# THE INFLUENCE OF MEDIA VIOLENCE ON YOUTH

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## About the Authors

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## Authors' Note

In the summer of 2000, the U.S. Surgeon General asked the National Institute of Mental Health (NIMH) to establish an expert panel of media violence researchers charged with the task of reporting on the effects of media violence, to be included as part of a larger report on youth violence.Rowell Huesmann organized the media violence expert panel and served as its chair. The authors of this report were that expert panel.

As members of the expert panel, we met in August 2000, communicated extensively, and submitted a first draft to NIMH and the Surgeon General's staff in September. In early November, we received a revised draft from NIMH that we considered to be a distortion of the research and completely unacceptable. In consultation with the relevant federal offices, we revised our original report in an effort to preserve the report's scientific accuracy while responding to the concerns that had led to the initial revisions. Later that month, we presented and discussed our revised report with key representatives from NIMH and the Office of the Surgeon General, modified it once again, and believed we had reached agreement on this statement. However, when the final Surgeon General's Report on Youth Violence was released in January 2001, it did not contain a separate chapter on media violence; instead, the full report discussed media violence only in a section on risk factors and included a brief and substantially altered appendix on media violence. The decision to proceed this way was made by the Surgeon General's office without consent from the expert panel.

This Psychological Science in the Public Interest report is a modification of the subcommittee's November 2000 report. Changes include updating the literature review, altering wording to make this work more suitable for this current publication, and a host of other corrections and stylistic changes. The main structure, gist, and overall rationale remain the same.

In such a joint endeavor over a long period of time, it is impossible to accurately specify the exact contributions made by each panel member, and consequently, authorship is alphabetical.

However, we should note the roles played by the various committee participants in the preparation of this report. Huesmann chaired the expert panel and was instrumental in organizing the meetings and integrating the writings. His main writing contributions were to the introduction, overview of the research, and theoretical section. Leonard Berkowitz contributed in multiple ways (phone and email discussions, the November meeting, writing and reference suggestions), particularly in regard to the introduction, overview of the research, and theoretical section. Craig Anderson initially dealt principally with the overview of the research and the theoretical, interventions, and discussion sections, but later took the lead in updating and revising the panel's report into its present form. Edward Donnerstein, Neil Malamuth, and Daniel Linz focused primarily on the sections discussing moderators and media use and content, although Malamuth also contributed to the theoretical section. James Johnson joined mainly in the preparation of the overview of the research. Ellen Wartella contributed mainly to the sections on media use and content and interventions. Generally, though, there was considerably more polishing of multiple sections by multiple people than this brief listing suggests. In other words, all made essential contributions to the entire project.

# THE INFLUENCE OF MEDIA VIOLENCE ON YOUTH

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## SUMMARY

Research on violent television and films, video games, and music reveals unequivocal evidence that media violence increases the likelihood of aggressive and violent behavior in both immediate and long-term contexts. The effects appear larger for milder than for more severe forms of aggression, but the effects on severe forms of violence are also substantial ($r$ = .13 to .32) when compared with effects of other violence risk factors or medical effects deemed important by the medical community (e.g., effect of aspirin on heart attacks). The research base is large; diverse in methods, samples, and media genres; and consistent in overall findings. The evidence is clearest within the most extensively researched domain, television and film violence. The growing body of video-game research yields essentially the same conclusions.

Short-term exposure increases the likelihood of physically and verbally aggressive behavior, aggressive thoughts, and aggressive emotions. Recent large-scale longitudinal studies provide converging evidence linking frequent exposure to violent media in childhood with aggression later in life, including physical assaults and spouse abuse. Because extremely violent criminal behaviors (e.g., forcible rape, aggravated assault, homicide) are rare, new longitudinal studies with larger samples are needed to estimate accurately how much habitual childhood exposure to media violence increases the risk for extreme violence.

Well-supported theory delineates why and when exposure to media violence increases aggression and violence. Media violence produces short-term increases by priming existing aggressive scripts and cognitions, increasing physiological arousal, and triggering an automatic tendency to imitate observed behaviors. Media violence produces long-term effects via several types of learning processes leading to the acquisition of lasting (and automatically accessible) aggressive scripts, interpretational schemas, and aggression-supporting beliefs about social behavior; and by reducing individuals' normal negative emotional responses to violence (i.e., desensitization).

Certain characteristics of viewers (e.g., identification with aggressive characters), social environments (e.g., parental influences), and media content (e.g., attractiveness of the perpetrator) can influence the degree to which media violence affects aggression, but there are some inconsistencies in research results. This research also suggests some avenues for preventive intervention (e.g., parental supervision, interpretation, and control of children's media use). However, extant research on moderators suggests that no one is wholly immune to the effects of media violence.

Recent surveys reveal an extensive presence of violence in modern media. Furthermore, many children and youth spend an inordinate amount of time consuming violent media. Although it is clear is that reducing exposure to media violence will reduce aggression and violence, it is less clear what sorts of interventions will produce a reduction in exposure. The sparse research literature suggests that counterattitudinal and parental-mediation interventions are likely to yield beneficial effects, but that media literacy interventions by themselves are unsuccessful.

Though the scientific debate over whether media violence increases aggression and violence is essentially over, several critical tasks remain. Additional laboratory and field studies are needed for a better understanding of underlying psychological processes, which eventually should lead to more effective interventions. Large-scale longitudinal studies would help specify the magnitude of media-violence effects on the most severe types of violence. Meeting the larger societal challenge of providing children and youth with a much healthier media diet may prove to be more difficult and costly, especially if the scientific, news, public policy, and entertainment communities fail to educate the general public about the real risks of media-violence exposure to children and youth.

## INTRODUCTION

For more than five decades, Americans have been concerned about the frequent depiction of violence in the mass media and the harm these portrayals might do to youth. Reflecting this concern, several major United States Government investigations and reports have examined the research on the association between youthful media consumers' exposure to television violence and their aggressive behavior—the 1954 Kefauver hearings, the 1969 National Commission on the Causes and Prevention of Violence, the 1972 Surgeon General's report Television and Growing Up (U.S. Surgeon General's Scientific Advisory Committee, 1972), and the 1982 National Institute of Mental Health (NIMH) report Television and Behavior. In 1972, U.S. Surgeon General Jesse Steinfeld testified before Congress that "the overwhelming consensus and the unanimous Scientific Advisory Committee's report indicates that televised violence, indeed, does have an adverse effect on certain members of our society" (Steinfeld, 1972, p. 26). The 1982 NIMH report reinforced this conclusion, and professional organizations took a similar position in viewing media violence as a serious threat to public health because it stimulates violent behavior by youth. By the early 1990s, most researchers in the field had arrived at a consensus that the effect of media violence on aggressive and violent behavior was real, causal, and significant.

A number of professional groups have also addressed the state of relevant research on media violence (e.g., Eron, Gentry, & Schlegel's, 1994, report for the American Psychological Association), as have other federal agencies (e.g., Federal Trade Commission, 2000). Indeed, six medical and public-health professional organizations held a Congressional Public Health Summit on July 26, 2000, and issued a Joint Statement on the Impact of Entertainment Violence on Children. This statement noted that "entertainment violence can lead to increases in aggressive attitudes, values, and behavior, particularly in children." The statement also concluded that the research points "overwhelmingly to a causal connection between media violence and aggressive behavior in some children" (Joint Statement, 2000, p. 1) The six signatory organizations were the

American Academy of Pediatrics, American Academy of Child and Adolescent Psychiatry, American Medical Association, American Psychological Association, American Academy of Family Physicians, and American Psychiatric Association. These reports, coupled with mounting public concern, stimulated a search for ways to reduce the adverse effects of media violence, and were responsible, in part, for the passage of the Telecommunications Act of 1996, which mandated that new TV sets be manufactured with a V(for violence)-chip that permits parents to block objectionable content.

For a variety of reasons, it is now time for a new assessment of what is known scientifically about how media violence affects young people and what can be done to mitigate these adverse effects. The body of research on TV violence continues to grow, both in depth and in breadth. In addition, important changes are occurring in the landscape of entertainment-media use, and some of these changes have stimulated new areas of research. The rise of new media—particularly interactive media (such as video games and the Internet)—has introduced new ways children and youth can be exposed to violence. The roles of these new media in producing youthful violence should be considered in light of existing theory and new research. It is especially advisable to ascertain what contribution media violence makes to serious interpersonal physical violence among older children and adolescents given the current national concern about this problem.

It is also important to present this report because of the disparity between, on one side, the actual research findings and, on the other side, the intransigent assertions made by a number of vocal critics. That is, although research shows the adverse effects of media violence, and there is increasing consensus among researchers in this area about these effects, the critics continue to pronounce that media violence cannot be affecting youth (e.g., Fowles, 1999; Freedman, 1984, 2002; Rhodes, 2000). Also indicative of this difference in views, a recent statistical analysis of the media-violence research (Bushman & Anderson, 2001) demonstrated that although the scientific evidence has grown considerably stronger over the past three decades, recent news reports imply

that the scientific evidence is weaker than did earlier news reports.

In this report, we do not deal directly with recent critiques of the field. A number of carefully reasoned essays already point out flaws in the critiques and explain why the proposition that media violence can have adverse effects on its audience is so strongly opposed by various interest groups (Bushman & Anderson, 2001; Hamilton, 1998; Huesmann, Eron, Berkowitz, & Chaffee, 1992; Huesmann & Moise, 1996; Huesmann & Taylor, 2003). Rather, our purpose is to summarize current scientific knowledge about five critical questions:

• What does research say about the relation—both short-term and long-term— between media violence and aggressive and violent behavior? (Overview of Empirical Research)

• How does media violence produce its effects on aggressive and violent behavior? (Theoretical Explanations)

• What characteristics of media violence are most influential, and who is most susceptible to such influences? (Research on Moderator Effects)

• How widespread and accessible is violence in the media (television, movies, music videos, video games, Internet)? (Research on Media Use and Content)

• How can individuals and society counteract the influence of media violence? (Research on Interventions)

We summarize our observations in the Discussion section, which also identifies crucial areas for additional research.

In reading through this monograph, a few important points should be kept in mind: First, researchers investigating the impact of media violence on youth have focused mostly on how it affects the viewer's aggression. Aggression is defined by psychologists as any behavior that is intended to harm another person. There are many forms of aggression. For example, verbal aggression usually refers to saying hurtful things to the victim. Relational or indirect aggression refers to behavior that is intended to harm the target person but is enacted outside of the target

person's view (e.g., behind his or her back), such as telling lies to get the person in trouble or to harm his or her interpersonal relationships. The aggressive behaviors of greatest concern usually involve physical aggression. Physical aggression may range in severity from less serious acts, such as pushing or shoving, to more serious physical assaults and fighting, extending to violent acts that carry a significant risk of serious injury. There is no clear-cut consensus-based line separating "violence" from milder forms of physical aggression, nor is one needed to understand the research findings on media violence. We use the term violence to refer to the more extreme forms of physical aggression that have a significant risk of seriously injuring their victims.

Some studies have focused on the impact of media violence on aggressive thinking, including beliefs and attitudes that promote aggression. Other studies have focused on the influence of media violence on aggressive emotions–that is, on emotional reactions, such as anger, that are related to aggressive behavior. It is important to keep these three types of outcome variables (behavior, thoughts, emotions) separate, and to reserve the labels "aggression" and "violence" for behaviors intended to harm another person.

Second, as we and others have frequently noted, the weight of evidence indicates that violent actions seldom result from a single cause; rather, multiple factors converging over time contribute to such behavior. Accordingly, the influence of the mass media is best viewed as one of the many potential factors that help to shape behavior, including aggression. When we use causal language, we do not mean that exposure to media violence is either a necessary or a sufficient cause of aggressive behavior, let alone both necessary and sufficient (Anderson & Bushman, 2002c). To our knowledge, no media-violence researcher has ever made such an extreme claim. The 14-year-old boy arguing that he has played violent video games for years and has not ever killed anybody is absolutely correct in rejecting the extreme “necessary and sufficient” position, as is the 45-year-old two-pack-a-day cigarette smoker who notes that he still does not have lung cancer. But both are wrong in inferring that their exposure to their respective risk factors (violent media, cigarettes) has

not causally increased the likelihood that they and people around them will one day suffer the consequences of that risky behavior.

Third, a developmental perspective is essential to an adequate understanding of how media violence affects youthful conduct and to the formulation of a coherent public-health response to this problem. Most youth who are aggressive and engage in some forms of antisocial behavior do not go on to become violent teens and adults. However, research has shown that a significant proportion of aggressive children are likely to grow up to be aggressive adults, and that seriously violent adolescents and adults often were highly aggressive and even violent as children. In fact, the best single predictor of violent behavior in older adolescents and young adults is aggressive behavior when they were younger (Huesmann & Moise, 1998; Tremblay, 2000). Thus, influences that promote aggressive behavior in young children can contribute to increasingly aggressive and ultimately violent behavior many years later. It is therefore important to identify factors—including media violence—that, singly and together, may play a role in these outcomes in childhood.

Fourth, it is important to avoid the error of assuming that small statistical effects necessarily translate into small practical or public-health effects. There are many circumstances in which statistically small effects have large practical consequences. Perhaps the most relevant circumstances are when small effects accumulate over time and over large proportions of the relevant population. For example, when Abelson (1985) asked a group of Yale University psychology scholars knowledgeable both about the concept of statistical variance and about baseball "to estimate what percentage of the variance in whether or not the batter gets a hit is attributable to skill differentials between batters" (p. 131), he found that these statistically sophisticated psychologists greatly overestimated the variance due to skill differences. The median estimate was 25%, whereas the correct statistical answer is actually about 0.3%. But, this small effect of batting-skill differences has a huge impact on outcomes such as team win/loss records, career runs batted in, league championships, and World Series championships, because even small

differences in batting skill accumulate across large numbers times at bat within a season and across a career.

Similarly, even small statistical effects of media violence on aggressive behavior can have important societal consequences for at least three different reasons. First, a large portion of the population (almost everyone, in fact) is exposed to this risk factor (accumulation across a large population). Second, the deleterious effects of exposure to media violence are likely to accumulate (via learning) within the individual with repeated exposure. Third, even short-lived effects of a single exposure (via priming effects--see the Theoretical Explanations section) can add significant amounts of aggression and violence to society because at any given waking hour a large portion of the population either is currently being exposed to violent media or has been exposed to such violence within the past 20 min.

Medical scientists and public-health officials seem to have avoided the problem of under-estimating the public health importance of small effects by translating their findings into cancer rates or heart attack rates or death rates for the entire U.S. population, but behavioral scientists have not traditionally done this type of population-rate translation. Thus, people are frequently shocked to learn that many behavioral science effects are considerably larger than key medical science effects that are deemed extremely important (e.g., Bushman & Huesmann, 2001). For example, Rosenthal (1990) reported that the major study on aspirin's ability to reduce heart attacks was stopped prematurely because the initial results were so strong that it was deemed ethically irresponsible to continue giving placebos to the control group; aspirin's effect accounted for about 0.1 % of the variance. Our point: Conclusions about small statistical effect sizes need to be made with caution and in this broader context.

Finally, it must be recognized that the firmest evidence about the effects of media violence, or any other presumed causal influence, on aggression is provided by true experiments in which participants are randomly assigned to conditions experiencing different "doses" of the factor under

investigation. There have been many such experiments involving media violence. Out of ethical necessity, these generally have not examined effects on the most serious types of physical aggression. However, longitudinal studies (as reviewed in a later section) reveal that children who exhibit relatively high levels of the mild forms of aggression common in childhood are more likely than other children to engage in more severe forms of aggression in adolescence and adulthood. Similarly, methodological research designed to test the generality of laboratory measures of aggression (e.g., Anderson & Bushman, 1997; Carlson, Marcus-Newhall, & Miller, 1989) has demonstrated that high levels of the mild forms of aggression typical of laboratory studies correlate well with each other and with more extreme forms of physical aggression measured in real-world contexts. Consequently, experiments on media violence add significantly to understanding of the causal effects of media violence on aggression, and are especially valuable when their findings are integrated with the results of more naturalistic surveys and longitudinal studies dealing with serious forms of physical aggression and violence. In other words, no single methodological approach can provide unequivocal answers to the key questions about media violence, but converging results from studies using multiple methodologies can enhance confidence in the validity of the conclusions drawn. This triangulation approach to science is effective precisely because different methodologies have different inherent strengths and weaknesses, and converging results essentially rule out competing alternative explanations (e.g., Anderson & Bushman, 2001).

## OVERVIEW OF EMPIRICAL RESEARCH ON MEDIA VIOLENCE AND AGGRESSION

Most studies of the effects of media violence have examined passive visual media (dramatic television and movies, television news, and music videos), that is, media that viewers observe only. However, there have also been a limited number of investigations of interactive visual media (video games and the Internet), media that viewers both observe and interact with. In this section, we examine both kinds of studies. Within each genre, we begin with experimental studies, in which cause and effect are unambiguous but the effects observed are short term. Of necessity, the

outcomes in these experiments tend to be physical aggression that is not life threatening, or else verbal aggression, aggressive thoughts, or aggressive emotions. We then turn to surveys, or cross-sectional studies, that provide a snapshot of the relation at one point in time between individuals' habitual consumption of media violence and their aggressive behavior.[1] These surveys often deal with more serious forms of physical aggression, but this type of methodology by itself is not as conclusive about causation as experimental studies are. For genres for which longitudinal studies exist, we conclude our review by examining how youths' habitual consumption of violence affects their violent and aggressive behavior later in life. Like cross-sectional investigations, longitudinal studies often examine serious physical aggression, but they generally provide better evidence about causal influences than can cross-sectional studies.

Because of space constraints, we provide illustrative examples of carefully selected key studies in each area, rather than an exhaustive review of the research literature. However, in addition to discussing these selected studies, we describe (if available) meta-analyses that have aggregated the results of most major investigations to reach overall estimates of effect sizes. A meta-analysis essentially averages the effect sizes of multiple studies, and allows the researcher to ask whether a particular factor (e.g., exposure to media violence) is significantly linked to a particular outcome (e.g., violent behavior). There are several commonly used measures of effect size, any of which can be applied to experimental, correlational, and longitudinal types of studies.. To provide a common metric for this discussion, we have converted all effect sizes to correlation coefficients (rs).

**Dramatic Television and Movies**

Randomized Experiments: Examples

A substantial number of laboratory and field experiments over the past half-century have examined whether exposure to violent behavior on film or television tends to increase aggressive behavior in the short term (see reviews by Bushman & Huesmann, 2001; Comstock, 1980; Geen, 1990; Geen & Thomas, 1986; Huesmann, Moise, & Podolski, 1997). The consistent finding from

such randomized experiments is that youths who watch violent scenes subsequently display more aggressive behavior, aggressive thoughts, or aggressive emotions than those who do not.

In the typical experimental paradigm , researchers randomly assign youths to see either a short violent or a short nonviolent film, and then observe how they interact with other people after viewing the film. Both physical and verbal aggression toward others may be assessed. The time period for testing the effects is short—from a few minutes to a few days after seeing the film—and generally there is no attempt to test for lasting effects of the single exposure. With older teenagers and college students, physical aggression has often been measured by the willingness of participants to inflict an electric shock or a loud aversive noise on a peer. This person has sometimes been an individual who provoked them earlier, but in other investigations has been a neutral bystander. The participants are typically given a weak rationale for harming the other person (e.g., the punishment is an unfavorable evaluation of the peer's work on an assigned task).

In the following paragraphs, we describe several studies selected from the large number of studies of this type, in part because their outcome measure was physical aggression against another person, in part because the authors reported enough information that effect sizes could be computed, and in part because they illustrate the wide range of settings, participant populations, experimental procedures, and measures used.

Bjorkqvist (1985) exposed 5- to 6-year-old Finnish children to either violent or nonviolent films. Two raters who did not know which type of film the youngsters had seen then observed the children playing together in a room. Compared with the children who had viewed the nonviolent film, those who had just watched the violent film were rated much higher on physical assault (hitting other children, wrestling, etc), as well as other types of aggression. The results for physical assault were highly significant ($p < .001$), and the effect size was substantial ($r = .36$).

Josephson (1987) randomly assigned 396 seven- to nine-year-old boys to watch either a violent or a nonviolent film before they played a game of floor hockey in school. Observers who did not

know what movie any boy had seen recorded the number of times each boy physically attacked another boy during the game. Physical attack was defined to include hitting, elbowing, or shoving another player to the floor, as well as tripping, kneeing, pulling hair, and other assaultive behaviors that would be penalized in hockey (the only verbal act included in the measure was insulting another player with an abusive name). One added element in this study was that a specific cue that had appeared in the violent film (a walkie-talkie) was carried by the hockey referees in some conditions. This particular cue presumably reminded the boys of the movie they had seen earlier. Josephson found that for aggressive boys (those who scored above average on a measure of aggressiveness), the combination of seeing a violent film and seeing the movie-associated cue stimulated significantly more assaultive behavior than any other combination of film and cue ($p < .05$). The effect size was moderate ($r = .25$).

Two related randomized experiments demonstrated that exposure to media violence can lead to increased physical assaults by teenage boys, at least in the short run. In a home for delinquent boys in Belgium, Leyens, Camino, Parke, and Berkowitz (1975) assigned boys in two cottages to see violent movies every night for five nights while boys in the other two cottages saw nonviolent films. The boys were observed interacting after the movies each evening and were rated for their frequency of hitting, choking, slapping, and kicking their cottage mates. Those boys who were exposed to the violent films engaged in significantly more physical assaults ($p < .025$) on their cottage mates. The effect sizes for such physical aggression were not published, but the best estimates from the published data suggest a substantially larger effect for the boys who were initially more aggressive ($r = .38$) than for the boys who were initially less aggressive ($r = .14$).. In similar field experiments with American youth in a minimum-security penal institution for juvenile offenders, Parke, Berkowitz, Leyens, West, and Sebastian (1977) found similar effects of exposure to violent films on overall interpersonal attacks (physical or verbal), although they did not report the effects on frequency of physical assault separately,. These two experiments are especially

important because they demonstrate that violent movies can generate serious physical aggression even in a setting where this behavior is counter to officially prescribed rules.

Although witnessed violence can evoke aggression in people who are not highly emotionally aroused at the time, several experiments have shown that emotionally or physically excited viewers are especially apt to be aggressively stimulated by violent scenes. For example, in the experiment by Geen and O'Neal (1969), college men who had been provoked by another student and who were also exposed to loud noise shocked their provocateur significantly more intensely ($p < .01$) after they had watched a film of a prizefight than after they had seen a movie of a track meet. The effect size was quite large ($r = .75$) and seemed to be accentuated by the viewers' noise-generated excitement. This study has been replicated with variations of film content and provocation with essentially identical results (see Berkowitz, 1993).

Finally, Donnerstein and Berkowitz's (1981) study demonstrated that combining violent portrayals with sexual stimulation is particularly potent at stimulating male viewers to be more physically assaultive toward females who have provoked them. In this experiment, male university students watched either a movie portraying sex and violence, a nonviolent sex film, or a movie that was neither sexual nor violent and were then given an opportunity to retaliate against a woman who had angered them earlier, by giving her electric shocks. The men who had viewed the violent sex film punished the woman more intensely than did their counterparts who had watched either the neutral film or the nonviolent sex movie. Again, the effect size was quite large ($r = .71$).

The six key experiments we have just reviewed all examined the immediate causal effect of media violence on physical aggression. A great many studies have also examined the immediate effect of media violence on aggressive thoughts or emotions (for reviews, see Berkowitz, 1993; Bushman & Huesmann, 2001; Geen, 2001; Rule & Ferguson, 1986). These studies are important to consider because research has shown that the risk of physically aggressive behavior against other people is increased among youth who believe that violence against others is acceptable (Huesmann

& Guerra, 1997), in part because they believe that their targets are “bad” people and that punishing them is justified (e.g., Berkowitz, 1965; Berkowitz & Geen, 1967). Similarly, people who accept violence toward females (Byers & Eno, 1991; Lackie & de- Man, 1997), who view others as being hostile (Dodge & Frame, 1982), who believe that retaliation is "honorable" (Nisbett & Cohen, 1996), who fantasize about violence (Rosenfeld, Huesmann, Eron, & Torney-Purta, 1982), or who just simply think about violent words (Carver, Ganellen, Froming, & Chambers, 1983) also are at high risk for physical aggression against others.

Typically, randomized experiments reveal that exposure to media violence can cause immediate increases in aggressive thoughts and tolerance for aggression in both children and older youth. For example, in studies with young children (Drabman & Thomas, 1974, 1975; Thomas & Drabman, 1975), youngsters shown a brief violent film clip were slower to call an adult to intervene when they saw two younger children fighting than were peers who had watched a neutral film. The single violent clip appeared to make the children more tolerant of aggression, at least temporarily. Similarly, Malamuth and Check (1981) found an increased acceptance of physical aggression toward women by college men several days after they had watched violent sex scenes. Still other studies have shown that college students randomly assigned to view a short violent film segment display more aggressive thoughts (e.g., Bushman, 1998) or more aggressive emotions (e.g., Anderson, 1997) than comparable students who are assigned to view a nonviolent film segment. Using a somewhat longer time frame, Zillmann and Weaver (1999) reported an experiment in which college-age males and females viewed either four violent or four nonviolent feature films on consecutive days. One day after viewing the last film, all participants took part in a supposedly unrelated study in which level of hostile behavior was assessed. Those who previously had seen the violent films exhibited significantly more hostility than did those who previously had seen the nonviolent films.

Randomized Experiments: Meta-Analysis and Summary

Three meta-analyses in the past 15 years have computed the overall effect sizes for randomized experiments investigating the influence of TV and movie violence on aggression (Hearold, 1986; Paik & Comstock, 1994; Wood, Wong, & Chachere, 1991). The most recent and comprehensive of these was the analysis of Paik and Comstock, who examined effect sizes from 217 studies published between 1957 and 1990. On the basis of 432 independent tests of effects in the randomized experiments they reviewed, Paik and Comstock found a moderate to large average effect size ($r$ =.38). When the analysis was limited to experiments in which the outcome was classified as physical violence against a person, the 71 independent effect sizes yielded an average $r$ of .32. The studies in the review reported 32 independent effect sizes for criminal violence against a person; among this group, the average effect size was smaller but still significant, $r$ = .13.

In summary, many well-controlled, randomized experiments have examined how exposure to violent TV and film media affects aggression in youths of all ages. The evidence from these experiments is compelling. Brief exposure to violent dramatic presentations on TV or in films causes short-term increases in youths' aggressive thoughts, emotions, and behavior, including physically aggressive behavior serious enough to harm others. The effect sizes are moderate on the average but vary greatly depending on the outcome measure used; usually, effect sizes are smaller for more serious outcomes than for less serious outcomes. There is some evidence that youth who are predisposed to be aggressive or who recently have been aroused or provoked are somewhat more susceptible to these effects than other youngsters are, but there is no evidence of any totally immune group. The average effect sizes, even for relatively serious physical aggression, are large enough to warrant social concern.

Cross-Sectional Surveys: Examples

Cross-sectional surveys over the past 40 years have consistently provided evidence that the current physical aggression, verbal aggression, and aggressive thoughts of young people are correlated with the amount of television and film violence they regularly watch (see reviews by

Chaffee, 1972; Comstock, 1980; Eysenck & Nias, 1978; Huesmann & Miller, 1994). Moreover, the studies reporting significant correlations have used a variety of research methods and examined youngsters of different ages and from different cultures (e.g., Huesmann & Eron, 1986). In some studies, the aggression assessed has included physically aggressive acts serious enough to fit our definition of violence. For example, McLeod, Atkin, and Chaffee (1972) studied the correlations between "aggressive behavioral delinquency" (fighting, hitting, etc.) and TV violence viewing in samples of Wisconsin and Maryland high school and junior high school students. They found significant correlations ranging from .17 ($p < .05$) to .28 ($p < .01$) for both males and females. In a study of English 12-17 year old males Belson (1978) reported 49% more violent acts in the past 6 months by heavy TV violence viewers than by light violence viewers.

The cross-sectional correlations have generally been in the small to moderate range. On the average they have been slightly higher for elementary-school children than for teenagers and adults, particularly when general aggression is assessed. For example, Eron, Huesmann, Lefkowitz, and Walder (1972) obtained a significant correlation of .21 for 8-year-old boys and a nonsignificant correlation for the same boys when they were 19. Similarly, Huesmann, Moise-Titus, Podolski, & Eron (2003) reported a correlation of .18 ($p < .05$) between TV violence viewing and general aggression for 6 to 10 year old males, but a non-significant correlation between general aggression and concurrent TV violence viewing for the same males when they were in their twenties. For females in their twenties, however, they reported a significant correlation ($r = .23$, $p < .01$). Other studies also have found significant correlations at older ages.

Cross-Sectional Surveys: Meta-Analysis and Summary

Paik and Comstock's (1994) meta-analysis examined cross-sectional surveys published between 1957 and 1990. For 410 tests of the hypothesis that viewing television violence is positively correlated with aggressive behavior, they reported an average $r$ of .19. Perhaps more important for the current review, these authors identified 200 tests of the hypothesis in which the dependent

measure of aggressive behavior was actual physical aggression against another person. The effect size was essentially the same for these studies as for all surveys combined (i.e., $r = .20$).

These cross-sectional surveys provide convincing evidence that frequent viewing of violence in the media is associated with comparatively high levels of aggressive behavior. The surveys also support the causal conclusions of the experimental studies, and suggest that findings of short-term effects in the laboratory may well be generalizable to longer-term effects on real world aggression. However, these cross-sectional surveys alone do not indicate whether media violence causes aggression, whether aggressive youth are attracted to media violence, or whether some other factor predisposes the same youth to both watch more violence and behave more aggressively than their peers. Longitudinal surveys investigating the subsequent effects of exposure to media violence at an early age provide better evidence regarding these possibilities.

Longitudinal Surveys: Examples

A small group of studies have examined the effects of television violence on aggressive behavior over time. Four of the key studies are discussed here. In a study of a representative sample of 856 youth in Columbia County, New York, beginning in 1960, Eron and his colleagues found that a boy's exposure to media violence at age 8 was significantly related to his aggressive behavior 10 years later, after he graduated from high school ($r = .31$, $N = 184$, $p < .01$; Eron et al., 1972; Lefkowitz, Eron, Walder, & Huesmann, 1977). At both times, aggressive behavior was measured primarily by peer nomination, a technique in which the youths answer a series of questions about their classmates' aggressiveness. The researchers assessed both physical aggression (e.g., “Who pushes and shoves other kids?”) and verbal aggression (e.g., “Who makes up stories and lies to get other kids in trouble?”). The longitudinal correlation remained above .25 even when there was statistical control of other potentially relevant factors, such as initial aggressiveness of the child, IQ of the child, family socioeconomic status (SES), parents’ aggressiveness, and parents’ punishment and nurturance of the child. Furthermore, additional statistical analyses evaluating the connection

between scores at the two ages cast doubt on the possibility that the longitudinal relation was merely a consequence of highly aggressive youth liking to watch more violence than their less aggressive counterparts. Aggressiveness at age 8 did not predict viewing of violence at age 18. In contrast to the findings obtained for the boys (and with the results obtained in other investigations—see Huesmann & Eron, 1986; Huesmann, Lagerspetz, & Eron, 1984; Huesmann, Moise-Titus, Podolski, & Eron, 2003), the findings for the girls revealed no relation between exposure to TV violence and aggressive behavior.

In a longitudinal study of boys and girls ages 7 to 16 from two Midwestern cities (conducted by the NBC television company), Milavsky, Kessler, Stipp, and Rubens (1982) examined the effects of television violence on aggression using measures that included serious physical aggression and delinquency. The youth were surveyed up to five times during a 3-year period (1970-1973). Cross-sectional correlations between viewing of TV violence and concurrent levels of aggression were obtained for the total sample within each time of assessment; they were significant and comparable to those found in most other cross-sectional studies, that is, .13 to .23 for boys and .21 to .37 for girls.

The investigators then examined the longitudinal correlations between aggressive behavior at one point in time and TV violence viewing at an earlier time, while statistically controlling for earlier aggression. They examined these correlations over 15 intervals ranging from 5 months to 3 years apart. For elementary-school boys, 12 of the 15 correlations were positive, although only 2 were statistically significant. Ten of the 15 correlations were positive for girls, although only 3 were statistically significant. A comparable analysis carried out in a subsample of teenage boys showed a positive correlation in 6 of 8 cases, but only 1 such “lag” yielded a significant effect. In all cases, adding SES as a covariate reduced the significant effects further. However, it should be noted that these predictive analyses were based on subsamples from which the research team had deleted the data of many of the most aggressive children (25% of boys and 16% of girls in the

initial sample), because they supposedly had not reported their TV viewing accurately. Given that highly aggressive youths appear to be more likely than others to be aggressively stimulated by violent scenes, it may well be that discarding these data artifically decreased the reported effects.

In the late 1970s, Huesmann and his colleagues began a longitudinal study of the effects of TV violence in five countries (Huesmann & Eron, 1986; Huesmann, Lagerspetz, & Eron, 1984; Huesmann, Moise-Titus, Podolski, & Eron, 2003). Representative samples of middle-class youth in each country were examined at three times as they grew from 6 to 8 or from 8 to 11 years of age. Aggression was assessed by peer nominations in response to questions about physical and verbal behaviors, among other things. The cross-sectional correlations between aggression and overall exposure to TV violence were positive and small to moderate in all countries, with significant correlations being obtained for both boys and girls in the United States. However, the extent to which earlier viewing of TV violence predicted later aggression varied substantially between the genders and among the countries. In the United States, girls' viewing of TV violence had a significant effect ($r = .17$, $p < .05$) on their later aggression even after taking into account their early levels of aggression, SES, and scholastic achievement. For the boys in the U.S. sample, TV violence alone did not predict later aggression, but those who had watched violent programming frequently in their early childhood and who also reported a strong identification with aggressive TV characters were generally regarded by their peers as the most aggressive ($r = .19$, $p < .05$).

Fifteen years after the study started, more than 300 participants in the U.S. sample were reinterviewed when they were in their early 20s (Huesmann et al., 2003). Results from this 15-year follow-up suggest a delayed effect of media violence on serious physical aggression. The researchers found significant correlations between television violence viewing during childhood and a composite measure of aggression (physical, verbal, and indirect) during young adulthood, for both men ($r = .21$, $n = 153$, $p < .01$) and women ($r = .19$, $n = 176$, $p < .01$). When the outcome examined was restricted to physical aggression or violence (e.g., punch, beat, choke, threaten or

attack with a knife or gun), the correlations were still significant (rs = .17 and .15 respectively). Furthermore, when the people who had watched violent programs frequently in childhood were compared with their counterparts who viewed these programs much less often, it was found that the former, as adults, committed significantly more acts of physical aggression, such as having "pushed, grabbed, or shoved their spouses" (p. 210; 42% vs. 22% in the case of males) or "shoving, punching, beating or choking" (p. 210) someone who had made them angry (17% vs. 4% for females). Finally, analyses showed that for both men and women, frequent exposure to TV violence during childhood resulted in high levels of aggressive behavior later, whereas high aggressiveness during childhood did not lead to frequent viewing of television violence later.

These effects of frequent childhood exposure to TV violence on later aggression remained significant even when the researchers controlled statistically for parents' education and children's achievement. Although analyses of the data from the other countries are not yet completed, preliminary results indicate that childhood exposure to media violence also predicts adult aggression in males and females in Finland and in males in Israel, but not in Poland, where the social transition of the 1980s seems to have changed the relations (Huesmann & Moise-Titus, 1999; Viermero, 2002).

A final longitudinal study worth discussing examined effects of TV habits in adolescence and early adulthood on later violent behavior (J.G. Johnson, Cohen, Smailes, Kasen, & Brook, 2002). Total amount of television watching (rather than amount of violent TV viewing more specifically) was assessed at ages 14 and 22. Although this is not the ideal measure of violent TV exposure, the high proportion of television programs that contain violence (see the section on Violent Content of Media) suggests that, on average, those people who watch a lot of television usually are also getting the most exposure to violent TV. Moreover, in analyzing total time watching TV rather than the more specific time watching violent TV, the study probably underestimated the actual effect of exposure to violent television on later aggressive behavior (Anderson & Bushman, 2002a).

The most relevant results of this study have to do with effects on "assault or physical fights resulting in injury" (pp. 2469-2470), which was assessed at age 16 or 22 in one analysis, and at age 30 in another analysis.. TV exposure at age 14 significantly predicted assault and fighting behavior at 16 or 22 years of age, even after controlling statistically for family income, parental education, verbal intelligence, childhood neglect, neighborhood characteristics, peer aggression, and school violence. The effect size across all participants was in the small range ($r$ = .17). In addition, TV exposure at age 22 significantly predicted assault and fighting behavior at age 30; the size of this effect was in the medium range ($r$ = .35). There were many additional findings of interest involving differences in effect size for males versus females at different time periods and for different measures of aggression. But the most important implication of this study is that television watching (and presumably exposure to violent TV) may have important adverse effects on much older populations than was previously believed.

Longitudinal Survey Studies: Meta-Analysis and Summary

The only meta-analysis to look at longitudinal studies of media violence separately was conducted by Anderson and Bushman (2002c). Although this analysis pooled studies of all types of media violence, the great majority were investigations of violent TV. Anderson and Bushman found a statistically significant average effect size of .17 across 42 independent tests involving almost 5,000 participants. Given these meta-analytic results and the specific outcomes of the key longitudinal studies we have already discussed, it seems safe to draw a conclusion from this research: High levels of exposure to violent TV programs in childhood can promote aggression in later childhood, adolescence, and even young adulthood. The effect sizes are small to medium, depending on the time lag. There also is some evidence that more aggressive children tend to watch more violence than their less aggressive peers, but the evidence is stronger that seeing a lot of media violence is a precursor of increased aggression even when social class, intellectual functioning, prior level of aggressiveness, and parenting are statistically controlled. Furthermore,

the most recent studies suggest that this increased aggression in young adulthood includes very serious forms of aggression and violence.

Studies on the Introduction of TV

Television was not introduced in all communities at the same time. A few researchers have taken advantage of this variation in timing to examine TV's effects on aggression within a society (Joy, Kimball, & Zabrack, 1985). For example, Centerwall (1989a, 1989b, 1992) carried out time-series analyses using aggregated data on crime and media viewing to examine the effect of the introduction of TV on violence in the United States, Canada, and South Africa (where television came on the scene only recently), comparing crime rates before and after the introduction of television. He concluded that the introduction of television, combined with frequent portrayal of violent acts, increases interpersonal violence in a society. However, this analysis must be viewed with caution because of other factors that might have influenced national crime rates at the same time.

For methodological reasons, more convincing evidence is provided by Williams (1986), who found an increase in the level of children's aggression in one Canadian community after TV was introduced to it, although two comparable communities (without TV) showed no such increase. Even in this case, though, caution must be exercised in drawing any conclusions, because Williams assessed the total amount of TV viewing, not the amount of media violence to which the children were being exposed. Finally, Hennigan et al. (1982) reported that rates of larceny went up more in American cities in which TV was introduced than in comparable American cities in which TV was not yet available. Again, caution is required in interpreting these results, because there is no way to know what aspect of TV might be responsible (e.g., rising consumer desires promoted by commercials might lead to increases in stealing). In summary, the investigations of the relatively immediate aftereffects of the introduction of television do not contradict the conclusion, drawn from the other types of studies, that TV violence stimulates aggression in young viewers, but these

investigations do not provide much corroborative support either.

Studies on Television News Violence

Does seeing violence in news coverage encourage imitative, or "copycat," behavior? There are many anecdotal reports of people imitating fictional violence. For example, it has been claimed that the movie Taxi Driver led directly to John Hinckley's attack on President Reagan. Despite the frequency of these presumed instances of a "contagion of violence," however, there has been relatively little research examining how news stories of aggressive events affect behavior. Most such investigations have been time-series field studies that have compared data on a community's violence rate before and after some highly publicized news of a violent occurrence. On the whole, these studies support the notion of a contagion effect, with some of the best evidence indicating that stories of a well-known person's suicide increase the likelihood that other people will also take their own lives (Phillips, 1979, 1982; Simon, 1979; Stack, 1989). Other investigations indicate there might also be a contagion of criminal violence. For example, a study by Berkowitz and Macaulay (1971) showed that there was a jump in the number of violent crimes, but not property crimes, after several high-profile murder cases in the early and mid-1960s, including the assassination of President Kennedy. However, some of the research in this area has been questioned, and the results are subject to various interpretations. For example, Phillips's (1983) frequently cited finding of increases in violent crimes following televised prizefight has not been widely accepted by researchers because of methodological challenges (Baron & Reiss, 1985; see Phillips & Bollen, 1985, for a response) and the difficulties in explaining the specific pattern of results (e.g., increases only exactly 3 days after the event).

**Studies of Music Videos and Music Lyrics**

Music videos are also of concern because these videos are sometimes replete with violence. Even those that do not have explicit aggressive content often have antisocial overtones (Baxter, De Riemer, Landini, Leslie, & Singletary, 1985; Caplan, 1985; Rich, Woods, Goodman, Emans, &

DuRant, 1998), and music videos are widely watched by adolescents.

Randomized Experiments

No experimental studies to date have examined how exposure to music videos affects youths' physically aggressive behavior. However, Waite, Hillbrand, and Foster (1992) observed a significant decrease in aggressive behavior on a forensic inpatient ward after removal of Music Television (MTV). Barongan and Hall (1995) reported a study suggesting that antisocial lyrics (without video) can affect behavior, but the assessed behavior was not clearly aggressive. In this investigation, male college students listened to misogynous or neutral rap music, viewed three vignettes (neutral, sexual and violent, assaultive), and then chose one of the three vignettes to be shown to an unknown female (who was actually a member of the research team). Those who had listened to the misogynous music were significantly more likely than those in the neutral-music condition to select the assaultive vignette.

Several research groups have examined how music videos affect adolescents' aggressive thinking and attitudes. For example, J.D. Johnson, Adams, Ashburn, and Reed (1995) randomly assigned African American adolescents to an experimental condition in which they viewed nonviolent rap music videos containing sexually subordinate images of women or to a no-music-video control condition. When queried about their attitudes, the young women who saw the demeaning videos indicated greater acceptance of teen dating violence than did comparable women in the control condition. In related work with young African American men, J.D. Johnson, Jackson, and Gatto (1995) found that exposure to violent rap music videos increased endorsement of violent behavior in response to a hypothetical conflict situation. Peterson and Pfost (1989) found that exposing males to nonerotic violent music videos led to a significant increase in adversarial sexual beliefs and negative affect. Similarly, college students shown rock music videos with antisocial themes reported a greater acceptance of antisocial behavior compared with the students in the control group, who were not shown antisocial rock music videos (Hansen & Hansen, 1990).

Students were also more likely to accept stereotypic sex role behavior after being exposed to music videos that displayed such behavior (Hansen, 1989; Hansen & Hansen, 1988).

Several experiments have examined the influence of violent songs without video on aggression-related variables. Some of these failed to obtain reliable effects of the lyric content (e.g., Ballard & Coates, 1995; St. Lawrence & Joyner, 1991; Wanamaker & Reznikoff, 1989). For example, participants in Ballard and Coates's investigation heard one of six songs varying in genre (rap vs. heavy metal) and lyric content (homicidal, suicidal, neutral). Lyric content had no impact on participants' rating of their mood, including anger. In most studies showing no effect, the genre of the songs (heavy metal) made the lyrics nearly incomprehensible, a problem noted by the researchers themselves. Other studies have reported mixed results. Wester, Crown, Quatman, and Heesacker (1997) had male undergraduates listen to (a) sexually violent music and lyrics, (b) the same music without lyrics, (c) sexually violent lyrics without music, or (d) no music or lyrics. Analyses yielded no differences in negative attitudes toward women among the four groups. However, participants exposed to violent lyrics viewed their relationships with women as more adversarial than other participants did.

More recently, Anderson, Carnagey, and Eubanks (2003) reported a series of five experiments on the effects of music lyrics. The experiments were designed to avoid the problems of comprehensibility and music genre encountered in earlier work. Across studies, seven violent songs by seven artists and eight nonviolent songs by seven artists were used to ensure that results were not due to one or two specific songs, artists, or genres. These five experiments provided consistent evidence that songs with violent lyrics increase aggression-related thoughts ($r = .21$) and affect ($r = .27$).

Cross-Sectional Surveys

We found no published cross-sectional studies of the effects of exposure to violent music videos on aggressive behavior. However, Roberts, Christenson, and Gentile (2003) summarized the

results of an unpublished study that found a positive correlation between amount of MTV watching and physical fights among third- throughfifth-grade children. In addition, children who watched a lot of MTV were rated by peers as more verbally aggressive, more relationally aggressive, and more physically aggressive than other children. Teachers rated them as more relationally aggressive, more physically aggressive, and less helpful.

Several studies suggest a connection between the kind of music youths listen to and whether their behaviors and attitudes are maladaptive. Rubin, West, and Mitchell (2001) found that college students who preferred rap and heavy metal music reported more hostile attitudes than students who favored other genres of music. Heavy metal listeners held more negative attitudes toward women, whereas rap music fans were more distrustful. Similarly, Took and Weiss (1994) found a correlation between preference for rap and heavy metal music and below-average academic performance, behavior problems in school, drug use, arrests, and sexual activity. Still other studies have obtained correlations betweens music preferences and a variety of maladaptive behaviors. But these studies have not specifically linked lyric preferences to those behaviors.

Summary of Studies of Exposure to Music Videos and Lyrics

The experimental studies provide substantial evidence that watching violent music videos creates attitudes and beliefs that are relatively accepting of violence in young viewers, at least in the short term. The cross-sectional studies also link violent music videos to more long-term maladaptive attitudes and beliefs in youth, but provide no direct evidence on the reasons for this connection. Studies of music lyrics without video show less consistency, perhaps because of the methodological problems mentioned earlier. However, the better controlled experiments suggest that understandable violent lyrics can increase aggressive thinking and affect. There are no published longitudinal studies of the effects of violent music videos or violent lyrics without video. Such studies are clearly needed before a definitive conclusion about long-term effects of exposure to violent music videos and lyrics can be reached.

**Studies of Video Games**

Violent video games have recently surpassed violent music videos and even violent TV as a matter of concern to parents and policymakers. There are several reasons for this. First, children are spending an increasingly large amount of time playing video games. Second, a large portion of these games contain violence. Third, because the children playing these games are active participants rather than observers, they may be at increased risk of becoming aggressive themselves. The impact of exposure to violent video games has not been studied as extensively as the impact of exposure to TV or movie violence; however, on the whole, the results reported for video games to date are very similar to those obtained in the investigations of TV and movie violence (Anderson & Bushman, 2001; Anderson et al., in press).

Randomized Experiments

In several studies, children were randomly assigned to play violent or nonviolent video games and then were observed when given an opportunity to be aggressive. Most of these studies found that the violent game significantly increased youths' aggressive behavior. For example, Irwin and Gross (1995) assessed physical aggression (e.g., hitting, shoving, pinching, pulling at clothes or hair, kicking) between boys who had just played either a violent or a nonviolent video game. Those who had played the violent video game were more physically aggressive toward peers. The average effect size ($r$) across six measures of physical aggression was .31. Also, several randomized experiments measured college students' propensity to be physically aggressive (by delivering a mild shock or unpleasantly loud noise to someone who had provoked them) after they had played (or not played) a violent video game. For example, Bartholow and Anderson (2002) found that college students who had played a violent game subsequently delivered more than two and a half times as many high-intensity punishments as those who played a nonviolent video game. The effect of the violent game was significant for both women ($r$ = .50) and men ($r$ = .57).

A number of randomized experiments have examined the effects of violent video games on

aggressive thoughts, emotions, and physiological arousal. For example, Calvert and Tan (1994) had participants play the violent virtual reality game Dactyl Nightmare or engage in movements similar to those of Dactyl Nightmare players, and then used a procedure in which participants listed their thoughts to assess aggressive cognitions. The participants who had played the violent game generated significantly more aggressive thoughts than those who had simply mimicked its movements ($r = .50$). Other studies have found similar effects using a wide array of measures to assess aggressive thinking, including time taken to read aggressive and nonaggressive words (Anderson & Dill, 2000), aggressive content of written stories (Bushman & Anderson, 2002), and hostile explanations for hypothetical unpleasant interpersonal events (Kirsh, 1998).

Several randomized experiments have tested the effects of video games specifically selected to differ in violent content but not in arousal or affective properties. For example, Anderson et al. (in press) tested the effects of 10 video games on physiological arousal and several affect-relevant dimensions, including frustration, difficulty, and enjoyment (Experiment 1), and then selected two games that were similar on these measures but different in violent content. In two subsequent experiments, the violent game significantly increased aggressive behavior relative to the nonviolent game ($r$s = .25 and .19), demonstrating that the effects of violent video games on aggression are independent of the games' effects on arousal or affect.

Cross-Sectional Surveys

Several survey studies have measured the correlation between time spent playing violent video games and aggression. For example, Anderson and Dill (2000) created a composite measure of recent exposure to violent video games, and correlated it with college students' self-reported acts of aggressive delinquent behavior in the past year (e.g., hitting or threatening other students, attacking someone with the idea of seriously hurting or killing him or her, participating in gang fights, throwing objects at other people). The overall correlation between exposure to violent video games and violent behavior was significant ($r = .46$, $p < .05$). The magnitude of the association decreased

but remained significant when analyses controlled for antisocial personality, gender, and total time spent playing any type of video game. Similarly, Gentile, Lynch, Linder, and Walsh (in press) obtained a significant correlation between time playing violent video games and physical fights among eighth and ninth graders ($r = .32$).

Longitudinal Surveys

There are no published longitudinal surveys specifically focusing on effects of violent video games on aggression. However, two recent longitudinal studies have linked such games to increases in aggression. Slater, Henry, Swaim, and Anderson (in press) surveyed sixth- and seventh-grade students from 20 middle schools across the United States on four occasions over a 2-year period. The media-violence measure included three items assessing the frequency of watching action movies, playing video games involving firing a weapon, and visiting Internet sites that describe or recommend violence. The aggressiveness measure included aggressive cognitions, values, and behavior, and thus is not a pure aggression measure. Control variables included gender, sensation seeking (a personality trait), general use of the Internet, and age. The main result was that media-violence exposure at one point in time was positively (and statistically significantly) related to aggressiveness at a later point in time even after statistically controlling for earlier aggressiveness and various other aggression-related variables. Interestingly, the longitudinal effect of aggressiveness on later use of violent media was not statistically significant. Both of these findings are similar to the longitudinal effects reported in the earlier section on television violence (i.e., the effect of exposure to violent television on later aggression is larger than the effect of early aggression on later exposure to violent television).

The second longitudinal study was reported by Ihori, Sakamoto, Kobayashi, and Kimura (2003). They studied Japanese fifth and sixth graders at two points in time separated by 4 to 5 months, measuring overall video-game exposure rather than exposure to violent video games. They reported that amount of exposure to video games was positively (and significantly) related to later

levels of violent physical behavior after controlling for earlier violent behavior.

Neither of these two longitudinal studies has all of the desired features needed to draw strong longitudinal conclusions about effects of violent video games on aggression. Nonetheless, both are strongly suggestive.

Video-Game Violence: Meta-Analysis and Summary

The findings of the first comprehensive meta-analysis of violent-video-game effects (Anderson & Bushman, 2001) have recently been corroborated in a new analysis (Anderson et al., in press) that examined methodological features of the studies in greater detail. In the latest analysis, studies were divided into two categories—those without any of 10 potential methodological problems (the best-practices studies) and those that had at least one of these problems. For each of five outcome variables examined, the best-practices studies yielded a significant effect of exposure to violent video games, as can be seen in Figure 1. Specifically, such exposure was related to increases in aggressive behavior ($r$ = .27), aggressive affect ($r$ =.19), aggressive cognitions (i.e., aggressive thoughts, beliefs, and attitudes), ($r$ =.27), and physiological arousal ($r$ = .22) and was related to decreases in prosocial (helping) behavior ($r$ = -.27). Furthermore, the best studies yielded larger effect sizes than the not-best studies, contradicting claims by representatives of the video-game industry and other critics of the video-game research literature. Finally, experimental and cross-sectional studies yielded essentially similar effect sizes for all five outcome variables with one exception—there were no best-practices cross-sectional studies of arousal to compare with best-practices experimental studies of arousal.

Though the number of studies investigating the impact of violent video games is small relative to the number of television and film violence studies, there are sufficient studies with sufficient consistency (as shown by the meta-analysis results) to draw some conclusions. These studies offer support for a connection between playing violent video games and increased likelihood of engaging in aggression. The experimental studies demonstrate that in the short term, violent video games

cause increases in aggressive thoughts, affect, and behavior; increases in physiological arousal; and decreases in helpful behavior. The cross-sectional studies link repeated exposure to violent video games wotj aggressive and violent behavior in the real world. The longitudinal studies further suggest long-term effects of repeated exposure to violent video games on aggression and violence.

**Studies of Internet Participation**

The basic theoretical principles concerning the effects of exposure to media violence should be applicable to Internet media. To date, there are no published studies that address how exposure to Web-based media violence affects aggressive and violent behavior, attitudes, beliefs, and emotions. However, because of the visual and interactive nature of Web material, we expect the effects to be very similar to those of other visual and interactive media. The Web materials with violence tend to be video games, film clips, and music videos, and there is no reason to believe that delivering these materials into the home via the Internet, rather than through other media, would reduce their effects.

**Meta-Analyses Combined Across Media Type**

Five major meta-analyses of general effects of media violence have been published in the past 20 years (Anderson & Bushman, 2002c; Bushman & Anderson, 2001; Hearold, 1986; Paik & Comstock, 1994; Wood et al., 1991). The most recent one (Anderson & Bushman, 2002c, based on data collected and reported in Bushman & Anderson, 2001) examined all published reports of effects of media violence on aggression through the year 2000. A restrictive definition of aggression (i.e., behavior intended to harm another person) was used to ensure the validity and integrity of the results. The studies included in the analysis covered all types of media: television, movies, comic books, music, and video games. By far the most frequent type of media violence investigated was the violence in TV and movies, although the growing video-game literature contributed a fair number of tests as well. More modern meta-analytic procedures were used than in some earlier meta-analyses of media-violence effects, such as averaging multiple effect sizes when

a study reported effects for more than one measure of aggression, so that each group of participants was represented in the meta-analysis only once. These modifications resulted in somewhat lower numbers of "studies" of media-violence effects than reported by Paik and Comstock, but the basic conclusions of all of these meta-analyses are essentially the same.

Figure 2 presents Anderson and Bushman's (2003c) results broken down into four separate categories: cross-sectional studies, longitudinal studies, field experiments, and laboratory experiments. The figure shows considerable convergence in results across methods: All four kinds of studies demonstrate highly reliable effects of media violence on aggression. The average effect sizes obtained were .17 for 42 longitudinal studies involving 4,975 participants, .18 for 86 cross-sectional studies involving 37,341 participants, .19 for 28 field experiments involving 1,976 participants, and .23 for 124 laboratory experiments involving 7,305 participants. These results differ substantially from Paik and Comstock's (1994) results primarily in that the average effect size for experiments is considerably lower in the more recent analysis (.23 compared with .38), perhaps because of the more conservative methodology employed in the later analysis.

**Summary of Empirical Research**

As this review of the empirical research has shown, exposure to media violence has a statistically significant association with aggression and violence among youth. The findings are generally consistent across media type and research methodology. The experimental research clearly demonstrates that exposure to media violence heightens the chances that a youth will behave aggressively and have aggressive thoughts in the short run. The cross-sectional surveys consistently indicate that the more frequently youth are exposed to media violence, the greater is the likelihood they will behave aggressively and have aggressive thoughts. The longitudinal research consistently shows that exposure to media violence in childhood is a predictor of subsequent aggression in adolescence and young adulthood even when many other possible influences are statistically controlled. Furthermore, there is evidence that habitual exposure even in

late adolescence and early adulthood produces similar increases in aggression and violence in later years. Although the sizes of these effects are in the range that statisticians call small to medium, the effects are generally of the same magnitude as many other effects that are considered important public-health threats (e.g., cigarette smoking, exposure to asbestos; Bushman & Huesmann, 2001).

## THEORETICAL EXPLANATIONS

One reason these empirical results have been increasingly accepted by the scientific community over the 30 years since the first Surgeon General's report on media violence is the growing understanding of the psychological processes underlying these effects. Although the underlying tenets of the current theories of media-violence effects were formulated even before that early Surgeon General's report (see Bandura, Ross, & Ross, 1961, 1963a, 1963b, 1963c; Bandura, 1973; Berkowitz, 1962; Eron, Walder, & Lefkowitz, 1971), researchers from a variety of disciplines, primarily psychology, communication, and sociology, have developed, tested, and refined ever-better theoretical models accounting for the consequences of exposure to media violence. The generally accepted theories that have evolved not only explain why exposure to media violence increases aggressive and violent behavior, but also suggest numerous factors that might exacerbate or mitigate the effect. These models generally fall under the rubric of social-cognitive, information processing models. Such models focus on how people perceive, think, learn, and come to behave in particular ways as a result of interactions with their social world, a world which includes observation of and participation in real social interactions (e.g., with parents, peers) as well as fictional social interactions (e.g., various forms of media). Reviews of several such formulations are available (Anderson & Bushman, 2002b; Anderson & Huesmann, 2003; Berkowitz, 1984, 1993; Huesmann, 1997, 1998).

Within the framework of these theories, it is important to distinguish between relatively immediate (or short-term) and delayed (or long-term) effects. It is now generally agreed that although some processes contribute to both kinds of effects, others contribute primarily to one or

the other. In particular, short-term effects are thought to be due to observational learning and imitation, arousal and excitation, and priming, whereas long-term effects are thought to be due to observational learning, automatization of aggressive schematic processing, and desensitization or emotional habituation. We discuss each of these processes in turn.

**Observational Learning and Imitation**

Humans begin imitating other humans at a very early age, and the observation of others' behaviors is the likely source of many of a young child's motor and social skills (Bandura, 1977; Meltzoff & Moore, 1977). Humans and chimpanzees are now known to have specific neurological systems designed for imitation (Rizzolati, Fadiga, Gallese, & Fogassi, 1996), and these systems make it easy for very young primates to acquire rudimentary social behaviors. Social interactions hone these behaviors that children first acquire through observation of others, but observational learning remains a powerful mechanism for the acquisition of new social behaviors throughout childhood and maturity. As a child grows older, the behaviors and the circumstances in which they are seen as appropriate or useful become more abstract, and beliefs and attitudes are developed from inferences made about observed social behaviors (Guerra, Huesmann, & Spindler, in press). Theoretically, children can be expected to learn from whomever they observe—parents, siblings, peers, or media characters—and many researchers now agree that such observational learning can contribute to both the short- and the long-term effects of media violence on aggressive behavior. Much of this learning takes place without an intention to learn and without an awareness that learning has occurred.

According to observational-learning theory, the likelihood that an individual will acquire an observed behavior is increased when the model performing the behavior is similar to or attractive to the viewer, the viewer identifies with the model, the context is realistic, and the viewed behavior is followed by rewarding consequences (Bandura, 1977).[2] A child's immediate imitation of observed behaviors would probably be the simplest example of observational learning though some scholars

would suggest that there should be a lag before the imitation occurs for it to be called "learning." Observational learning can help to explain some of the short-term effects of exposure to violent media, but what happens in the longer term? The reinforcements a person receives when imitating a behavior are largely responsible for whether the behavior persists. For example, youngsters might be rewarded or punished by people in their social environment (parents, teachers, peers) for the actions they exhibit, or they might vicariously experience the rewards or punishments other persons obtain when these others imitate the portrayed behavior. Through imitation and reinforcement, children develop habitual modes of behavior (e.g., Bandura, 1977, 1986; Huesmann, 1997). Whether observational learning leads to long-term effects of media violence depends in part on the consequences the imitated behaviors bring.

It is theorized that children not only learn specific behaviors from models; but can also learn more generalized, complex social scripts (sets of “rules” for how to interpret, understand, and deal with a variety of situations, including conflict); e. g., Anderson & Huesmann, 2003; Huesmann, 1988, 1998; Huesmann & Miller, 1994). Once learned, such scripts serve as cognitive guides for future behavior. For example, from observing violent people, children may learn that aggression can be used to try to solve interpersonal conflicts. As a result of mental rehearsal (e.g., imagining this kind of behavior) and repeated exposure, this approach to conflict resolution can become well established and easily retrieved from memory. Finally, through inferences they make from repeated observations, children also develop beliefs about the world in general (e.g., is it hostile or benign) and about what kind of behavior is acceptable.

Observational learning and imitation are often thought of as conscious processes, but that need not be the case. Recent theoretical and empirical work (e.g., Bargh & Chartrand, 1999; Neuman & Strack, 2000) suggests that some types of imitative behaviors are very automatic, nonconscious, and likely to be short-lived. Similarly, observational learning of complex scripts and schemas (e.g., beliefs, attitudes, and other types of knowledge that guide perception, interpretation, and

understanding) can also occur outside of awareness, even with no immediate imitation of behaviors. Theoretically, it should not matter much for the long-term consequences of observation of violent behavior whether or not the child is aware of its influence. Repeated observation of aggressive behavior should increase the likelihood that children will incorporate aggressive scripts into their repertoires of social scripts, particularly if their own use of those scripts is followed by reinforcement.

**Priming and Automatization of Aggressive Schematic Processing**

Neuroscientists and cognitive psychologists have discovered that the human mind often acts as an associative network in which ideas are partially activated (primed) by associated stimuli in the environment (Fiske & Taylor, 1984). An encounter with some event or stimulus can prime, or activate, related concepts and ideas in a person's memory even without the person being aware of this influence (Bargh & Pietromonaco, 1982). For example, exposure to violent scenes may activate a complex set of associations that are related to aggressive ideas or emotions, thereby temporarily increasing the accessibility of aggressive thoughts, feelings, and scripts (including aggressive action tendencies). In other words, aggressive primes or cues make aggressive schemas more easily available for use in processing other incoming information, creating a temporary interpretational filter that biases subsequent perceptions. If these aggressive schemas are primed while certain events--such as ambiguous provocation--occur, the new events are more likely to be interpreted as involving aggression, thereby increasing the likelihood of an aggressive response. Priming effects related to aggression have been empirically demonstrated both for cues usually associated with violence, such as weapons (Anderson, Benjamin, & Bartholow, 1998; Berkowitz & LePage, 1967; Carlson, Marcus-Newhall, & Miller, 1990), and for initially neutral cues that have been observed repeatedly to be connected to violence, such as the color of a room in which violence is repeatedly observed (Leyens & Fraczek, 1983). For example, the mere presence of a weapon within a person's visual field can increase aggressive thoughts and aggressive behavior (Bartholow, Anderson,

Benjamin, & Carnagey, in press).

Priming effects are often seen as purely short-term influences. But research by cognitive and social-cognitive scientists has shown that repeated priming and use of a set of concepts or schemas eventually makes them chronically accessible. In essence, frequently primed aggression-related thoughts, emotions, and behavioral scripts become automatically and chronically accessible. That is, they become part of the normal internal state of the individual, thereby increasing the likelihood that any social encounter will be interpreted in an aggression-biased way, and therefore increasing the likelihood of aggressive encounters throughout the individual's life (e.g., Anderson & Huesmann, 2003). This automatization process, which changes short-lived increases in aggression-biased perceptions into relatively long-lasting aggression-biased perceptual filters, is essentially another type of learning process, one that has long-term consequences.

**Arousal and Excitation Transfer**

Media violence is exciting (arousing) for most youth. That is, it increases heart rate, the skin's conductance of electricity, and other physiological indicators of arousal. There is evidence that this arousal can increase aggression in two different ways. First, arousal, regardless of the reason for it, can energize or strengthen whatever an individual's dominant action tendency happens to be at the time. Thus, if a person is provoked or otherwise instigated to aggress at the time increased arousal occurs, heightened aggression can result (e.g., Geen & O'Neal, 1969). Second, if a person who is aroused misattributes his or her arousal to a provocation by someone else, the propensity to behave aggressively in response to that annoyance is increased (e.g., Zillmann, 1971, 1982). Thus, people tend to react more violently to provocations immediately after watching exciting movies than they do at other times. This kind of effect is usually short-lived, perhaps lasting only minutes.

Such arousal-transfer effects can occur with any kind of exciting activity, not just exciting movies, TV shows, music videos, or video games. For this reason, the arousal properties of violent media have not drawn as much attention as their other consequences. Nonetheless, it bears noting

that frequent episodes in which exposure to violent media is followed by frustrating or provoking events could well lead to an increase in the viewers' aggressive social encounters, which in turn can affect their self-images and the aggressiveness of their social environment. Indeed, recent research shows that playing a violent video game for as little as 10 min increases the player's automatic association of "self" with aggressive actions and traits (Uhlmann & Swanson, in press). In the same study, the researchers also found that past history of exposure to violent video games was positively associated with aggressive views of the self.

**Emotional Desensitization**

The term "desensitization" has been employed in so many different ways that the exact meaning of any particular usage can be quite unclear. We specifically use the label emotional desensitization to refer to a reduction in distress-related physiological reactivity to observations or thoughts of violence (Carnagey, Bushman, & Anderson, 2003). In the present context, emotional desensitization occurs when people who watch a lot of media violence no longer respond with as much unpleasant physiological arousal as they did initially. Because the unpleasant physiological arousal (or negative emotional reactions) normally associated with violence has an inhibitory influence on thinking about violence, condoning violence, or behaving violently, emotional desensitization (i.e., the diminution of the unpleasant arousal) can result in a heightened likelihood of violent thoughts and behaviors (Huesmann et al., 2003).

Habituation of neurophysiological responses over time is a well-established psychological phenomenon (though some responses resist habituation); repeated presentation of the same stimulus usually results in smaller and smaller neurophysiological responses to that stimulus. Similarly, systematic desensitization procedures are highly successful in the treatment of phobias (e.g., Bandura & Adams, 1977; Wolpe, 1958, 1982) and other anxiety or fear disorders (e.g., Pantalon & Motta, 1998). For example, systematically exposing someone with a snake phobia to snakes (initially under conditions designed to minimize anxiety and later under more anxiety-

producing conditions) reduces the original anxiety reactions to such an extent that the person is no longer snake phobic. One feature of modern systematic desensitization treatments is to have the phobic person observe other people (live or filmed) successfully interacting with the feared stimulus (Bandura, Grusec, & Menlove, 1967; Bandura & Menlove, 1968).

Similarly, violent scenes do become less unpleasantly arousing over time (see Cline, Croft, & Courrier, 1973), and more aggressive (relative to less aggressive) college students do tend to show decreased arousal to repeated scenes of violence (Titus, 1999). Research has shown that even relatively brief exposure to media violence can reduce physiological reactions to the sight of real-world violence (Carnagey et al., 2003, Thomas, Horton, Lippincott, & Drabman, 1977) and can decrease helpful behavior toward victims of aggression (Carnagey et al., 2003; Drabman & Thomas, 1974, 1975; Thomas & Drabman, 1975). However, it still has to be established whether or not such decreased arousal in response to violent scenes stimulates violent behavior, and it is therefore uncertain how big a role emotional desensitization plays in the long-term cumulative effects of media violence on the instigation of aggression. Unfortunately, there have been few attempts to date to test this hypothesis directly.

## RESEARCH ON MODERATOR EFFECTS

Although the psychological processes through which media violence operates are present in every child, children are not affected equally by media violence. Some studies indicate that different children are affected differently by media violence. Similarly, not all portrayals of violence in the media have the same effect. It is therefore important to examine the characteristics of individuals, of media content, and of social environments that may increase or decrease--that is, moderate--the influence of media violence on aggressive behavior. A number of factors have been proposed as possible moderators, some on the basis of the psychological theorizing reviewed in the previous section, some because of empirical evidence that seems to suggest their importance, and

others for both reasons.

**Viewer Characteristics**

Many viewer characteristics have been hypothesized as moderators of how people interpret and react to violent media content. For example, developmental theory suggests that younger children, whose social scripts, schemas, and beliefs are less crystallized than those of older children, should be more sensitive to this influence (Guerra et al., in press). Observational-learning theory suggests that the viewers' age and gender can influence the extent to which they identify with the depicted aggressive characters, which may in turn influence learning and enactment of the observed aggression. Relatively low intellectual competence might exacerbate the effects of exposure when the story plots are fairly subtle and complicated. A high level of aggressiveness might result in an enhanced susceptibility to media-violence effects by affecting the perception of violence in the observed scenes.

Age and Gender of Viewer

Paik and Comstock (1994) reported an inverse relation between viewers' age and the magnitude of the effect of TV violence on aggression and other antisocial behaviors. In other words, as several developmental psychologists had theorized, the media-violence effect was largest in the youngest age group (less than 5 years old). However, the moderating influence of age was found to be quite complicated: The effect size did not decrease consistently as age increased. For example, the overall effect size among college-age students matched or exceeded that for 6- to 11-year-olds in experimental studies. However, these comparisons did not control for the different outcome measures used in research with adults and children. Aggressive behavior is often used as an outcome measure for children, whereas measures of aggressive thoughts are often used for college students and adults. In one of the two longitudinal investigations that used the same behavioral measure of aggression on the same participants at different ages, the longitudinal effect of media violence on aggressive behavior was significant for children (age 8) but nonexistent for young

adults (age 19; Eron et al., 1972). But, what constitutes an appropriate or "best" measure of aggression differs for different ages and genders. Spousal violence is appropriate for adult couples but not children, whereas classroom aggression is more appropriate for children. To further complicate matters, the recent study by J.G. Johnson et al. (2002) found a larger longitudinal effect of television viewing on assault and fighting behavior at age 30 than at earlier ages (16, 22).[3]

Paik and Comstock (1994) also reported little difference in the average effect size for females and males. Although some early studies in the United States and some studies in other countries found stronger relations between media-violence viewing and aggression for boys than for girls (e.g., Eron et al., 1972), more recent investigations seem to show mostly similar effects. For example, in their recent study of children growing up between 1977 and 1995, Huesmann et al. (2003) reported similar effect sizes for males and females over 15 years old. However, there were some gender differences in the kinds of aggression associated with early childhood exposure to media violence. For example, early exposure to violence predicted increased use of indirect aggression (e.g., telling lies to get colleagues in trouble, taking other people's things out of anger) as an adult among females but not males; and early exposure to media violence had a stronger relation to physical aggression as an adult among males than females. Several possible factors have been suggested as contributors to these gender differences, as well as to changes in gender differences over time. One set concerns media violence itself: the difference in the frequency with which aggressive males and females are depicted in the mass media, the different kinds of aggression those characters use, and the increase in the depiction of aggressive females over the years. Another possible contributing factor is the increasing acceptability of female aggression by society--a change which makes it more likely that aggressive inclinations will be enacted by females.

Aggressiveness of Viewer

Individuals who are characteristically more aggressive than their peers are likely to have

multiple risk factors predisposing them toward aggressive behavior. Existing research indicates that one of these risk factors may be a lower threshold for a media-violence-induced activation of aggressive behavior. Studies of violent television, film, and video games (e.g., Anderson & Dill, 2000, Study 1; Bushman, 1995; Bushman & Geen, 1990; Friedrich & Stein, 1973; Josephson, 1987) have found that highly aggressive individuals show greater effects (on aggressive behavior, attitudes, emotions, and beliefs) of exposure to media violence than their relatively less aggressive counterparts. Children who are at the greatest risk to grow up to be very aggressive are those who both were initially aggressive and watched relatively high amounts of TV violence (Dorr & Kovaric, 1980; Huesmann, Eron, Lefkowitz, & Walder, 1973). At the same time, this does not mean that the relatively nonaggressive child is unaffected by violent portrayals. Several studies have shown significant effects of media violence on later aggression among children with low levels of earlier aggression, as well as their highly aggressive peers (e.g., Eron et al., 1972; Gentile & Anderson, 2003; Huesmann et al., 1973, 2003). Furthermore, studies sometimes obtain essentially equal-size media-violence effects for individuals with low and high aggressive tendencies (e.g., Anderson & Dill, 2000, Study 2) and sometimes find that less aggressive individuals are more affected by media violence than more aggressive individuals are (e.g., Anderson, 1997).

Bandura's (1977) concept of "reciprocal determinism" helps to make sense of some of these findings. Different types of people seek out different types of media content but then are also affected differently by the content. Thus, children with strongly aggressive predispositions may be especially attracted to viewing violent media, perhaps because it helps them justify their own behavior (Bushman, 1995; Fenigstein, 1979; Gunter, 1983; Huesmann et al., 2003; O'Neal & Taylor, 1989), but, as noted, they may also be more likely than other children to be influenced by such exposure. For example, they may perceive the violence as more normative and may identify more with the violent characters. Both of these factors should increase the likelihood that the media

exposure will influence them. Along these lines, studies focusing on sexually violent media have shown that young men who are relatively high in risk for sexual aggression are more likely to be attracted to and aroused by sexually violent media (e.g., Malamuth & Check, 1983) and may be more likely to be influenced by exposure to such violent media than those low at risk for sexual aggression (e.g., Malamuth & Check, 1985). Finally, it is important to realize that experiments and longitudinal studies have shown that aggressive youths' attraction to violent media cannot explain away the effect of the violent media on those youths. Rather, their attraction is an added risk factor that increases the likelihood they will be affected by the violence they observe.

Intelligence of the Viewer

The relevant theories do not make a clear prediction about the role of the viewers' intelligence as a moderator of the effect of media violence. On the one hand, children of lower intellectual ability watch more television and see more television violence (see Comstock & Paik, 1991, pp. 86-95) than children of higher intelligence, and also are more at risk to behave aggressively (Huesmann, Eron, & Yarmel, 1987). On the other hand, children of higher intelligence usually learn more rapidly, through either conditioning or observational learning, so one might expect them to be influenced more. The existing empirical research provides little support for either argument. Although statistically controlling for intelligence has frequently lowered observed media-violence correlations in cross-sectional and longitudinal studies (see Milavsky et al., 1982), differences in intelligence do not explain the media-violence effects on aggression, and there is little evidence that either high or low intelligence exacerbates the media-violence effects (see Eron et al., 1972; Huesmann & Eron, 1986; Huesmann et al., 2003).

Perceptions of Realism and Identification With Aggressive TV Characters

Observational-learning theory suggests that children who identify fairly strongly with an aggressive character or perceive a violent scene as realistic are especially likely to have aggressive ideas primed by the observed violence, to imitate the character, or to acquire a variety of aggressive

scripts and schemas (beliefs, attitudes, interpretational biases).. Of course, identification and realism depend on the portrayal as well as the viewer. Some evidence indeed suggests that relatively realistic portrayals are more likely to increase viewers' aggression than those presented in a more fictionalized or fantastic fashion (Atkin, 1983; Berkowitz & Alioto, 1973; Feshbach, 1972; Geen, 1975; Hapkiewicz & Stone, 1974). Also, when people are asked to imagine themselves as the protagonist in a violent film, the effects of viewing the film are enhanced, perhaps because of the viewers' relatively greater psychological involvement (Leyens & Picus, 1973). In longitudinal research, Huesmann and his colleagues (1986, 2003) found that children who thought that violent shows they watched were telling about life "just like it really is" or who identified with aggressive TV characters had relatively high average scores on a measure of physical and verbal aggression 1 year later and scored higher on a composite measure of aggressiveness (physical, verbal and indirect or relational) 15 years later. In both of these longitudinal analyses, those most at risk to behave aggressively were children who both watched violence and identified with the violent characters.

As with other moderator effects, though, it is important to note that the occasional finding of increased risk when perceptions of realism and identification are high does not mean that there are no deleterious effects when levels of realism or identification are low. For instance, numerous studies have found significant effects of media violence on aggression even when the media violence is clearly fictional and unrealistic (e.g., virtually all experiments using cartoonish media-violence stimuli and college-student participants).

**Media Content Characteristics**

Not all violent portrayals pose the same risk to viewers (Wilson et al., 1997). A variety of studies—primarily laboratory investigations involving children and young adults—indicate that how violence or aggression is presented can alter its meaning for the audience and may moderate viewers' behavioral, cognitive, and emotional reactions. We have already noted that the effect of

media violence is sometimes enhanced when the violence seems like "real life" and is committed by characters with whom the viewer can identify. However, some other characteristics of the content also seem to be important.

Characteristics of the Aggressive Perpetrator

Given that identification with the perpetrator may increase the effects of his or her behavior on viewers, it is important to consider what characteristics of a perpetrator might be conducive to identification. There is evidence suggesting that viewers are particularly likely to identify with and be influenced by an aggressive character portrayed as similar to themselves (e.g., in age, gender, and race; Bandura, 1986, 1994). However, the overall attractiveness, power, and charisma of the perpetrator may be more important than any of these personal attributes by themselves. For example, in the early 1970s, African American children imitated the behavior of White male actors more than African American actors (Neely, Hechel, & Leichtman, 1973).

Portrayed Justification and Consequences of the Aggression

According to observational-learning theory, when violence is portrayed as justified, viewers are likely to come to believe that their own aggressive responses to a perceived offense are also appropriate, so they therefore are more apt to behave aggressively. Supporting this contention, findings from experiments that varied the extent to which the observed violence was justified demonstrated that seemingly warranted media violence increased the likelihood that angered participants would assault people who had provoked them earlier (Berkowitz, 1965; Berkowitz & Geen, 1967; Berkowitz & Powers, 1979; Geen & Stonner, 1973). Theoretically, rewarding perpetrators for their aggression should also raise the likelihood that viewers will model the aggressive act, and indeed, media portrayals in which violence is rewarded have been shown to increase the risk that viewers will behave aggressively (Bandura, Ross, & Ross, 1961, 1963a, 1963b, 1963c; Lando & Donnerstein, 1978). However, violence does not need to be explicitly rewarded to increase the risk of a harmful effect; seeing unpunished media violence may also

enhance learning of aggressive thoughts and behaviors (Bandura, 1965; Walters & Parke, 1964).

Another important question concerns the effects of showing the negative consequences to the victim of portrayed aggression. Seeing the harm and pain resulting from violence might serve as a vicarious punishment for the viewer who identifies with the aggressor, reducing the vicarious value of any rewards associated with the aggressive act, and thereby reducing the usual media-violence effect on aggressive behavior. However, little research has been conducted to test this speculation. Goranson (1970) summarized two unpublished experiments on this topic. He reported that after being angered and then viewing a filmed aggressive boxing match, participants who were subsequently informed that the losing boxer had died behaved less aggressively toward their earlier antagonist than those not informed of the victim's death. Malamuth and Check (1985) obtained similar results. Participants in their study listened to an audio-taped passage of a rape. For some participants, the passage indicated that the victim was hurt and disgusted, whereas others heard that the victim became sexually aroused by the rape and was not hurt. A subsequent measure indicated that those who heard about negative consequences to the rape victim were less accepting of common rape myths than those who heard about positive consequences to the victim.

However, there is some theoretical and empirical support for the opposite view, that explicit portrayal of blood, gore, or other painful consequences might increase aggressiveness on the part of the viewer. Repeated exposure to such negative consequences can lead the viewer to experience less of a negative emotional reaction to future scenes of blood and gore and to pain expressed by victims. Such habituation (or desensitization) may well enable one to consider harming someone without experiencing the negative emotional reactions that normally inhibit aggression. Empirically, viewers who show less negative emotional reactions to viewing violence are more likely to behave aggressively than those who show more negative reactions (Kirwil & Huesmann, 2003; Moise-Titus, 1999).

These few studies are not sufficient for firm conclusions. It may be that the short-term effects of

portraying negative consequences differ from the long-term effects, and there may well be other complicating factors involved. In any case, it is clear that additional research is needed on this question.

**Social Environment**

Little research to date has examined how cultural, environmental, and situational variables (e.g., place, presence of co-viewers) moderate the impact of media violence. However, the theories and the data we have already reviewed suggest that such social factors might moderate the effect if they alter the chances that the child will identify with aggressive characters, alter the child's perception of the scene's reality, alter the chances that the child will watch violence, or alter the chances that the child will carry out aggressive behaviors learned from watching the violence. Any of these factors might be influenced by culture, neighborhood environment, or family.

Influence of Culture

There have been many studies on media violence carried out in countries other than the United States, but few studies have examined the effect of media violence in non-Western cultures. Within Western countries, the empirical results have mostly been similar, but with important exceptions. For example, Huesmann and Eron (1986) reported there was no relation between viewing of TV violence and aggression among Israeli children raised on a kibbutz, but found a moderate to strong relation among Israeli children raised in a suburb. It may be that cultural environments with strong sanctions against violence within the group mitigate the expression of any aggressive behaviors learned from media violence. This could also explain why effects for U.S. females appear to be much stronger among those who grew up in the 1970s and 1980s than among those who grew up in the 1950s and early 1960s. However, the lack of research in non-Western cultures and other anomalies in the research in Western countries suggest that the full effects of culture and society are not yet well understood. For example, in the preliminary results from a 15-year follow-up among Polish females who experienced the social upheavals of the end of Communism as

teenagers, Huesmann and Moise-Titus (1999) reported that those girls who were more aggressive as children and watched more violence became less aggressive and more successful young adults than the girls who had been less aggressive and watched less violence.

Influence of Neighborhood and SES

Low-SES children on average watch more television and television violence than high-SES children (Comstock & Paik, 1991). The SES link to television viewing habits does not account for the overall association between viewing media violence and aggression among youth (Huesmann et al., 2003). Nor is there much evidence that low SES increases or decreases the effect of media violence on behavior. That is, the effect of media violence on aggression appears essentially the same on low- and high-SES children. However, the generally high dose of media violence given to low-SES children is yet another risk factor for adulthood violence in this population.

Influence of Parents

From a theoretical standpoint, parents have the potential to be important moderators of the effects of media violence on children. Children and adolescents form attitudes and beliefs and take action as a result of their exposure to media content, but they also may discuss what they see with others—especially parents and friends—and their responses may ultimately be shaped by these interpersonal interactions. Singer and Singer (1986a, 1986b) proposed that when parents take an active mediating approach toward television viewing by their children—including commenting regularly and critically about realism, justification, and other factors that could influence learning—children are less likely to be influenced badly by media content. Singer and Singer reported some data in support of this view, and some recent research has provided additional support. For example, Nathanson (1999) found that children whose parents discuss the inappropriateness of television violence with them or restrict access to violent television shows report lower aggressive tendencies than children whose parents do not discuss television violence or restrict access to violent television shows. Other findings suggested that either type of parental

intervention may decrease the importance children give to violent TV, which in turn may lower children's aggressive attitudes.

The few studies that have examined parents' characteristics as possible moderators have found little evidence that factors such as parents' aggressiveness, coldness, personality, or viewing habits increase or decrease the effects of exposure to violence (Huesmann et al., 2003). How parents control their children's viewing and what parents do when their children view violence appear to be more important in mitigating the effects of observing violence than who the parents are.

**Summary and a Caveat**

The studies discussed in this section on moderators suggest potentially productive avenues for studies on preventive intervention. One approach would be based on parental interventions with the child during and after exposure to violence, as well as parental restrictions on access to violent media. Another would be based on altering violent presentations to reduce the characteristics that increase observational learning, desensitization, automatization, and priming effects. However, such intervention studies will require a much more systematic research base to more clearly identify the most important moderating factors. Furthermore, although there is evidence of a number of moderating factors (e.g., realism), there is no evidence that any group is completely protected from the effects of media violence or that any moderator provides complete protection from these effects. For example, even though more realistically presented media violence sometimes produces larger effects than less realistic portrayals, and youth who perceive violent media as more "real" are sometimes more affected than peers who perceive it as less real, studies using portrayals that are clearly not real (e.g., cartoon characters) and participants who know that the stimuli are fictitious (e.g., college students) still yield significant media-violence effects.

## RESEARCH ON MEDIA USE AND CONTENT

In the preceding sections, we have addressed how exposure to violent media may affect

children, youth, and young adults. The findings raise questions about the content of media violence and its accessibility to and consumption by youth. This section provides an overview of current knowledge about family access to and children's use of media in general, violent content in the media, and factors that affect children's preferences for (and potential for exposure to) violence in media. We focus on media in the United States, but similar issues have been raised in many other countries as well.

**Children's Access to Media in the Home**

Three recent nationally representative surveys—two from the Kaiser Family Foundation[4] (hereafter referred to as Kaiser; Roberts, Foehr, Rideout, & Vrodie, 1999; Rideout, Vandewater, & Wartella, 2003) and one from the Annenberg Public Policy Center[5] (hereafter referred to as APPC; Woodard, 2000)—illustrate just how prevalent media are in the home.[6] All three studies reported that virtually all families with children have at least one television set, most have at least one VCR or DVD player, and the majority (between 74 and 78%) now subscribe to cable or satellite TV. In addition, these studies concurred that 7 in 10 families with children have a video-game system, a similar percentage of families own a computer, the majority of American children have a bedroom TV (including 30% of children age 0-3), and the likelihood of having a bedroom TV increases as children get older; less common but also palpably present in 2-17 year old children's rooms are video-game players (between 33 and 39%), VCRs (30%), and Internet hookups (between 6 and 11%). In recent years, the percentage of families with on-line connections has risen, from 15% in 1996 to 52% in 2000. Family income is positively related to all media ownership except video games. And of course, the rapid growth of video gaming means that even these fairly recent figures underestimate the current level of access and use.

Children spend more time consuming entertainment media than engaging in any other activity besides school and sleeping (Roberts et al., 1999; Stanger & Gridina, 1999). They average approximately 4 hr per day in front of a television or computer screen (Roberts et al., 1999;

Woodard, 2000), but the number of hours is even higher for many children. For example, 25% of sixth graders watch more than 40 hr of television per week (Lyle & Hoffman, 1972)—more time than they spend in school. At 10 a.m. on any Saturday morning, about 60% of the 6- to 11-year-olds in America are watching television (Comstock & Paik, 1991). Indeed, children age 0-6 spend more time on entertainment media than on reading, being read to, and playing outside combined (Rideout et al., 2003).

The 1999 Kaiser survey (Roberts et al., 1999) and Comstock and Paik (1991) both reported that TV viewing peaks at ages 8 through 13, although the APPC survey found no significant age differences in TV viewing. For all other media, all surveys show that children's time spent with media does vary significantly by age. For example, younger children spend more time watching television (including videos and DVDs) than do older children, whereas teenagers spend more time on computer-related media and the telephone than do young children.

As one might expect, children from households with lower incomes, on the average, spend significantly more time watching TV and videotapes and playing video games than children from families with higher incomes (Comstock & Paik, 1991; Roberts et al., 1999). In addition, children with lower IQs spend more time watching TV than children with higher IQs do (Comstock & Paik, 1991). However, the variation within any social class or IQ level is large; at all levels, some children watch large amounts of TV and some children watch none.

**The Violent Content of Media**

Several content analyses over the past three decades have systematically examined the amount of violence on television (Gerbner, 1972; Gerbner, Gross, Morgan, & Signorielli, 1980; Larsen, 1968; Potter et al., 1995; Signorielli, 1990). The largest and most recent of these was the National Television Violence Survey[7] (NTVS; Wilson et al., 1997, 1998), which examined the amount and content of violence[8] on American television for 3 consecutive years.

The programs for NTVS were randomly sampled from 23 broadcast and cable channels over a

20-week period ranging from October to June during the 1994 through 1997 viewing seasons. The NTVS report revealed that 61% of programs on television contain some violence. Only 4% of all violent programs on television feature an antiviolence theme--or put in another way, 96% of all violent television programs use aggression as a narrative, cinematic device for simply entertaining the audience. These prevalence findings were quite consistent across 2 randomly sampled composite weeks of television from 3 different years. Moreover, most aggression on television is glamorized and trivialized: 44% of the violent interactions involve perpetrators who have some attractive qualities worthy of emulation; nearly 40% of the violent scenes involve humor either directed at the violence or used by characters involved with the violence; and nearly 75% of all violent scenes feature no immediate punishment or condemnation for violence. Almost 45% of all programs feature “bad” characters who are never or rarely punished for their aggressive actions. Much of the violence is also sanitized: 51% of violent behavioral interactions on television feature no pain, 47% feature no harm, and 34% depict harm unrealistically. The greatest prevalence of unrealistic harm appears in children's programming, presumably in cartoons. Of all violent scenes on television, 86% feature no blood or gore, and only 16% of violent programs depict the long-term, realistic consequences of violence.

NTVS is not without limitations, however; violence in news was not assessed. Much of news programming is filled with stories about crime and violence (R.N. Johnson, 1996; Lichter & Amundson, 1994; Slattery & Hakanen, 1994). Approximately 15% of the programs on the broadcast networks and 10% of the programs on the independent stations are news programs, not to mention the all-day news programming on two CNN channels on basic cable. Given that news stories often feature violence or its harmful aftermath, the prevalence of violence on American television may be considerably higher than the NTVS findings reveal.

There are no comparable comprehensive studies of violent content in contemporary American movies or video games. However, several independent research groups have conducted smaller

scale analyses of video-game content, using various methods, and the results converge on the same conclusion—that violence is widely present. A 1999 National Institute on Media and the Family report (Walsh, 1999) noted that a panel of parents rating 78 popular video games found that 25% of the games showed "many, intense instances" of violence, and another 30% showed at least "some instances" of violence. Another recent analysis found that about 89% of video games contain some violent content (Children Now, 2001). Studies of fourth- through eighth-grade children found that more than half stated preferences for games in which the main action is predominantly violent (Buchman & Funk, 1996; Funk, 1993). In surveys of children and their parents, about two thirds of children named violent games as their favorites; only about one third of parents were able to correctly name their child's favorite game, and 70% of the time that parents were incorrect, children described their favorite game as violent (Funk, Flores, Buchman, & Germann, 1999). Similar results have been reported in Japan. Shibuya and Sakamoto (2003) reported that 85% of the most popular video games of Japanese fifth graders contained violent content.

**Factors Affecting Children's Exposure to Violent Content**

By the time a typical child finishes elementary school, he or she will have seen approximately 8,000 murders and more than 100,000 other acts of violence on TV (Huston et al., 1992). The rate of violence per minute is much higher in video games than in most violent TV programs or movies, but data on the number of violent acts witnessed (or committed) in video games are not available.

Conventional wisdom holds that children enjoy violence in the media, and Nielsen data do show that the most frequently watched children's programs are filled with conflict (Jordan, 1996). However, Cantor (1998) pointed out that this trend may be the result of what is made available during times when children are likely to be in the audience (e.g., Saturday morning); children's favorite programs are prime-time sitcoms depicting family interactions. There is little systematic research (outside of the industry) that examines children's tastes for different genres. That boys are more likely than girls to be attracted to and enjoy violent media is fairly well established in studies

on television (Cantor & Nathanson, 1997; Comstock, 1995; Huston & Wright, 1997; Valkenburg & Janssen, 1999) and appears to be the case with computer-video games (Barnett et al., 1997; Gentile & Anderson, 2003; Griffiths, 1997). However, males may be more strongly attracted to violent entertainment media than are females because media tend to cater to male audiences and use males as lead character (e.g., *X-Men*, *Batman*, *Spiderman*, *Superman*).

Males and females also differ in their perceptions of and preferences for different types of violence. For example, Funk and Buchman (1996) found no gender difference in overall preference for violent video games, but girls preferred fantasy violence, whereas boys preferred human violence. Cantor (1998) reported that males were more attracted to "justice restoring" violent programming (such as that found in Batman) than females, but were equally attracted to "comedic violence."

A few studies have examined the impact of the family's SES on children's attraction to violence; interpretation of the findings of these studies is complicated by the fact that lower-SES children tend to consume more media overall. Van der Voort (1986) found that children from lower-SES homes engaged in higher levels of viewing than children from more affluent families, but also showed more enjoyment and approval of the violence and identified more strongly with the characters. Comstock (1995; Comstock & Paik, 1991) and Huston and Wright (1997) found a relationship between lower income levels and a greater preference for violence, particularly among boys. Evidence on ethnic differences in children's preferences remains unconvincing, because many studies have failed to appropriately control for SES. For both boys and girls, a lower self-evaluation of behavior (e.g., lower ratings of their own ability to get along well with others) is linked to a higher preference for violent games (J.B. Funk, Buchman, & Germann, 2000). Finally, perhaps because lower-IQ children watch more television on the average than higher-IQ children do, they also watch more violent television on the average (Eron et al., 1972; Huesmann, et al., 2003).

## RESEARCH ON INTERVENTIONS

Recent efforts to reduce the harmful effects of media violence on youth have taken various forms, including (a) attempting to reduce the amount of media violence and its accessibility to children (e.g., calls for media self-regulation and violence ratings), (b) encouraging and facilitating parental monitoring of children's media access (e.g., V-chip legislation), (c) educating parents and children about the potential dangers of media violence (e.g., media and empathy educational programs), and (d) changing children's thinking to reduce the chance that they will imitate the violence they see. Only a few of these approaches have received scientific study. The lack of formal research on interventions related to media violence is somewhat surprising, considering that the knowledge base from which experimental interventions could be developed is large. Historically, much more attention has been paid to establishing the existence of a relationship between media violence and behavior, determining its theoretical basis, and discovering what moderates the effect than has been paid to determining how to prevent it.

### Changing Attitudes

Interventions specifically designed to counter violent messages presented in the media are rare (Eron, 1986; Singer & Singer, 1986a, 1986b; Singer, Singer, & Rapaczynski,1984); however, two have shown some success. Huesmann, Eron, Klein, Brice, and Fischer (1983) studied the effectiveness of two intervention programs designed to reduce the likelihood that 7- to 8-year-old children would imitate aggressive behaviors they saw on TV. In the first study, training sessions about television and realism failed to change attitudes or aggressive behavior. However, the same children participated in an additional—and successful—intervention the following year. In the second study, the children produced a videotape (ostensibly for children who had been "fooled by television or harmed by television violence") of themselves presenting persuasive essays explaining why it is bad to imitate TV violence and how television is not like real life (Huesmann et al., 1983, p. 905). Four months after the intervention, the children's aggressive behavior (as reported by

peers) had increased, as would be expected for this age, but it increased significantly less than the aggressive behavior of a randomly assigned comparison group of children who received a placebo intervention. Children who received the preventive intervention were also more inclined to view television violence as harmful and "not reflecting true life." The effectiveness of this intervention fits well with basic research on the effect of creating or reading causal explanations on beliefs, attitudes, and behavior (e.g., Anderson, Lepper, & Ross, 1980; Anderson & Sechler, 1986; Slusher & Anderson, 1996). That research showed that creating or considering causal explanations relevant to an issue leads to corresponding changes in beliefs, judgments, and behaviors.

Similar results for media-violence interventions have been found with judgments involving sexual aggression. Linz, Fuson, and Donnerstein (1990) showed college men an educational documentary on the psychological impact of "slasher" films and two rape-prevention education films. The men were assigned to write essays about myths of sexual violence or essays critically evaluating television for its inaccurate portrayal of real life. After being videotaped reading these essays, they watched a playback of themselves and other participants advocating their antirape arguments or their media critiques. Men who had participated in either of these educational interventions were less likely to assign responsibility to a rape victim in a videotaped mock trial than were men in the control groups, who saw a neutral video or no video at all.

**Encouraging Parental Monitoring and Guidance**

As noted in the Research on Moderator Effects section, recent research has found that the harmful effects of exposure to media violence can be reduced if parents guide their children's media exposure and discuss their interpretation of media violence with their children. For example, one study found that when parents speak negatively about violent TV or restrict viewing of violent television content, children place less importance on violent programming and have less aggressive attitudes. However, if parents watch TV with their children and say nothing about the violent content, children report higher than normal aggressive attitudes (Nathanson, 1999). Other studies

have shown that when children watch a violent program with someone else present, they are less likely to express aggressive attitudes (Corder-Bolz, 1980) or to behave aggressively (Hicks, 1968) immediately after viewing the program if the other person makes negative comments about the violence than if that person is silent. They also are quicker to notify an adult that other children are fighting (Horton & Santogrossi, 1978) if they heard negative commentary while watching the violent program.

**Providing Media Education**

The preceding examples suggest that educating parents and teachers about specific techniques to reduce the effects of media violence might be a viable general intervention strategy. However, from an empirical and theoretical standpoint, there is little reason to believe that improving consumers' ability to critically analyze, interpret, and evaluate media messages (i.e., improving media literacy; Corder-Bolz, 1982) would have much of an impact. To minimize observational learning, priming, automatization, and desensitization, an intervention must either reduce the child's exposure to violence or reduce the likelihood that the child will identify with the aggressive characters, perceive their actions as realistic and justified, and perceive aggression as acceptable. General media literacy programs do not specifically attempt to accomplish either of these two types of reductions; thus, it is not surprising that there is no valid research demonstrating effectiveness of general media-literacy education.

On a more positive note, one recent study tested an intervention that combined education about the effects of violence with a counterattitudinal intervention and parental monitoring (Robinson, Wilde, Navracruz, Haydel, & Varady, 2001). Two elementary schools similar on many key factors were selected for the study; one was randomly chosen to participate in the intervention, and the other served as a control. The intervention consisted of 18 classroom lessons over a 6-month period. The lessons, which lasted 30 to 50 min each, included elements of media education and attitude interventions. After the lessons were completed, the children were encouraged to not watch

TV or movies or play video games for a "TV Turnoff" period of 10 days. Finally, the children were encouraged to create and follow a video-entertainment budget of 7 hr per week. Newsletters were used to enlist parents' support in helping the children achieve these goals. Note that the TV Turnoff targeted media use in general, but did not address issues of aggressive behavior.

The aggressive behavior of both the control children and the children who received the intervention was assessed in several ways. First, peers were asked to report on the participants' aggressive behavior before the intervention (September) and again 7 months later (April). In addition, 60% of the children were observed for physical and verbal aggression on the playground. Finally, parents were interviewed about their child's aggressive and delinquent behavior. All four of the aggression measures showed that levels of aggression in April (adjusted for scores before the intervention) were lower for the intervention participants than for the control participants. Both peer ratings ($p < .03$) and observed verbal aggression ($p < .01$) showed significant effects of the intervention, whereas observed physical aggression and parent-reported aggression did not yield statistically significant effects. The authors also reported that the effect of the intervention did not differ significantly for boys versus girls or for children of different ages.

## DISCUSSION

### Major Research Findings

We began our review by listing five questions that were our focus:

- What does research say about the relation—both short-term and long-term—between media violence and violent behavior?
- How does media violence produce its effects on violent behavior?
- What characteristics of media violence are most influential, and who is most susceptible to such influences?• How widespread and accessible is violence in the media (TV, music videos, video games, Internet)?
- How can individuals and society counteract the influence of media violence?

We summarize the broad answers to these questions in this section.

Media Violence, Aggression, and Violent Behavior

In brief, five general observations follow from this review of relevant research. First, media violence has a modest direct effect ($r$ = .13 to .32) on serious forms of violent behavior. Second, a more extensive body of research documents a larger impact of media violence on aggression (including violence; $r$ = .18 to .38). Third, the research base for these first two conclusions is large; diverse in methods, samples, and media genres; and consistent in overall findings. Fourth, for many individuals, the negative effects of habitual childhood exposure to media violence extend well into adulthood even if media violence is no longer being consumed. Fifth, even individuals who typically are not highly aggressive are negatively affected by exposure to violent media both in short-term situations and over long periods of time.

More specifically, research provides strong evidence that in the short term, exposure to media violence causes increases in children's, adolescents', and young adults' physically and verbally aggressive behavior, as well as in aggression-related variables (such as aggressive thoughts and emotions) that are theoretically linked to aggressive and violent behavior. This body of research has grown considerably over the decades since the 1972 Surgeon General's report. The relatively few large-scale longitudinal studies reported in recent years provide converging evidence linking repeated exposure to violent media in childhood with aggression later in life, and in particular with increased likelihood of serious physically aggressive behavior including physical assaults, spouse abuse, and other types of crimes. Because extremely violent criminal behaviors (e.g., forcible rape, aggravated assault, homicide) are relatively rare, additional longitudinal studies with very large samples are needed to estimate accurately how habitual childhood exposure to media violence compares in magnitude with other risk factors for the most serious criminally violent behavior.

Theory

There is a growing body of well-supported theory explaining why and when exposure to media violence causes increases in aggression and violence. Although the scope of this overview did not include positive media influences, the same principles used to explain and understand how media violence increases aggression could also help to clarify how media examples of prosocial behavior might cause increases in prosocial behavior. Media violence produces short-term increases in aggression by activating (priming) aggressive thoughts, increasing physiological arousal, and triggering an automatic tendency to imitate observed behaviors (especially among children). Media violence produces long-term increases in aggression and violence by creating long-lasting (and automatically accessible) aggressive scripts and interpretational schemas, and aggression-supporting beliefs and attitudes about appropriate social behavior. Additionally, repeated exposure to violence desensitizes individuals' normal negative emotional responses to violence, thereby making it easier to think about engaging in violence and decreasing sympathetic and helping reactions to victims of violence.

Moderators

Although more research is needed to specify the conditions that exacerbate or mitigate the negative effects of exposure to violent media, knowledge about some of the critical links in the causal chain between viewing violence and behaving aggressively or violently is growing. Moderators in this chain include certain characteristics of viewers (e.g., age, aggressiveness, perceptions of media realism, identification with aggressive characters) and their social environment (e.g., parental and family influences), as well as aspects of media content (e.g., perpetrator characteristics, degree of realism, justification of violence, depiction of the consequences of violence). The relative influence of these factors is not yet clear, but their importance is clear. Research on moderators not only enhances understanding of media violence and aggression, but also provides clues to potential avenues for preventive intervention. For example, the research points to the vital role of parents in supervising and influencing what their

children see and do, and in helping them to interpret media violence in ahealthy (or less harmful) way.

Finally, the existing empirical research on moderators suggests that no one is exempt from the deleterious effects of media violence; neither gender, nor nonaggressive personality, nor superior upbringing, nor higher social class, nor greater intelligence provides complete protection. Many youths who consume media violence will not be obviously influenced by it (e.g., will not rush out to commit violent crimes), but the psychological processes that can produce the effect operate in everyone, thereby putting all of us at some risk.

Media Use and Content

Recent surveys depict the abundant presence of electronic media in American homes, as well as the extensive presence of violence within the media landscape. They also document the expansion of opportunities for children's exposure to media violence at home through the proliferation of new media, including video games, music videos, and the Internet. Current psychological theory suggests that the interactive nature of many of these new media may lead to more powerful effects on children's behavior than are found with more passive media such as TV. However, research to test this hypothesis is not yet well developed. Although it is apparent from existing data that most youths are exposed to many hours of violent media each week, the patterns of usage for the newest media (e.g., video games, Internet) are likely changing so rapidly that estimates of violence exposure may be out of date by the time they are published. New and more extensive data on exposure are needed.

Interventions

Many efforts (e.g., media education, promotion of V-chips) to lessen the effects of media violence are under way, but almost none have been systematically studied. From a scientific public-health perspective, this preventive domain is largely uncharted territory. As noted in the Report on Youth Violence (U.S. Department of Health and Human Services, 2001), a powerful body of

scientifically based knowledge about effective ways to prevent violence in youth is emerging. Although many of the preventive programs that have been implemented address a complex array of factors in the life of young people, few have addressed the role of media. The gap between these areas of research needs to be filled. What is clear is that reducing exposure to media violence will reduce aggression and violence in both the short term and the long term. What is less clear is what sorts of interventions will lead to a reduction in exposure, though current evidence suggests that counterattitudinal interventions and parental interventions are likely to reduce exposure, and general media-literacy interventions by themselves are unlikely to do so.

**Implications**

Unlike earlier federal research reports on media violence and youth (NIMH, 1982; U.S. Surgeon General's Scientific Advisory Committee on Television and Social Behavior, 1972), this overview was initiated within a broader examination of the causes and prevention of youth violence. This context is vital, and we urge readers to take a close look at that report (despite our misgivings about its treatment of media violence). It permits media violence to be seen as one part of the complex influences on the behavior of children and youth. And it suggests that multilayered solutions—including but not limited to solutions that address exposure to media violence—are needed to address the problem of aggressive and violent behavior in modern society. Media violence exposure is only one risk factor underlying aggression and violence. It may be the least expensive risk factor to modify—it costs little to choose nonviolent forms of entertainment for oneself or one's children. However, the troubling truth is that violent media are entering the home and inviting active participation of even very young children—often with little parental supervision.

The cup of research knowledge about violence in the media is relatively full but not overflowing. It certainly supports sustained concern about media violence and sustained efforts to curb its adverse effects. It suggests that simply reducing children's exposure to violent media

would be a positive step that would yield positive benefits. How best to approach the goal of reducing exposure to violent media is a question that will require additional research into intervention programs, as well as public policy debates.

Although at present, violence rates in the age group most prone to such behavior (i.e., early teens to mid 20s) appear to be leveling off somewhat, this recent trend should not be misinterpreted as a sign that concern with media violence is misplaced. As we have noted throughout this report, violence is a complex interpersonal phenomenon that occurs when a host of contributing factors converge at the right (or wrong) time and place. The large number of contributing factors points to the complexities of understanding social and psychological causation in a context of human development. The extant research literature clearly reveals that exposure to violent media plays an important causal role in violence in modern society.

Similarly, the fact that estimates of the size of the effect of media violence are typically in the small to moderate range should not mislead people into thinking that the overall impact of media violence on aggressive and violent behavior is small to moderate. Because of the large numbers of youth exposed to many hours of media violence, even a small effect can have extremely large consequences (Abelson, 1985; Rosenthal, 1986). Although a correlation of .20 between viewing media violence and aggressive behavior indicates that media violence may statistically account for only 4% of the variation in aggressive behavior, few other factors account for much more. A correlation of .20 can be said to represent a change in the odds of aggressive behavior from 50/50 to 60/40, which is not a trivial change (Rosenthal, 1986). Furthermore, the size of the media-violence effect is equal to or larger than the size of many medical effects that our society deems large, such as the effect of condom use on sexually transmitted HIV, the effect of passive smoking on lung cancer at work, and the effect of calcium intake on bone mass (see Bushman & Huesmann, 2001).

Despite limitations in current research knowledge, it is possible to develop a coherent

public-health approach to violence prevention that builds upon what is known, even as attempts to learn more are under way. Clearly, even without all the pieces of the research puzzle in place, a troubling picture is emerging: A variety of violent media are entering the home and inviting the active participation of young children—often with little parental supervision. Although additional research to address unresolved questions is needed, it is clear that media violence is a causal risk factor that should be addressed in thoughtful ways.

Regardless of the attempts made to limit the amount of violence reaching American families, those families themselves are clearly critical in guiding what reaches their children. Whether by adopting V-chip technology for home TV programming, subscribing to voluntary violence screening by Internet providers, or simply monitoring closely children's use of TVs, computers, and video games, parents can reduce and shape their children's consumption of violent media. Communities—including schools, religious organizations, and parent-teacher organizations—can teach parents and children how to be better, healthier consumers of the media. Federal agencies can be more proactive in encouraging needed research, in sharing with the public the relevant findings of current research, in encouraging violence-prevention researchers to interact more with media researchers, and in creating networks for sharing solutions to social and public-health problems. Furthermore, as the media-violence landscape continues to change, parents will need better tools (e.g., more thorough and more simple computer and Internet screening tools) to aid them in the increasingly difficult task of monitoring and modifying their children's media habits.

Media use is often described in nutritional terms: People talk about "media consumption" and "a steady diet of violence." Implicitly, perhaps, they recognize that nourishing children's minds through the media is like nourishing their bodies. In both cases, from a public-health perspective, today's consumption patterns are far from optimal. And for many youths, they are clearly harmful. The challenge is to discover how to provide more nourishing fare.

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**FOOTNOTES**

1. Although we focus primarily on studies that measured exposure to violent media, we also include the occasional study that assessed only a more general measure of total media time (e.g., total time spent watching television per week). In the few studies that have reported both types of measures (e.g., Anderson & Dill, 2000, Study 1), the more specific measure of violent-media exposure typically yielded a much higher correlation with aggressive or violent behavior than did the more general measure of total media time. Nonetheless, because a high proportion of entertainment media contains violence (see Research on Media Use and Content), it seems appropriate to include studies that measured total media time only when they provide tests of media-violence hypotheses in contexts where studies using the more specific measure of violent media exposure are lacking. For both theoretical and empirical reasons, studies using the more general measures likely underestimate the true association between media violence and aggressive-violent behavior.

2. Though these factors facilitate observational learning, none are necessary conditions for media violence to have effects. For example, cartoon characters in television or video games are not very realistic, but numerous randomized experiments have shown that exposure to violent cartoonish behavior increases aggressive behavior.

3. This study assessed television viewing time, not time spent viewing violent television programs specifically. Nonetheless, the reversal in the relation between age and effect size is very difficult to explain, and suggests that the nuances of the developmental effects on the relation between exposure to media violence and aggression are incompletely understood.

4. Data for this study came from a nationally representative sample of 1,090 children aged 2 through 7, for whom data were collected through face-to-face interviews with parents and caregivers, and a nationally representative sample of 2,065 students in grades 3 through 12 (8-18 years old), who filled out in-class pencil-and-paper questionnaires with the assistance of trained researchers.

5. Data for this study came from telephone interviews conducted in April and May 2000 with 1,235 parents of children between the ages of 2 and 17 and 416 children between the ages of 8 and 16. The samples were drawn through random digit dialing.

6. The APPC study examined use of all household media: TV (and cable access), computers (and Internet access), VCRs, books and magazines, video games, stereos and CDs, and telephones. The Kaiser study looked at all of these except print and telephone.

7. NTVS randomly sampled programs from 6:00 a.m. to 11:00 p.m.

8. Violence was defined as overt depiction of a credible threat of physical force, or the actual use of such force intended to physically harm an animate being or group of beings. The study authors also noted that "violence also includes certain depictions of physically harmful consequences against an animate being or group that occur as a result of unseen violent means. Thus, there are three primary types of violent depictions: credible threats, behavioral acts, and harmful consequences" (Smith & Donnerstein, 1998, p. 170). Content analyses of television programs generally treat the program itself as the unit of analysis and exclude advertisements.

Fig. 1. Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, helping behavior, and physiological arousal. Results are shown separately for studies without any of 10 potential methodological problems (best-practices studies) and those that had at least one of these problems. Vertical capped bars indicate 95% confidence intervals. If a vertical capped bar does not include the zero line, then the effect of violent video games on that outcome variable is statistically significant for the methodology category indicated. Adapted from " Violent Video Games: Specific Effects of Violent Content on Aggressive Thoughts and Behavior," by C.A. Anderson, N.L. Carnagey, M. Flanagan, A.J. Benjamin, J. Eubanks, and J.C. Valentine, in press, in M. Zanna (Ed.), Advances in experimental social psychology, , New York: Academic Press. Reprinted by permission.

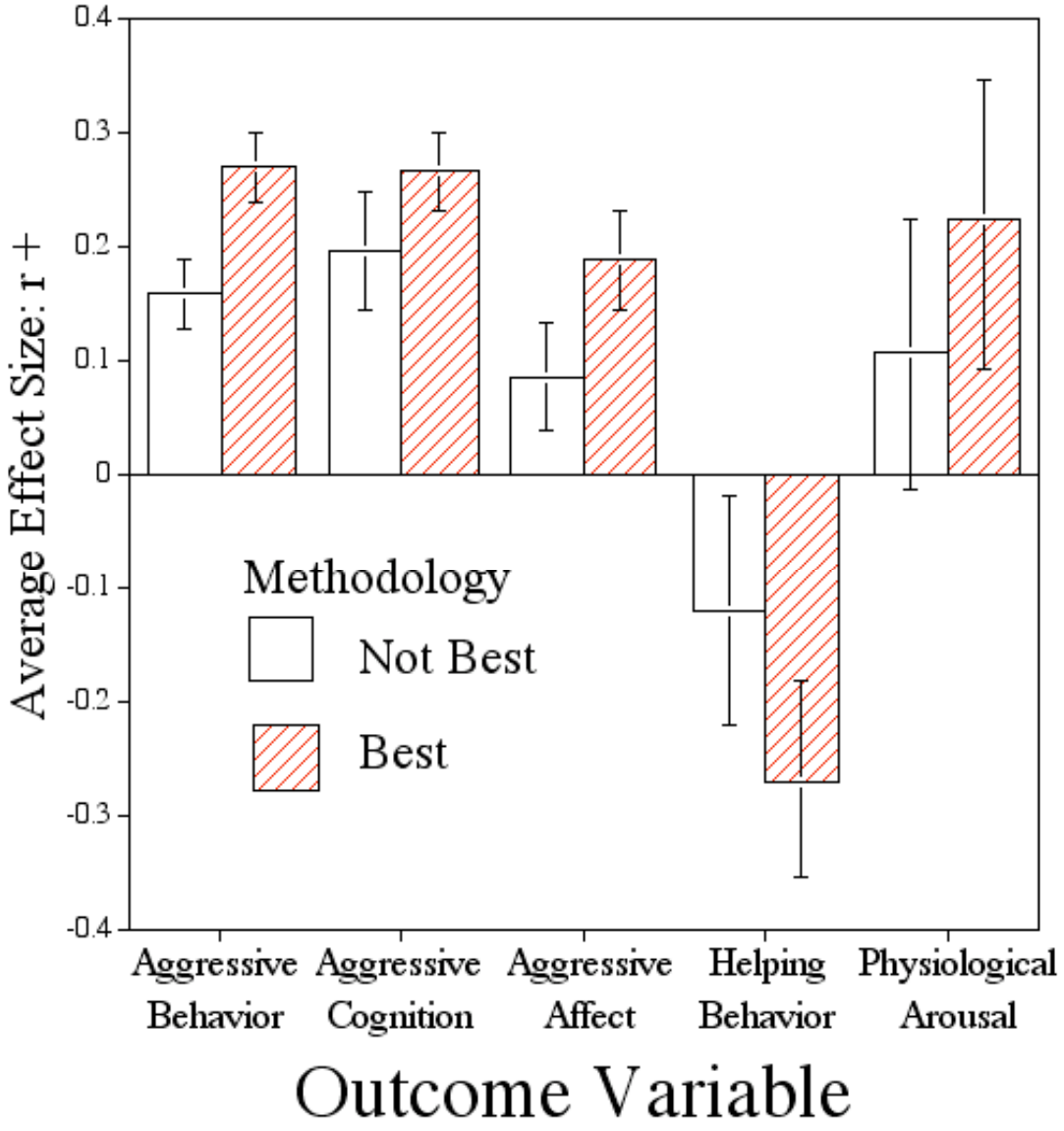
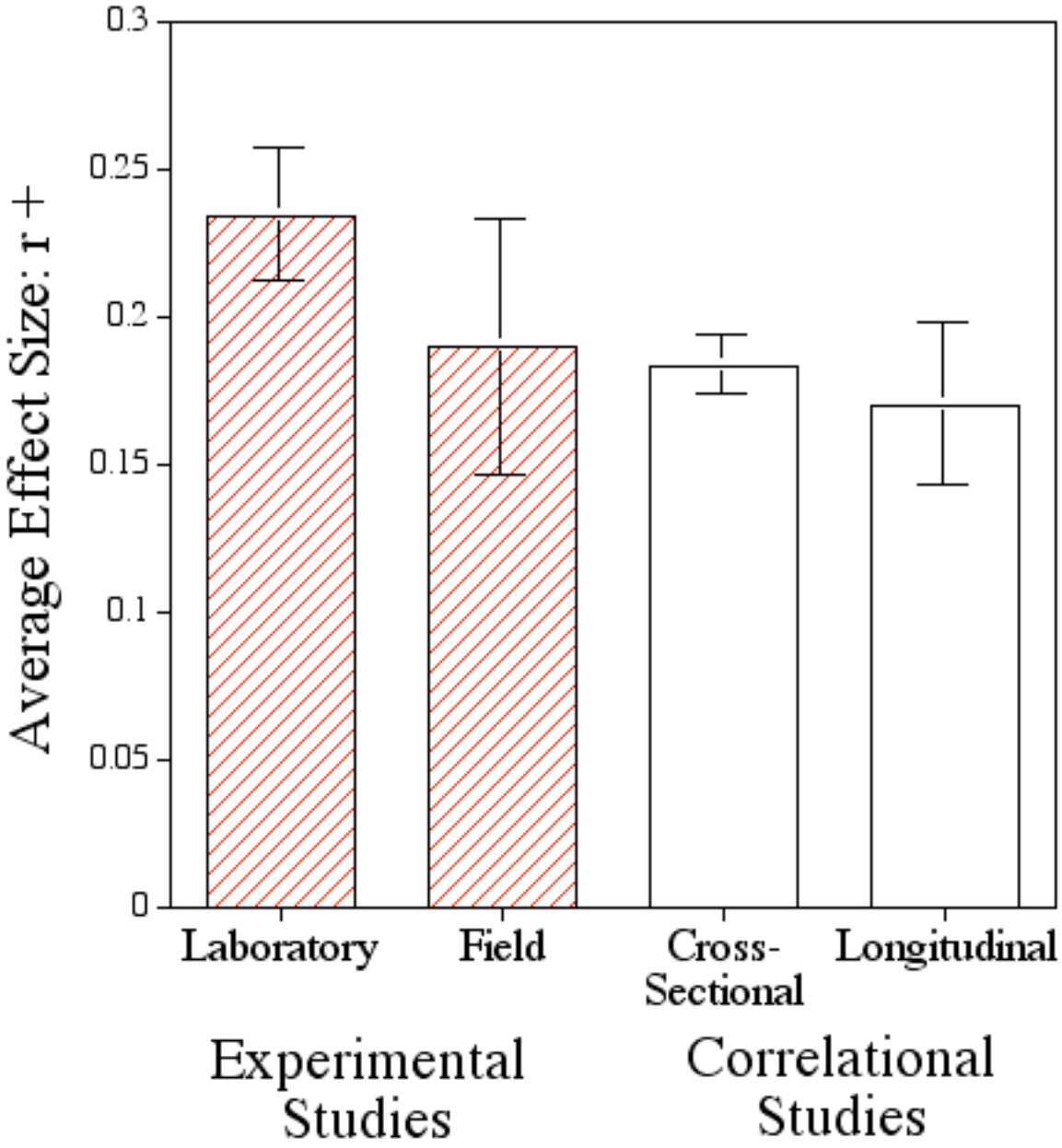
Fig. 2. Effects of media violence on aggression for two types of experimental studies and two types of correlational studies. Vertical capped bars indicate 95% confidence intervals. If a vertical capped bar does not include the zero line, then the effect of violent video games on that outcome variable and methodology type is statistically significant. Based on data reported in Anderson and Bushman (2002c).