there have been questions about other qualities of the experience that may influence aggressive outcomes. Some of these factors involve the properties of the video game, others involve how the game is played, and still others involve the player needs that game use fulfills.

The *properties of the game* include factors such as the presence or absence of a plot, the kind of plot, and the production features used to present aggressive content. TV programs and movies are often based on stories with plots that have morals in which the hero acts aggressively to save others and overcomes a desire for revenge and retribution (Calvert, 2015; Calvert, Murray, & Conger, 2004). The moral decision of how heroes respond to the aggression of others, particularly in regard to their own desire to take revenge, provides a potentially redeeming quality to these experiences, as all humans grapple with the impulse to “get

even” with those who have “wronged them” at varying points in their lives (Calvert, Kondla, Ertel, & Meisel, 2001). Comprehension of these complex archetypal plots has implications for how youth perceive heroic characters, as adolescents with poor plot comprehension were more likely to identify with the villain than those who understood the story (Calvert et al., 2004).

Although early violent video games typically reduced the plot to a bare minimum (Calvert, 1999), changes over time have led to an increased use of complex plots, which require players to grapple more with their feelings and decisions about vengeance. For example, player actions in *Assassin’s Creed II* can lead players to feel guilty, and they are able to decide how much revenge they will pursue as well as how they assassinate other players (HavenDan, 2015). Other violent video games explicitly involve taking on antisocial roles (e.g., Grand Theft Auto). Virtually no research has been directed to the presence, and more especially to the *kind of plot*, that is part of violent video games, particularly as the games have evolved. Content analyses of violent video games are needed over time, and more attention is needed about the stories and morals of specific video games that are being used as stimuli in various studies.

How the game is played involves the user interface (e.g., joystick, Wii remote, or player movements per se), the player perspective (e.g., 3rd person vs. 1st person viewpoint), and the use of competition and cooperation as ways to engage players in the game. Game interfaces have changed considerably over time, with user activity much more cumbersome in the past than is the case at present (Przybylski, Rigby, & Ryan, 2010). Players also have a symbolic perspective during game play through their characters. First-person perspectives have been thought to impact the player the most because their perspective is that of the avatar, which may increase player identification with their character; by contrast, third-person perspectives treat the player as a more distal agent with control over that avatar (O’Keefe & Zehnder, 2004). Some researchers have also suggested that competitive features of games, not the aggressive content, produce the aggressive effects (Adachi & Willoughby, 2011).

User needs, or motivations for using violent video games, include the satisfaction of three basic human needs: competence, autonomy, and relatedness (Przybylski et al., 2010). Based on the identity of the users, specific games may have differential effects on them. In addition, perceptually salient production features and engaging plots can influence how the game is experienced, leading to immersion in a video game program, which may enhance player enjoyment. To the extent that enjoyment increases, players may experience what is described as “flow,” which can facilitate sustained exposure to the violent video game over time. As exposure increases, deleterious effects of exposure, such as desensitization, may increase (Calvert, 1999). The



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role of these characteristics in the relationship between violent video game use and aggressive outcomes was mostly unexplored in the early literature.

Summary. Based on the extant literature and the prior meta-analyses about violent video game use and aggression, we found several areas that were worthy of evaluation in addition to those that have typically been studied. These new areas included the impact of violent video game use on children per se, developmental trajectories, gender influences, ethnicity influences, the degree of exposure, other risk factors (e.g., low SES), and other characteristics of games, including the needs that are met by game use. These categories are not mutually exclusive, making it extremely difficult to tease out differential impacts of game use.

An Empirical Examination of the New Literature Since 2009

After reviewing the existing meta-analyses and identifying the issues with the prior literature, the task force turned to the more recently published literature. Our review of this literature was designed to address two questions. First, does the more recent literature provide further evidence of the effects of violent video game use, and if so, what do those effects mean and do they *matter*? Second, does the more recent research address the questions about potential moderators that have virtually been ignored in the literature? To answer these questions, we employed two techniques: (1) a systematic evidentiary review, and (2) an effect-size review (meta-analysis) of the studies identified through the systematic evidentiary review as having sufficient utility for addressing the task force's objectives.

Procedure for the Systematic Evidentiary Review of Studies Since 2009

A systematic evidentiary review synthesizes all empirical evidence that meets prespecified criteria to answer specific research questions. This approach uses systematic methods selected to minimize bias in order to produce more reliable findings (Oxman, 1994). The Institute of Medicine and others have utilized systematic evidentiary reviews as a standard approach when summarizing bodies of literature in order to draw conclusions and make policy decisions about a field of research (e.g., McGinnis et al., 2006). A systematic evidentiary review includes the following: a clear set of objectives with predefined eligibility criteria used to include studies in the review; explicit methodology; a systematic search that attempts to identify all studies that meet the criteria; an assessment of the findings in the studies identified; a systematic presentation of the characteristics and findings in the included studies; and conclusions based on the evidentiary review (Zief & Agodini, 2012).

To conduct the systematic evidentiary review, we repeated the literature search process described earlier to capture all relevant articles that became publically available between January 1, 2009 (since the last meta analyses by Anderson et al., 2010), and August 12, 2013. We identified 170 new research reports, including gray literature, which are reported on the APA website.³ Those reports were screened according to the following inclusion criteria developed by the task force: (1) Does the report include at least one empirical analysis addressing video game violence separately from other media violence? (2) Does the analysis include complete statistics? (3) Does the report include at least one outcome variable considered in the earlier meta-analyses: a composite score of aggression, aggressive behavior, aggressive cognitions, aggressive affect, physiological measures, reduced pro-social behavior, reduced empathy/desensitization, delinquency or violence? (4) Does the report include some measurement of violent video game exposure? (5) Does the report include some description or assessment to determine that the violent video game is, in fact, violent? (6) Is the study published in a peer-reviewed academic journal?

In establishing these criteria, the task force sought to create a body of evidence that would be extensive and directly relevant to our goal of identifying relationships between violent video game use and aggressive behaviors and associated outcomes, and to address whether those relationships are causal. Although the task force initially included gray literature in its screen, in part to answer concerns about the potential for publication bias in evidence (see Ferguson, 2007a, 2007b), the task force ultimately decided that peer-review would be an inclusion criterion.

³ See <http://www.apa.org/pi/families/review-video-games.pdf>.



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The rationale was as follows. First, peer-review provides a basic, independent indication of quality. Second, by selecting peer-reviewed journal articles as our source of information, the task force also tried to standardize our unit of inquiry. Whereas the same information may be found in multiple conference proceedings, for example, it is less likely that the same study would be published in multiple locations. The task force examined these articles for all possible effects of violent video game use related to the outcome variables identified through the earlier meta-analyses review, including long-term, short-term, negative, positive and null effects.

Sixty-eight of the 170 articles examined met all six screening criteria. These articles reported the results of 78 studies that were then each coded for study characteristics by one primary coder who had established reliability with two other coders. Coded characteristics included research design and methodology, sample characteristics, violent video game exposure characteristics, aggression risk factors, and outcome variables.⁴

Utility ratings. A systematic evidentiary review includes an assessment of the findings in the identified studies. The first step in the assessment is to determine the utility of the research for meeting the goals of the review. To assess the utility of the evidence provided by the studies in the current review, each study was rated on a 3-point scale (high, medium, low) for 5 dimensions for fulfilling the task force's charge: possibility for causal inference, ecological validity, sampling validity, and measurement of independent and dependent variables. Each of the studies was randomly assigned to two members of the task force for rating, except studies with neurological outcomes, which

were all assigned to two members with topic-matter expertise. Task force members rated each study's contribution to the evidence base pertaining to the research questions identified in the earlier review of meta-analyses.

The studies were then divided into two groups reflecting studies rated as having sufficient utility and those rated as having insufficient utility for informing the decisions and recommendations the task force was charged with making. Studies were assigned to the sufficient utility group if they were rated by at least one rater as having sufficient ecological validity, sampling validity, or possibility for causal inference to address the task force's charge and no more than one of these variables was rated as insufficient in utility by the second rater. In addition, the study had to have at least one dependent and one independent variable rated as having sufficient measurement validity to be included in the sufficient utility group. We used three primary criteria for evaluating the measures in a study: validity, reliability, and precision. Studies that ranked high on at least one of these factors and low on none of these factors were rated as having sufficient utility. Studies that did not meet these criteria were assigned to the insufficient utility group. Based on 596 cases, the interrater reliability was good with $\kappa = .789$. Any initial differences of more than one unit were resolved by having both raters rescore the article. Study inclusion on the sufficient or insufficient utility group reflected the task force's determination of the potential relevance of the study for answering the specific research questions considered in this review. This rating process yielded 31 studies published since 2009 with sufficient utility to be included in the synthesis of findings.

Next, the task force members considered the evidence available for each research question using the following four inquiries: (1) Was there enough research to draw conclusions? (2) What does the evidence suggest about a relationship between violent video game use and measured outcomes for children and adolescents? (3) What is the utility of the research support? (4) What are the limitations of the data set?

Results

Following this assessment of the utility of the evidence provided by the studies, we completed two major kinds of analyses. The first approach was the systematic evidentiary review of the high utility articles for aggressive behavior; aggressive cognitions; aggressive affect; prosocial, empathy, and moral engagement outcomes; physiological and neurological outcomes; and delinquency and violence outcomes. We also examined potential moderators for these

⁴ Also see <http://www.apa.org/pi/families/review-video-games.pdf> for details on the characteristics of studies coded in the systematic evidentiary review.



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outcomes, including age, gender, ethnicity, overall exposure, other risk factors, and game characteristics.

The second approach was the effect size analyses of the high utility studies for five dependent variables: a composite aggression score; aggressive behavior; aggressive cognitions, aggressive affect, and decreased empathy/desensitization; and physiological arousal. We analyzed these variables because they involve very serious antisocial outcomes that had been the dependent variables in previous meta-analyses, and because the interpretations of these findings have been the focus of a heated debate about whether any detrimental outcomes in some of these areas even matter (see Anderson et al., 2010; Ferguson, 2007a; Ferguson, 2007b; Ferguson & Kilburn, 2009).

The aggressive behaviors in the studies that we reviewed included a range of measures such as peer nomination for aggressive behavior, teacher ratings of aggressiveness, self-report questionnaires, and administration of aversive noise blasts or hot sauce to a confederate. While ethical considerations constrained the use of severe forms of aggression in experimental studies, some of the aggressive behavior measures included self-reports of hitting, pushing, and fighting, which are serious forms of antisocial behavior. The use of peer ratings, teacher ratings, and self-report buttressed the ecological validity of the findings in this area. To dismiss self-report, multiple informant report, and laboratory-based measures of aggression would require dismissing substantial portions of aggression research on a wide range of other topics, including research on bullying, intimate partner violence, and aggression toward sexual minorities (Malti, McDonald, Rubin, Rose-Krasnor, & Booth-LaForce, 2015; Parrott & Lisco, 2015; Watkins, DiLillo, Hoffman, & Tem-

plin, 2015). Such methodological pluralism is usually seen as strengths of these literatures.

Aggressive cognition measures included aggressive intentions, self-reported anger, aggressive cognitions, hostile attributions and expectations, de-humanization, and proviolence attitudes. Hostility, aggressive affect, and less emotional reactivity (i.e., increased desensitization) were the outcome variables measured for aggressive affect. Measures of decreased prosocial behavior, lower levels of empathy to the distress of others, and lower levels of sensitivity to aggression measured that area. Physiological measures included changes in heart rate, skin conductance, and blood pressure.

If exposure to violent video game content results in a range of aggressive and antisocial outcomes as measured in these studies, this state of affairs *matters* in the socialization of our youth. More specifically, such exposure would contribute to a web of potential aggressive outcomes that our youth often experience, particularly our adolescent boys, almost every day (Hamby & Grych, 2013). The results of the systematic evidentiary review are summarized below and in Table 1, organized by outcome variables, followed by the meta-analysis findings, which are summarized in Table 2.

Systematic Evidentiary Review

Aggressive behavior. The link between violent video game exposure and aggressive behavior is one of the most studied and best established (e.g., Anderson et al., 2010). Of the 31 high utility studies, 14 investigated the relation between violent video game use and aggressive behaviors. Aggressive behavior measures included experimental proxy paradigms, such as the administration of hot sauce or a noise blast to a confederate, self-report questionnaires, peer nomination and teacher rating of aggressiveness. Self-reported aggressive behaviors included hitting, pushing, and fighting.

As predicted by cognitive, learning, and arousal theories (Bandura, 1986; Dodge, 1986; Huesmann, 1998; Zillmann, 1991), violent video game use was associated with increased aggressive behavior in 12 of 14 studies published after the earlier meta-analyses. This relation continued to be a reliable finding and demonstrated good multimethod consistency across various representations of both violent video game exposure and aggressive behavior. The relation held across a range of samples, including those with older children, adolescent, and young adult participants. There was also consistency over time, in that the new findings were similar in effect size to those from past meta-analyses (see meta-analytic review).

Since the earlier meta-analyses, the literature has broadened in some directions. For example, there are more longitudinal and multiexposure studies. The literature has also broadened in terms of populations studied, including a lim-



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ited number of studies of children, high-risk populations, and non-U.S. samples, although more similar research is needed. Several longitudinal studies, using both experimental and naturalistic approaches, demonstrated that the effects of violent video game exposure last beyond immediate effects in the laboratory.

Aggressive cognitions. Numerous laboratory experiments and longitudinal studies have assessed the impact of violent video game use on aggressive cognitions, which includes both self-reports and direct measures of cognitive processes. Aggressive cognition measures included hostile attributions and expectations, word completion, Implicit Association Test responses, reported anger, aggressive intentions, aggressive cognitions about the world being a hostile place, dehumanization, and proviolence attitudes.

These measures inform our understanding of the psychological processes through which violent video game use might impact behavior.

Of the 31 studies reviewed, 13 included aggressive cognitions as an outcome. Consistent with schematic processing as an explanatory mechanism (see Huesmann & Miller, 1994), all 13 of these studies found an effect of violent video game use on increased aggressive cognitions, replicating the finding in the pre-2009 research. In general, this research utilized improved designs (e.g., exposure via timed computer presentation and better measurement of dependent variables such as computer-recorded response times, and implicit associations), and longer-term follow-up with participants.

Aggressive affect. Thirteen of the 31 studies included aggressive affect as an outcome; all were experimental studies with adults. Aggressive affect measures included self-report questionnaires, picture rating tasks, and experimental proxy. Consistent with arousal theory (Zillmann, 1991), 12 of the 13 experimental studies that examined the effects of violent video games on affect indicated negative outcomes for adults. The most common negative outcome was increased hostility or aggressive affect. There was also evidence of less emotional reactivity (i.e., increased emotional desensitization) as a negative outcome, which is often seen as a result of previous experience with violent video games. There were no nonexperimental, naturalistic studies of the affective outcomes of violent video game use on adults. Also, there were no studies of the effects of violent video games on children's affect.

Prosocial behavior, empathy, and sensitivity to aggression. In addition to increases in aggressive outcomes, 9 studies examined decreases in socially desirable behaviors following exposure to violent video games. Consistent with social-cognitive theory (Bandura, 1986) and arousal theory (Zillmann, 1991), 7 of the 9 studies revealed decreased pro-social behavior, empathy to the distress of

Table 1
Key Findings from the Evidentiary Review

1. Exposure to violent video games is associated with increases in aggressive behavior, aggressive thoughts, aggressive feelings, and reductions in prosocial behaviors, empathy, and sensitivity to aggression. These findings cross a variety of different kinds of methodologies, including experimental research, and are robust. Hence, we concluded that exposure to violent video games is a risk factor for aggressive outcomes.
2. There are insufficient studies that examine the link between exposure to violent video games and delinquency, criminal behavior, or other violent outcomes. This area is an important one in need of additional research.
3. Even when risk factors such as antisocial personality traits, delinquency, poor academic achievement, parental conflict, child and parent depression, and exposure to deviant peers are controlled, the relation between violent video game exposure and aggressive outcomes remains robust.
4. The current data suggest that the magnitude of relation between exposure to violent video games and aggressive outcomes does not differ for adolescents, college students, and young adults. However, there are virtually no studies on children under age 10.
5. There are major gaps in the literature about the impact of violent video game exposure as a function of gender, ethnicity, and socio-economic status. These variables are in need of future study.
6. Although more exposure to violent video games is associated with higher levels of aggressive outcomes, there are insufficient studies that examine dose-response relation links with violent video game exposure.
7. There are gaps in the literature about video game properties (e.g., plots, production features), the player perspective during video game use (e.g., first- versus third-person perspective, competition, or cooperation), and user motivations for using violent video games. These variables are in need of future study.



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others, and/or sensitivity to aggression after violent video-game use. Eight of these studies were experimental. All but two studies included only adult participants.

Physiological and neurological outcomes. None of the 31 studies we reviewed utilized physiological measures as their primary outcomes. Of the eight studies that included physiological measures such as heart rate changes, skin conductance, and blood pressure changes along with other measures, five found an effect of violent video game exposure and three showed no effect.

Two studies that we reviewed examined neurological outcomes as a function of violent video game exposure. Although both found effects, there were too few studies to derive a finding related to neurological outcomes.

Delinquency and criminal behavior. Although the media and the public often ask about the association between violent video game use and delinquency and criminal behavior that involve violence, only one of the 31 studies we reviewed included delinquency, criminal behavior, or

violence as an outcome. Thus, there was too little high utility research addressing these outcomes to reach a conclusion.

Age and developmental trajectory. The new high utility literature added 10 studies with children and adolescents, and 21 studies of young adults. Our two key questions regarding age were as follows. First, is there any evidence that violent video game use is associated with aggressive outcomes for children and adolescents? The studies including children varied in outcome, but overall support the premise that the findings are similar for adolescents, college students and young adults. Nevertheless, there are few studies of children under age 10.

Second, are violent video game use effects stronger at particular ages or developmental stages? The second question cannot be answered from studies included in our review, which have rarely examined the variation of patterns across age groups. Where studies do examine multiple age groups, they do not offer enough variance in participant age to paint a meaningful picture of differential developmental impacts of violent video game use.

Gender. Of the 31 studies included in the evidentiary review, seven included only male participants; nine did not analyze gender though there were male and female participants; two analyzed gender and found no effects, leading the researchers to collapse gender in subsequent analyses; six used gender as a covariate; and only seven analyzed gender fully as a variable of interest. In short, just over half of the studies did not examine potential gender differences for outcomes related to violent video game use.

Given the pervasive findings of gender differences in physical aggression favoring males (e.g., Anderson & Bushman, 2002), empathy favoring females (e.g., Rueckert & Naybar, 2008), and console video game use favoring males (Rideout, 2015), this approach is somewhat surprising. When analyzed, the negative effects of violent video game use do appear for both genders in our findings. Nevertheless, another limitation of the current literature is that potentially different outcomes of violent video game use for males and females are typically not considered. Thus, no

Table 2
Results of Meta-Analyses for All Outcomes

Outcomes	Ferguson & Kilburn (2009)	<i>k, r, d, SE</i>			
		Anderson et al. (2010)	Ferguson (2007a)	Ferguson (2007b)	New studies
Overall composite	27, .080, .161, —				18, .154, .312, .05*
Aggressive behavior		140, .192, .391, —*	5, .150, .303, —*	17, .040, .080, —*	7, .184, .374, .092*
Aggressive cognitions		95, .170, .345, —*	12, .250, .516, —	7, .360, .772, —*	8, .166, .336, .064*
Aggressive affect		62, .100, .201, —^			9, .093, .187, .074*
Decreased empathy/desensitization		32, .179, .364, —^			
Physiological arousal		29, .135, .272, —	4, .270, .561, —		3, .189, .384, .265

^ Aggressive affect analysis. + Decreased empathy/desensitization analysis. * Meta-analyses with corrections for publication bias.



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conclusions were possible regarding gender effects in this domain because of a lack of proper examination of this variable.

Ethnicity. Of the 31 studies in the high utility category, only one— an adolescent Hispanic sample— examined a sample of ethnic minority children from the United States. Thus, there were too few studies involving ethnic minority children to draw any conclusions on this question.

Degree of exposure. Based on social cognitive theory (Bandura, 1986), increased use of violent video games should lead to increased levels of aggressive outcomes through the processes of imitation and disinhibition. The largest body of evidence on the question of whether the degree of exposure impacts violent video game use effects comes from seven nonexperimental studies that assessed violent video game habits among participants. Many naturalistic studies employed a continuous measure of violent video game use (either frequency of violent video game use and/or the degree of violence in frequently played games) and tested the linear association with violence. Five of the 7 studies supported the model that more violent video game use is associated with higher levels of aggressive outcomes. There were insufficient studies that examined a dose-response relation or heightened effects among heavy violent video game users. Therefore, the current evidence base cannot yet specify a particular amount of exposure that clearly marks a problematic level of exposure.

Other known risk factors. Five of the 31 high utility studies included consideration of other known risk factors for aggression, such as antisocial personality traits, delinquency, poor academic achievement, parental conflict, child and parent depression, and exposure to deviant peers. The

predominant strategy in these studies was to use risk factors as covariates in analyses of the effect of violent video game exposure on aggressive outcomes. The main question was as follows: once all of these known risk factors for aggression are accounted for, does violent video game use independently predict aggression? Three of the 5 studies tested for moderation whereby the interaction between violent video game use and one or more risk factors were examined. No study tested mediation, a weakness in how data were analyzed in these studies.

The effects of violent video game use were fairly robust even with the inclusion of third variables known to be risk factors for aggression. Four of the 5 studies support this finding. Only one study reported that violent video game use was not associated with aggression once other risk factors were accounted for. Of the three studies that tested for an interaction between a risk factor and violent video game use, only one documented a marginal effect of education level. Therefore, there is little evidence in the research we reviewed that risk factors moderated the effect of violent video game use on aggressive outcomes.

Other game characteristics. As in the earlier meta-analyses, other violent video game characteristics that might influence aggressive outcomes such as plot, action, pacing, perspective, and competition remain understudied. There were insufficient studies in our review to derive findings about these or any other game characteristics. Given the literature documenting the effects of such features with other media (e.g., Calvert et al., 2004; Potts, Huston, & Wright, 1986), research examining the role of these characteristics in violent video game use might increase our understanding of the critical aspects of the games that contribute to negative effects.

Effect Size Analyses

The task force also conducted effect size analyses of the 31 studies identified in our review as being of high utility in order to compare the earlier meta-analyses review with the review of the more recent literature. These analyses were undertaken to update the literature and to provide an independent assessment of the effect sizes and the meaning of those effect sizes in the violent video game use area. Although we attempted to extract effect sizes from all of the studies in the sufficient utility group, we were only able to compute effect size estimates from 18 of them. The major reason that effect sizes could not be computed for some studies was that they did not report the relevant results in sufficient detail. This is not necessarily a deficiency of the study—some studies were primarily focused on questions other than the impact of violent videogames (e.g., they might focus on the mechanism by which game use affects outcomes rather than the simple magnitude of the effect).

The effect sizes were computed as the difference between the mean outcome among the treated (e.g., exposed to violent video games) group versus the control group (e.g., exposed to nonviolent video games), expressed in (within treatment group) standard deviation units, sometimes called Cohen's *d*. Note that different studies used somewhat different outcome measures and the effect size measure is designed to put all of the mean differences (i.e., treatment effects) on the same scale. We chose to use the metric of Cohen's *d* because many of the studies were experimental, and it is the most common metric for use with experimental studies (Hedges & Olkin, 1985).

We also coded the variances of the effect size estimates that were used for meta-analysis. There are two statistical models for meta-analysis, known as the fixed effects and random effects models (Hedges & Olkin, 1985). They differ in whether they treat the variation between studies as random error and may lead to slightly different combined results. The results we obtained from fixed and random effects methods were not substantially different so we report here the results of the random effects analyses because they tend to be more conservative.

We conducted five meta-analyses using both fixed and random effects methods for a composite aggression score and separately for studies with each of four outcomes: aggressive behavior; aggressive cognitions; aggressive affect, decreased empathy, and desensitization; and physiological arousal. These outcomes were the only ones that were measured in at least three studies for which we could code effect sizes.

Some of the earlier meta-analyses expressed concern about the potential for publication bias and used methods to adjust for its potential effects (e.g., Ferguson, 2007a; Ferguson, 2007b; Ferguson & Kilburn, 2009). As a consequence, we computed several adjustments for publication bias, including trim and fill (Duval & Tweedie, 2000) and nonparametric weight functions (Hedges, 1992). Because results were similar, we report here only the results for the trim and fill method because this was the method used in previous meta-analyses (Anderson et al., 2010; Ferguson, 2007a; Ferguson, 2007b; Ferguson & Kilburn, 2009).

Note that the earlier meta-analyses used the *r* (correlation coefficient) metric (Anderson et al., 2010; Ferguson, 2007a; Ferguson, 2007b; Ferguson & Kilburn, 2009), while the current meta-analysis used the *d* metric. As a consequence, we converted the results of the previous meta-analyses into the *d* metric (and converted our results into the *r* metric for reference using a standard method, see Hedges & Olkin, 1985). In the summary of the meta-analyses presented in Table 2, we report the standard error of the combined effect size in the current meta-analysis as a measure of the statistical uncertainty of the combined effect size. In comparing the results of the several previous meta-analyses with these new analyses, we do not use a strict statistical significance

test, but rather look at general agreement. We used a 95% confidence interval to determine whether our findings were consistent with prior meta-analyses. However, we note that if significance tests were carried out and the Bonferroni methods were used to adjust for multiple testing, none of the differences would be statistically significant at the 5% level.

Table 2 summarizes our meta-analyses for a composite score of aggression as well as other scholars' findings for: a composite aggression score; aggressive behavior; aggressive cognitions; aggressive affect, decreased empathy and desensitization; and physiological arousal. Corrections for publication bias were used when available. For the composite score of aggression, we found an effect of .31 with a 95% confidence interval of .21 to .42, which is higher than the Ferguson and Kilburn (2009) score. For aggressive behavior, we found an average effect size of 0.37 with a 95% confidence interval of 0.19 to 0.56, which was consistent with previous estimates (Anderson et al., 2010; Ferguson, 2007a), though Ferguson (2007b) is somewhat lower than that range. For aggressive cognitions, we found an average effect size of 0.34 with a 95% confidence interval of 0.11 to 0.46, which was consistent with the effect size of Anderson et al. (2010), but perhaps not with Ferguson's two estimates (2007a; 2007b), which are somewhat larger. For aggressive affect, decreased empathy, and desensitization, we found an effect size of 0.19 with a 95% confidence interval of 0.04 to 0.34, which were consistent with previous estimates by Anderson et al. (2010) for aggressive affect and for decreased empathy/desensitization. For physiological arousal, we found an effect size of 0.38 with a 95% confidence interval of 0.15 to 0.91, which was consistent with estimates from Anderson et al. (2010) and Ferguson (2007a). Overall, then, our effect sizes were consistent with other scholars for all dependent variables except for two effect sizes that were lower and two that were higher than a 95% confidence interval.

Summary

The systematic evidentiary review and the meta-analyses conducted on the recent sufficient utility studies identified by the APA task force demonstrated highly robust correlations between violent video game use and aggressive behavior that are consistent with prior research and meta-analyses. Furthermore, longitudinal studies are consistent with the hypothesis that violent video game use is associated with growth in aggressive behavior over time, and laboratory experiments indicate that exposure to violent video games causes aggressive behavior in this limited context. Specifically, exposure to violent video games resulted in: (a) increased aggressive behavior; (b) increased aggressive cognition; (c) increased aggressive affect, increased desensitization, and decreased empathy; and (d) increased physiological arousal. These findings are consis-

tent with theoretical predictions made by social–cognitive theory, arousal theory, and schematic processing theory. Although some areas did not have sufficient studies to test effects, there were no outcomes supporting a reduction in any kind of aggressive outcome, as predicted in psychoanalytic theory through catharsis. Overall, the outcomes demonstrate clear and consistent adverse effects of violent video game exposure on the social and cognitive behaviors of children, youth, and adults. The gaps in the literature that we identified were partly addressed by more recent studies, but some gaps still remain, particularly studies that examine the link between violent video game exposure and extreme forms of aggression, that is, violence.

Discussion

The charge of the APA Task Force on Violent Media was to review and evaluate the scientific literature and to update the APA policy on the effects of violent video game use. To do this, we asked two major questions. Our first question was if the more recent literature provides further evidence of the effects of violent video game use on aggressive outcomes, and if so, how that research is to be interpreted. The second question was if the more recent literature filled in gaps that we had identified, such as the role of gender, ethnic background, age, dose effects, and game characteristics in aggressive outcomes. The answer to the first question was yes: we found negative deleterious outcomes of violent video game use on aggression. The answer to the second question was that that additional research had been conducted on some moderators that have been absent or infrequently examined in the literature, but more research needs to be conducted about other risk factors.

The recent research included from the systematic evidentiary review of the newer literature, our meta-analyses, and the previously conducted meta-analyses were of sufficient utility, variety, and scope to support the thesis that violent video game use results in negative outcomes. Notably, the findings are reasonably comparable across all of these meta-analyses (Anderson et al., 2010; Ferguson, 2007a; Ferguson, 2007b; Ferguson and Kilburn (2009), including the one conducted by this task force, though the interpretation of effect sizes varied considerably. To draw conclusions, the task force had to consider plausible alternative explanations for effects found and plausible explanations when no effects were found. This approach was simpler when multiple research designs—experimental, observational, and/or longitudinal—were used to study the same relationship between variables within one age group. Research that included methodological and statistical controls for alternative explanations was also useful. However, for outcome variables for which the research did not include multiple well-controlled experimental studies as well as correlational methods, it was difficult to reach conclusions about the relation between

violent video game use and those outcomes. That was the case for one outcome: the effects of violent video game use on extremely violent behavior, such as certain kinds of delinquency and criminal behavior.

To develop our conclusions, the task force considered the review of earlier meta-analyses (Anderson et al., 2010; Ferguson, 2007a; Ferguson, 2007b; Ferguson & Kilburn, 2009) and the results of our systematic evidentiary review and effect size analyses of the more recent literature. All pointed to the same conclusions, providing confidence in the findings that violent video game use is a risk factor for aggression.

Effects of Violent Video Game Use on Aggressive Outcomes

Two main controversies have characterized the field of violent video game use. The first involves publication bias, in which studies with null findings never make it into the literature; hence the argument has been made that the impact of violent video games is overestimated (Ferguson, 2007a; Ferguson, 2007b). The second is that aggressive outcomes per se do not really matter; only extreme forms of violence in real-life settings do (e.g., Ferguson, 2007a).

Consistent with prior meta-analyses, our meta-analyses demonstrated deleterious outcomes of using violent video games on: a composite score of aggression; aggressive behavior; aggressive cognition; and aggressive affect, decreased empathy, and desensitization. Physiological arousal also increased. As recommended by Ferguson (2007a, 2007b), we controlled for publication bias whenever possible. Only four effect sizes previously reported fell outside of our 95% confidence intervals generated by the meta-analyses of the newer literature that were reported here. One was for aggressive behavior (Ferguson, 2007b), which was *lower* than our effect size and two other effect sizes (Anderson et al., 2010; Ferguson, 2007a), and the other was for a composite aggression score (Ferguson & Kilburn, 2009), which was *lower* than our effect size. The other was for two meta-analyses on aggressive cognitions (Ferguson, 2007a; Ferguson, 2007b), both of which were *higher* than our effect size and one other effect size (i.e., Anderson et al., 2010).

Complimenting our meta-analysis findings was our evidentiary review of the 31 high utility studies, which were scored as high on possibility for causal inference, ecological validity, sampling validity, and/or measurement of independent and dependent variables, and not low on any of these variables. The evidentiary review supported the findings of the effect size analyses. Specifically, after violent video game use, 12 of 14 (86%) studies found increased aggressive behavior, 13 of 13 (100%) studies found increased aggression cognition, 12

of 13 (92%) studies found increased aggressive affect, 7 of 9 (78%) studies demonstrated decreased pro-social behavior, decreased empathy, and decreased sensitivity to aggression, and 5 of 8 (63%) studies found changes in arousal. There was only one study of delinquency, so nothing could be concluded on severe forms of violence. Coupled with earlier meta-analyses (Anderson et al., 2010; Ferguson, 2007a; Ferguson, 2007b; Ferguson & Kilburn, 2009), these findings lead to our conclusion that there are negative effects of violent video game use on a range of aggressive outcomes.

Social cognitive theory (Bandura, 1986), schematic and script-based information processing theories (e.g., Huesmann & Miller, 1994), and arousal theory (Zillmann, 1991), all of which predict deleterious outcomes after exposure to violent video games, were supported in the current research, with no support for positive outcomes after video game exposure, that is, reductions in violent actions through catharsis as would be predicted by psychoanalytic theory. The task force also questioned what theory would predict frequent use of any activity, including violent video games, would result in no effects whatsoever, as has sometimes been implicitly claimed in this research area (see Ferguson, 2007a, 2007b, 2015).

So do these deleterious effects of violent video game use on aggression *matter*? The definition of aggression includes cognitions, affect, or behaviors that harm another person or animate being, typically with the intent to do so (see Anderson et al., 2010; Baron & Richardson, 1994; Coie & Dodge, 1988; Ferguson, 2007a; Ferguson, 2007b; Ferguson & Kilburn, 2009; Huesmann & Taylor, 2006; VandenBos, 2007). Violence is a more extreme form of aggression (Anderson, 2000; Krug et al., 2002). Put another way, violence is a subset of aggression.

Concerns have been raised about how serious aggressive outcomes are if there are no extremely violent actions (Ferguson, 2007a; Ferguson, 2007b). Our APA task force concluded that the data we reviewed and analyzed indicate serious antisocial outcomes of using violent video games in areas that *matter*. More specifically, users of violent video games reported feeling hostile or angry, had increases in heart rate and blood pressure, thought about being aggressive, had proviolence attitudes, and acted aggressively in ways that they themselves reported (including hitting, pushing, and fighting) and that others reported about them (i.e., teacher and peer ratings). Essentially, those that use violent video games, especially over time, are exposed to a mean and antisocial world that can influence who they are and what they do. These deleterious findings are well documented, consistent, and pervasive, supported across numerous kinds of studies and summaries of studies, and warrant concern by the public as well as by policymakers.

Risk Factors: Questions Answered and Those Yet to Be Explored

Our second main objective was to examine if holes that we found in the literature remain unanswered, or if more recent research has addressed them. The answer to this question was mixed. In this section, we describe where more research is and is not available to address questions of moderators, and call for additional funding to conduct research to answer these remaining questions.

Age and developmental trajectory. Developmental changes or differences in sensitivity to violence are areas that we targeted in our review. Many studies in this area have historically concentrated on young adults who attend college, a convenience sample. The high utility research since 2009 added 10 more studies on children and adolescents, and 21 new studies on young adults. Overall, those studies found similar adverse outcomes for children as has been found for adolescents and young adults. Even so, children under age 10 are rarely studied, in part because of ethical issues involving exposure of young children to violent video games.

A related question is whether video game use effects are stronger at particular ages and what developmental mechanisms might explain age effects. For example, does violent video game use with peers as opposed to alone have stronger effects on aggression as children approach adolescence because of the growing influence of peers during this period of development (Steinberg & Monahan, 2007)? Or do younger children show stronger impacts of video game use because they have difficulty inhibiting impulses? We found insufficient studies to answer this or other developmental questions. These are areas in need of future research.

Ethnicity: Generalizability to the U.S. population. The U.S. population is becoming more racially and ethnically diverse with each passing decade. In 2014, the U.S. population was comprised of 24% Hispanic youth, 14% African American youth, and 52% European American youth (Colby & Norton, 2015). Although African American and Hispanic preadolescents use video games more than their European American peers do, ethnic differences are not found for adolescents (Rideout, 2015). Moreover, serious gamers are overwhelmingly European American males (Rideout, 2015).

Given these kinds of patterns, we were struck by how few research studies with children, adolescents, or adults included ethnically diverse samples, even in our more recent review of studies. One exception (Ferguson, Garza, Jera-beck, Ramos, & Galindo, 2013) included an adolescent Latino sample from the Southwest. Almost all of the high utility studies failed to report the race or ethnicity of participants. Also missing from the literature is any analysis of the effects of SES on violent video game use associations with aggressive outcomes. With little attention to race/

ethnicity or its interactions with social class differences, we have to question the representativeness of the study samples to the U.S. population as we currently know it. From a public health perspective, it is critically important to know whether any negative effects of exposure to violent video games are magnified in youth who are vulnerable because of their racial or ethnic background, their SES, or both.

Gender. The potential differential influence of violent video game use on males and females remains a question in the current literature. All-male samples or statistical controls for gender were used in over half of the recent studies in our sample, potentially obscuring differences in how males and females might react after exposure to violent videogames. Males are typically engaged in more physical aggression than females are (FBI, 2013; Hamby et al., 2013), and preadolescent and adolescent males spend much more of their time using console video games than their female peers do (Rideout, 2015). Therefore, it is important to examine the impact of video game violence for both genders separately, particularly in relation to different kinds of aggression-related dependent variables (e.g., increases in aggressive behavior, aggressive cognition, arousal, reductions in prosocial behavior and empathy). In the current data on preadolescent and adolescent males, there is also no indication of the kind of video game content used (Rideout, 2015), which is important information for understanding the video game-aggression literature. Future research is needed in these areas.

Game characteristics and requirements. Game characteristics, such as plots with morals and the use of perceptually salient production features (e.g., rapid pacing, fast action, and sound effects) to convey content, have rarely been considered in this literature. Although violent videogame research sometimes examines what is called program “pacing,” this research uses the term differently than the earlier literature that defined pacing as the rate of scene and character change (Wright et al., 1984). In the violent video game literature, pacing is used for what has traditionally been defined as “action” (i.e., the level of physical movement on the screen; see Huston et al., 1981). Terms need to be used consistently across the media literature in order to avoid confusion. Because earlier research addressing video content demonstrated that these characteristics influence viewer engagement, exploring the role of game characteristics in determining the impact of violent video game use on aggressive outcomes would be an important direction for future research.

Better understanding of game plots and morals is also needed. Using *Grand Theft Auto*, which is extremely violent with somewhat realistic characters, for instance, is quite different from using *Mario Brothers’* games, which contain aggressive content with animated cartoonish characters. In addition, youth who understood a movie plot identified more with the heroes who fought for justice, and those who

did not understand the plot identified more with the villain who fought for revenge (Calvert et al., 2004). Thus, video games that include violent plots require not just a plot, but one that emphasizes the potential of decisions during the game to triumph over the darker aspects of personality, such as killing with a motive of revenge. We call for a more differentiated rating of video games that includes how the game is made (the formal features), the levels of aggressive or violent content in specific games, and to what extent, if any, there is any use of moral themes embedded in the video game. The ESRB is the logical place for this rating system to begin, followed by systematic research on the characteristics of a range of games by scholars to create a library that can then be used for empirical studies on these questions.

Researchers have also begun to explore game characteristics other than violence as an explanation of the link between violent video game use and aggression. Competition, in particular, has been put forth as an alternative reason for aggression (see Adachi & Willoughby, 2011). When gamers compete with one another, an element of that competition can involve aggressive conduct toward another player for the goal of winning. Such behaviors should be less likely to occur within a cooperative team, even when the aggressive content is part of the game, because teamwork requires people to work with one another to win. Competition and cooperation, then, may provide an independent influence on aggressive outcomes after using aggressive video games. The literature on competition as an underlying causal component of the apparent link between violent game use and aggression is still nascent and is not currently substantial enough to influence, on its own, an objective assessment of the broader violent video game research.

Degree of exposure. Five of seven (71%) naturalistic studies supported the prediction that more violent video game exposure would result in more aggressive outcomes. The dose response approach did not receive sufficient attention in the literature to draw any conclusions. Both of these areas warrant future study.

Motivational appeal. Another important question that remains unanswered is the vast motivational appeal of violent video games in everyday life. In other words, why do children and adults use violent video games in the first place? Uses and gratification theory predicts that people use media to fulfill certain needs (Rubin, 2002). What are the needs that violent video game use fulfills? Is it the challenge of winning the game, the attention-getting properties of action and perceptually salient qualities of the game, the entertainment value of the experience? Can those needs be met by creating challenging prosocial video games that include arousing properties like fast action, rapid pace, and sound effects? These are some of the questions we suggest be addressed in future research.

Risk factors beyond the media. Although we conclude that exposure to violent video games is a risk factor for aggression, that finding does not mean that every person who uses a violent video game will be aggressive or violent. There are additional factors that place violent video game users at risk or that protect them from aggressive outcomes.

Risk factors for children include adverse family environments (e.g., child abuse, neglect, harsh and rejecting parents), neurobiological factors (e.g., perinatal complications, genetic risks), low academic achievement, the dark triad of personality (i.e., psychopathy including those with callous and unemotional traits, narcissism, Machiavellianism), access to guns, alcohol and drug abuse, social rejection from the normal peer group, poverty, and mental illness (Bushman et al., 2015). By contrast, protective factors include effective parenting, self-control skills, social competence skills, improving school environments, reducing alcohol and substance abuse, and reducing access to guns (Bushman et al., 2015). Any time a risk factor can be reduced, including exposure to violent video games, the odds are improved that children and youth will not end up on a path to aggression and violence (Sameroff, Bartko, Baldwin, Baldwin, & Seifer, 1988).

Policy Recommendations

Based on the results of the systematic evidentiary review and the meta-analyses of violent video game exposure, including our own meta-analyses, the APA Task Force on Violent Media recommended that APA engage in public education and awareness activities by disseminating our findings to children, parents, teachers, judges, and other professionals who work with children in schools and communities. The task force called for tests of educational interventions directed at children, youth, and their families to determine whether violent video game use can be decreased or the adverse impact of their use can be decreased. The task force also called for refinement of video game ratings by the Entertainment Software Ratings Board (ESRB).

We also called for additional research to fill in gaps in the research base on the effects of violent video game use. These include expansion of samples, including examination of at risk populations and understudied ethnic groups, the separate study of males and females, and additional study of school age and preschool-aged children. The kind of video game exposure which leads to deleterious effects is also a recommendation for future research, including how much and what kind of exposure leads to negative effects, the long term impact of exposure, properties of the video game being used, the link between video game ratings and the amount and kind of aggressive content in those games, the impact of increasingly realistic video games, how the game is played (e.g., cooperatively vs. competitively), and the potential role

of media literacy in curbing negative outcomes. More research is also needed on extremely serious effects of video game use such as delinquency and criminal behavior.

Summary and Conclusions

The literature on the effects of violent video game use on aggression has often generated more heat than light, with the same basic findings yielding very different interpretations of the results. Based upon our review and examination of the literature directly addressing violent video game use, the APA Task Force on Violent Media concluded that there is an effect of violent video game use on aggression. This effect is manifested as an increase in negative outcomes including a composite score of aggression, aggressive behavior, cognitions, and affect, and a decrease in positive outcomes such as pro-social behavior, empathy, and sensitivity to aggression. The convergence of negative outcomes after violent video game exposure was evident across numerous studies that used a range of different kinds of methodologies conducted in numerous countries by multiple disciplines and multiple scholars. To the extent that other known risk factors of aggression are examined as covariates in this literature (Anderson et al., 2010; Ferguson, 2007a; Ferguson, 2007b), these factors do not account for all of the variance in the link between violent video game use and aggressive outcomes. We do not, however, find evidence that violent video games make users criminals.

The APA Task Force on Violent Media has determined that there is sufficient evidence to indicate that these effects appear in older children, adolescents and young adults; however, there remains a dearth of studies that examine these effects in children younger than age 10 or that attempt to examine the developmental course of the effects. The task force is also concerned that the samples examined in these studies are not representative of current U.S. demographics. As many studies do not even report—much less analyze—sample characteristics such as ethnicity, SES, or, to a lesser extent gender, potentially vulnerable populations have not been sufficiently examined.

No single risk factor consistently leads a person to act aggressively or violently. Rather, it is the accumulation of risk factors that tends to lead to aggressive or violent behavior (Berkowitz, 1993; Eron, Huesmann, Lefkowitz, & Walder, 1974; Ferguson et al., 2013). Each risk factor increases the likelihood of such negative behavior (Sameroff et al., 1988). The research reviewed here demonstrates that violent video game use is one such risk factor.

Interpretation of the finding of an effect of violent video game use on aggression must be embedded in a context that asks, “What cost is necessary to produce (or prevent) the effect?” Costs to eliminate the effect might be measured in the creation of more informative ratings, or media literacy

education. Reasonable people can disagree about the value placed on these costs weighed against the benefit of preventing the effect, within the constraints of law and public health. Our society regularly applies such standards in law before sanctions are applied and in public health before action is taken. The next step is for stakeholders (e.g., legal systems, public health and other professional practitioners, the video game industry, parents) to decide what actions should be taken in light of the effect and the costs and benefits of each option.

In conclusion, the APA Task Force on Media Violence found that the use of violent video games results in increases in overall aggression as well as increases in the individual variables of aggressive behaviors, aggressive cognitions, aggressive affect, desensitization, physiological arousal, and decreases in empathy. We do not find sufficient studies to evaluate whether there is a link between violent video game use and criminal behavior. We recommend additional research in a variety of areas, including more studies of younger children, ethnicity, gender, dose-response effects, and game characteristics. We conclude that the use of violent video game use is a risk factor for subsequent aggression.

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Received November 3, 2015

Revision received April 27, 2016

Accepted April 27, 2016 ■