
Media Violence and the American Public

Scientific Facts Versus Media Misinformation

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Fifty years of news coverage on the link between media violence and aggression have left the U.S. public confused. Typical news articles pit researchers and child advocates against entertainment industry representatives, frequently giving equal weight to the arguments of both sides. A comparison of news reports and scientific knowledge about media effects reveals a disturbing discontinuity: Over the past 50 years, the average news report has changed from claims of a weak link to a moderate link and then back to a weak link between media violence and aggression. However, since 1975, the scientific confidence and statistical magnitude of this link have been clearly positive and have consistently increased over time. Reasons for this discontinuity between news reports and the actual state of scientific knowledge include the vested interests of the news, a misapplied fairness doctrine in news reporting, and the failure of the research community to effectively argue the scientific case.

In the movie *Grand Canyon* (Grillo, Kasdan, & Okun, 1991), Steve Martin plays the role of a producer of B-grade violent movies. However, after an armed robber shoots Martin's character in the leg, he has an epiphany. "I can't make those movies anymore," he decides. "I can't make another piece of art that glorifies violence and bloodshed and brutality. I can't contribute another stone to this landslide of dehumanizing rage that has swept across this country like a pestilence. . . . I'm done, kaput, finished. No more exploding bodies, exploding buildings, exploding anything. No more shit. I'm going to make the world a better place." A month or two later, his friend, played by Kevin Kline, calls on Martin at his Hollywood studio to congratulate him on the "new direction" his career has taken. "What? Oh that," Martin's character says. "That's over. I must have been delirious for a few weeks there." He continues, "There's always been violence, there will always be violence, violence and evil and men with big guns. My movies reflect what's going on; they don't make what's going on."

Modern society is exposed to a massive dose of violent media. What effect, if any, does this exposure have on people? In the 20th century, two major explosions occurred: a mass media explosion and a violent crime explosion. After discussing both, we raise four questions. Does the level of violence in the "reel" world mirror the level of violence in the real world? Is there strong evidence linking

exposure to media violence to aggression? How have news reports of the violent-media effect on aggression changed over time? Is there any correspondence between the cumulative scientific knowledge about media violence effects on aggression and news reports about this link? The answers to these questions differ depending on whom is asked. In this article, we consider answers from two sources: the entertainment industry and the scientific community. We also discuss why the entertainment industry and the scientific community often disagree in their assessment of the effect of violent media on aggression.

THE MASS MEDIA EXPLOSION

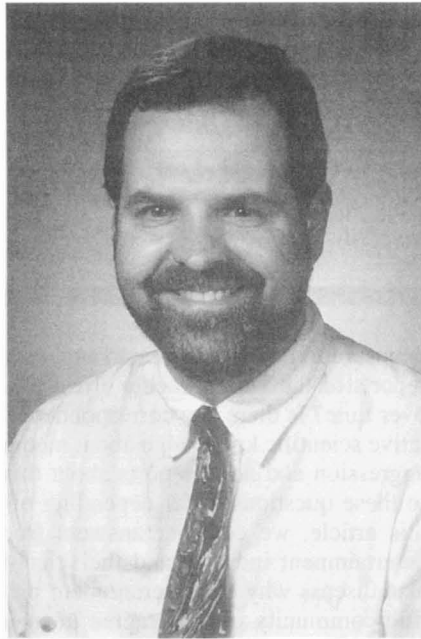
A mass media explosion occurred in the 20th century. Inventions such as the television set, the digital computer, and the videocassette player forever changed the way people gain information about the world, including information about how violent the world is. Television was introduced to the United States at the 1939 World's Fair in New York. Two years later, on July 1, 1941, the Federal Communications Commission licensed and approved the first commercially available television stations. Because of World War II, however, full-scale television broadcasting was suspended until 1946. In 1950, about 9% of American homes had TV sets. It didn't take long for television ownership in the United States to increase. By 1955, it was up to about 65%, and by 1965, it reached about 93%. Since 1985, television ownership has been about 98% (Nielsen Media Research, 1998). More recent types of electronic media have also become ubiquitous implements in modern society. About 97% of homes with children have a VCR, 90% have a CD player, and 89% have either a personal computer or other video-game-capable equipment (Federal Trade Commission, 2000).

The American public has consumed media as if they were ambrosia. A recent national study reported that consuming media is a full-time job for the average American child, who spends about 40 hours per week doing it (Kaiser

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Family Foundation, 1999). More than half of this time is spent watching television programs, movies, or videos. One telling statistic is that at 10 a.m. on any Saturday morning, more than 60% of all children in America are watching TV (Comstock & Scharrer, 1999).

VIOLENCE IN THE REEL WORLD

Violence in drama is as old as drama itself—from ancient Greek drama, through the Elizabethan theater, to modern electronic dramas. In William Shakespeare's play *Macbeth*, for example, Macbeth's head is brought on stage at the close of the play. In 1903, Edwin S. Porter directed a film called *The Great Train Robbery* (Edison & Porter, 1903). This 11-minute film is usually considered the first film ever made to tell an organized story (Turan, 1972). In one scene, there is a large close-up of a cowboy firing his pistol directly at the camera. The first audiences who saw the film reacted by running out of the theater screaming.

Americans get a heavy dose of media violence. A recent content analysis of more than 8,000 hours of programming on cable and broadcast television in the United States found that about 60% of TV programs contained violence (*National Television Violence Study*, 1996, 1997, 1998). By the time the average American child graduates from elementary school, he or she will have seen more than 8,000 murders and more than 100,000 other assorted acts of violence (e.g., assaults, rapes) on network television (Huston et al., 1992). The numbers are higher if the child has access to cable television or a videocassette player, as most do. Violence dominates the big screen as well as the small screen. The percentage of PG films produced has steadily dropped over the years (Auletta, 1993). Even G-rated films contain more violence now than they ever have before (Yokota & Thompson, 2000). Violence is also frequently

found in video games. For example, Provenzo (1991) found that 85% of the most popular video games were violent. Even young children are exposed to many violent video games. Buchman and Funk (1996) found that fourth-grade girls and boys reported that the majority of their favorite games were violent ones (59% for girls, 73% for boys).

One plausible explanation for the media emphasis on violent materials is that violent media are easy to export to foreign markets, perhaps because they lose less in translation than do other types of media. Comedies, for example, often require some knowledge of the popular culture. In time, violent media might become America's most exportable commodity (Hamilton, 1998).

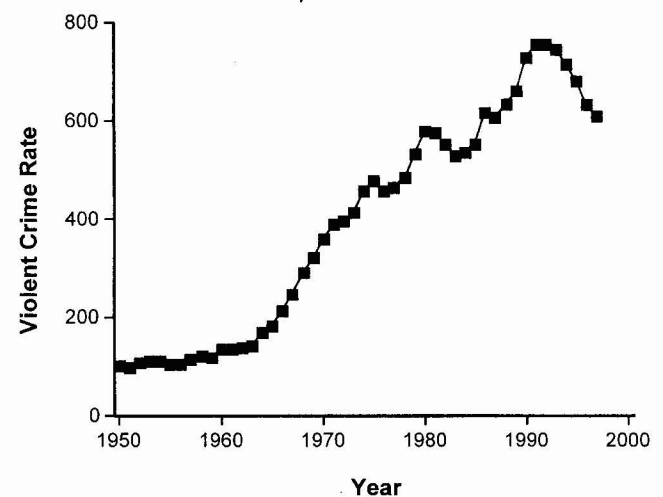
THE EXPLOSION OF VIOLENCE IN THE REAL WORLD

Violence is as American as cherry pie.

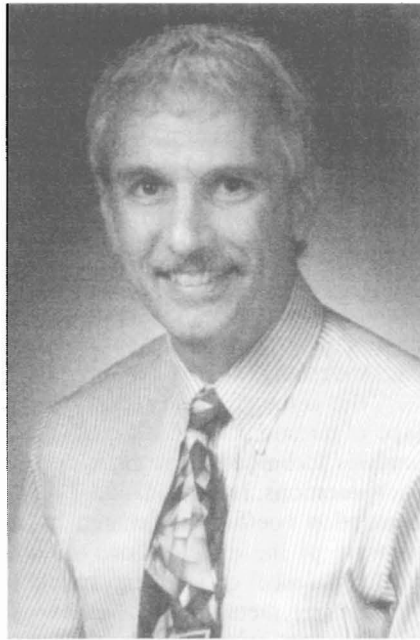
—H. Rap Brown

Among industrialized countries, the United States is one of the most violent (Zimring & Hawkins, 1997). Scholars have been investigating media violence as a potential contributor to societal violence in the United States since the early 1960s. One possible reason for the early interest in a link between media violence and societal violence is that violence in the United States began to increase fairly dramatically in 1965, exactly when the first generation of children raised on TV began to reach the prime ages for committing violent crimes (see Figure 1). Indeed, studies of violent crime rates before and after the introduction of television have shown similar effects in several countries (e.g., Centerwall, 1989, 1992).

Figure 1
U.S. Violent Crime Rate per 100,000 Inhabitants



Note. Data were obtained from *Uniform Crime Reports* (U.S. Federal Bureau of Investigation, 1951–1999).



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Of course, such comparisons of demographic trends are not proof of any causal relationship between violent media and violent crime. Numerous factors influence violent crime rates, including simple demographic trends (e.g., changes in age distribution) in the population. Thus, large numbers of empirical studies of media violence have been conducted over the past 40 years using more traditional psychological research methods. Before examining the outcomes of those studies, we first consider the claim that media violence mirrors what is happening in contemporary society.

DOES THE LEVEL OF VIOLENCE IN THE REEL WORLD MIRROR THE LEVEL OF VIOLENCE IN THE REAL WORLD?

The entertainment industry often claims that violent media simply reflect the violence that already exists in society. Consider the following statements from representatives of the three major television networks. According to Leonard Goldenson of ABC, "We are presently reaping the harvest of having laid it on the line at a time when many Americans are reluctant to accept the images reflected by the mirror we have held up to our society" ("Fighting Violence," 1968, p. 59). Julian Goodman of NBC agreed, "The medium is being blamed for the message" ("Fighting Violence," 1968, p. 59). Howard Stringer of CBS claimed that the TV industry is "merely holding a mirror to American society" (West, 1993). Zev Braun, also of CBS, said, "We live in a violent society. Art imitates the modes of life, not the other way around. It would be better for Congress to clean that society than to clean up the reflection of that society" ("Violence Bill Debated in Washington," 1990).

However, even in reality-based TV programs, violence is grossly overemphasized. For example, one study

compared the frequency of crimes occurring in the real world with the frequency of crimes occurring in the following reality-based police TV programs: *America's Most Wanted*, *Cops*, *Top Cops*, *FBI*, *The Untold Story*, and *American Detective* (Oliver, 1994). The real-world crime rates were obtained from the U.S. Federal Bureau of Investigation (FBI; 1951–1999) *Uniform Crime Reports*, which divide seven major types of crimes into two categories, violent and nonviolent. About 87% of the crimes occurring in the real world are nonviolent crimes, whereas only 13% of crimes occurring in reality-based TV programs are nonviolent crimes. The largest discrepancy between the real world and the world depicted on television is for murder, the most violent crime of all. Only 0.2% of the crimes reported by the FBI are murders, whereas about 50% of the crimes shown in reality-based TV programs are murders (Oliver, 1994).

According to film critic Michael Medved (1995), the claim that the entertainment industry merely reflects the level of violence in society is a lie.

If this were true, then why do so few people witness murders in real life but everybody sees them on TV and in the movies? The most violent ghetto isn't in South Central L.A. or Southeast Washington D.C.; it's on television. About 350 characters appear each night on prime-time TV, but studies show an average of seven of these people are murdered every night. If this rate applied in reality, then in just 50 days everyone in the United States would be killed and the last left could turn off the TV. (pp. 156–157)

In summary, there is far more violence in the reel world than in the real world.

IS THERE STRONG EVIDENCE LINKING EXPOSURE TO MEDIA VIOLENCE WITH INCREASED AGGRESSION?

The "Logical" Debate

The television and motion picture industries often claim that violent media have no influence on aggressive behavior. For example, Jack Valenti, president of the Motion Picture Association of America, said, "If you cut the wires of all TV sets today, there would still be no less violence on the streets in two years" (Moore, 1993, p. 3007). However, this same industry makes all of its money from commercials, charging hundreds of thousands of dollars for a few minutes of commercial airtime. As former Federal Communications Commission Chairman Reed Hundt said, "If a sitcom can sell soap, salsa and cereal, then who could argue that TV violence cannot affect to some degree some viewers, particularly impressionable children?" (Eggerton, 1994, p. 10).

Sometimes, the entertainment industry goes one step further and claims that violent media influence behavior in a beneficial way. For example, TV scriptwriter Grace Johnson said that violent TV shows "often serve as a release valve for aggressive impulses which would otherwise be bottled up, only to explode later" ("See No Evil?", 1954, p. 8). Similarly, film director Alfred Hitchcock said, "One of

television's greatest contributions is that it brought murder back into the home where it belongs. Seeing a murder on television can be good therapy. It can help work off one's antagonism" (Myers, 1999, p. 412).

The first recorded description of this "catharsis hypothesis" occurred more than one thousand years ago, in Aristotle's (trans. 1970) *Poetics*. He taught that viewing tragic plays gave people emotional release (*katharsis*) from negative feelings such as pity and fear. The tragic hero in a Greek drama did not just grow old and retire—he often suffered a violent demise. By watching the characters in the play experience tragic events, the viewer's own negative feelings were presumably purged and cleansed. This emotional cleansing was believed to benefit both the individual and society.

The ancient notion of catharsis was revived by Sigmund Freud and his associates. For example, A. A. Brill, the psychiatrist who introduced Freud's psychoanalytic techniques to the United States, prescribed that his patients watch a prizefight once a month to purge their angry, aggressive feelings into harmless channels (Feshbach & Price, 1984). While serving as chairman of the National Board of Review of Motion Pictures, Brill said,

You remember that the Greeks spoke of the play as effecting a "catharsis" of the emotions. The movies serve this purpose. So do hockey and football games. People get rid of pent-up aggression when they go to a prizefight, and society approves of this release. Children, too, have plenty of bottled up protest against life's little tyrannies—keeping clean, learning lessons, behaving themselves—and the screen is the great medium for giving the child an outlet for this revolt. (Mackenzie, 1940, p. 9)

The Scientific Evidence

Psychologists have studied the effect of violent media on aggression for several decades. Hundreds of studies have been conducted on this topic. Scientific evidence from a collection of studies, such as those on media-related aggression, can be integrated and summarized in a narrative (qualitative) review or in a meta-analytic (quantitative) review. Both types of reviews have been conducted on the research literature about media violence and aggression, and all have come to the same conclusion: that viewing violence increases aggression (e.g., Hearold, 1986; Hogben, 1998; Huston et al., 1992; National Institute of Mental Health, 1982; Paik & Comstock, 1994; Surgeon General's Scientific Advisory Committee on Television and Social Behavior, 1972; Wood, Wong, & Chachere, 1991). On the basis of such findings, in July 2000, six major professional societies—the American Psychological Association (APA), the American Academy of Pediatrics, the American Academy of Child and Adolescent Psychiatry, the American Medical Association, the American Academy of Family Physicians, and the American Psychiatric Association—signed a joint statement on the hazards of exposing children to media violence, noting that "at this time, well over 1,000 studies . . . point overwhelmingly to a causal connection between media violence and aggressive behavior in some children" (*Joint Statement*, 2000, p. 1).

One common industry response to the conclusions of such literature reviews is to deny the findings. For example, Jim Burke of Rysher Entertainment said, "I don't think there is any correlation between violence on TV and violence in society" (Stern, 1995, p. 28). Another is to claim that the effects of media violence on aggression are so small or that they affect so few people that the risks to society are negligible and can and should be ignored. For example, a *Time* magazine writer concluded, "While the bulk of published research has indeed found some correlation between watching fictitious violence and behaving aggressively, the correlation is statistically quite modest" (K. Anderson, 1993, p. 66).

But is the effect so small? How is one to judge? This type of question begs for a quantitative answer, and meta-analysis techniques have been developed to help address such questions. In the remainder of this article, we use the correlation coefficient, denoted by r , as the quantitative measure of the effect of one variable (e.g., exposure to media violence) on another variable (e.g., aggression).¹

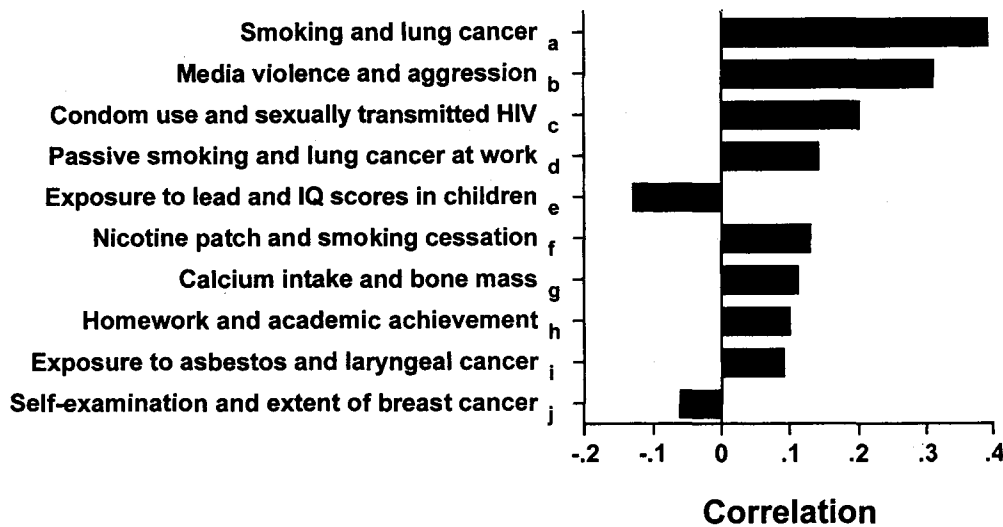
Earlier meta-analytic reviews of studies of media violence on aggression have reported average effect sizes ranging from $r+ = .11$ (Hogben, 1998) to $r+ = .31$ (Paik & Comstock, 1994). In all cases, the reviews found a significant positive relation. That is, greater exposure to media violence is strongly linked to increases in aggression.

Just how small are these estimates of the media violence effect? Figure 2 presents the results of the largest published meta-analysis on violent-media-related aggression (Paik & Comstock, 1994, included 217 studies in their meta-analysis), along with the results from a number of meta-analyses done in other (primarily medical) domains. All of the correlations in Figure 2 are significantly different from zero. Note, however, that the second largest correlation is for violent media and aggression. Most people would agree that the other correlations displayed in Figure 2 are so strong that they are obvious. For example, most people would not question the assertion that taking calcium increases bone mass or that wearing a condom decreases the risk of contracting HIV, the virus that causes AIDS.

¹ The correlation coefficient measures the magnitude of (linear) relation between two variables. The value of a correlation coefficient can range from -1 (a perfect negative correlation) to $+1$ (a perfect positive correlation), with 0 indicating no correlation between the two variables. In research, however, virtually no correlations are perfect. According to Cohen (1988), a *small* correlation is $\pm .1$, a *medium* correlation is $\pm .3$, and a *large* correlation is $\pm .5$, respectively. According to Cohen, most of the correlations in the social sciences are small-to-medium in size. The correlation coefficient can be calculated between two continuous measures, such as number of hours of violent TV watched per week and teacher ratings of aggressiveness, as well as between one dichotomous and one continuous measure, such as in experiments wherein children are randomly assigned to watch either a violent or a nonviolent TV show (dichotomous variable) followed by a free-play period in which the number of times the child hits another child is recorded (continuous variable). If the correlation is between two continuous variables, it is called the Pearson product-moment correlation coefficient; if it is between a continuous and dichotomous variable, it is called a point-biserial correlation.

Figure 2

Comparison of the Effect of Violent Media on Aggression With Effects From Other Domains



Note. All correlations are significantly different from zero. a = the effect of smoking tobacco on lung cancer, as estimated by pooling the data from Figures 1 and 3 in Wynder and Graham's (1950) classic article. The remaining effects were estimated from meta-analyses: b = Paik and Comstock (1994); c = Weller (1993); d = Wells (1998); e = Needleman and Gatsonis (1990); f = Fiore, Smith, Jorenby, and Baker (1994); g = Welten, Kemper, Post, and van Staveren (1995); h = Cooper (1989); i = Smith, Handley, and Wood (1990); j = Hill, White, Jolley, and Mapperson (1988).

Why, then, do some individuals question the assertion that viewing violence increases aggression? One possible reason is that people do not understand psychological processes as well as they understand physiological processes. Another possibility is that people might (mistakenly) believe that the media violence data are merely correlational. A third possibility that we examine in more detail later in this article is that news media reports of media violence research might not be accurately presenting the state of scientific knowledge, much like news media reports on the relationship between cigarette smoking and lung cancer in the 1950s, 1960s, and 1970s seemed to inaccurately portray that research as being weaker than medical scientists knew it to be.

More Logical Analyses

The Smoking and Media Violence Analogy

There are at least six instructive parallels between the smoking and lung cancer relationship and the media violence and aggression relationship. First, not everyone who smokes gets lung cancer, and not everyone who gets lung cancer is a smoker. Similarly, not everyone who watches violent media becomes aggressive, and not everyone who is aggressive watches violent media.

Second, smoking is not the only factor that causes lung cancer, but it is an important factor. Similarly, watching violent media is not the only factor that causes aggression, but it is an important factor.

Third, the first cigarette can nauseate a person. Repeated exposure reduces these sickening effects, and the

person begins to crave more cigarettes. Similarly, the first exposure to violent media can make a person (especially children) anxious and fearful (Cantor, 2000). Repeated exposure reduces these effects and leaves the viewer wanting stronger doses of violence.

Fourth, the short-term effects of smoking are relatively innocuous in most cases and dissipate fairly rapidly. Smoking one cigarette has numerous physiological effects that are rarely serious and that dissipate within an hour or so. Similarly, watching one violent TV program or film increases aggressive thoughts, feelings, and behaviors, but these effects usually dissipate within an hour or so (Bushman & Huesmann, 2001).

Fifth, the long-term, cumulative effects of smoking are relatively severe. One cigarette has little impact on lung cancer. However, repeated exposure to tobacco smoke, for example, smoking one pack of cigarettes a day for 15 years, seriously increases the likelihood of a person contracting lung cancer (and other diseases). Similarly, watching one violent TV show has little impact on the likelihood of a child becoming a habitual violent offender, but the empirical evidence now clearly shows that repeated exposure to violent media, for example, a couple of hours a day for 15 years, causes a serious increase in the likelihood of a person becoming a habitually aggressive person and occasionally a violent offender (Huesmann, Moise, Podolski, & Eron, 2000).

One final parallel also deserves consideration. In the long fight of medical science against the tobacco industry, the big money interests of the tobacco industry apparently

led them to deny publicly that there was any scientific evidence supporting the claim that tobacco products caused lung cancer. Many of the same arguments used in this war of deception have been and continue to be made by the entertainment industry regarding reports that exposure to violent media causes aggression. In both cases, the industry claims that there is no good evidence have persisted long after the scientific data clearly indicated there could be no reasonable doubt about the seriousness of the causal impact. That point in the history of scientific developments in the smoking case was reached quite some time ago: In 1964, the U.S. Surgeon General concluded that the evidence on the harmful effects of tobacco smoke was overwhelming enough to warn the American public about it (U.S. Department of Health, Education, and Welfare, 1974). In the next section of this article, we show that the no-reasonable-doubt point in the data on media violence effects was also reached some time ago: The U.S. Surgeon General issued such a statement in 1972 (Surgeon General's Scientific Advisory Committee on Television and Social Behavior, 1972).

When Small Is Big

Obviously, exposure to media violence does not produce violent criminals out of all viewers, just as cigarette smoking does not produce lung cancer victims out of all smokers. This lack of perfect correspondence between heavy media violence exposure and violent behavior simply means that media violence exposure is not a necessary and sufficient cause of violence. When an ad is shown on TV, no one expects that it will sell the product to everybody. If the ad influences only 1% of viewers, it is considered to be a great success (Medved, 1995). Suppose violent media make only 1% of the population more aggressive. Should society be concerned about a percentage so small? The answer is a resounding "Yes!" Suppose 10 million people watch a violent TV program. If only 1% of the viewers will become more aggressive afterward, then the violent TV program will make 100,000 people more aggressive! Because so many people are exposed to violent media, the effect on society can be immense even if only a small percentage of viewers are affected by them. It takes only one or two affected students to wreak murderous havoc in a school, as demonstrated in recent years in Jonesboro, Arkansas; West Paducah, Kentucky; Pearl, Mississippi; Stamps, Arkansas; Springfield, Oregon; Littleton, Colorado; and Santee and El Cajon, California. (See Abelson, 1985, and Rosenthal, 1990, for examples of how small effect sizes can yield large effects.)

It might be that only 1 in 1,000 viewers will behave more aggressively immediately after viewing a particular program, but the cumulative effects may well increase the aggressiveness of most (if not all) of the 1,000 viewers. Furthermore, laboratory experiments have shown that merely viewing 15 minutes of a relatively mild violent program increases the aggressiveness of a substantial proportion (at least one fourth) of the viewers (e.g., Bushman, 1995).

HOW HAVE NEWS REPORTS OF THE VIOLENT-MEDIA EFFECT ON AGGRESSION CHANGED OVER TIME?

Print and TV news reports have a substantial impact on public opinion (e.g., McCombs & Shaw, 1991; Rogers & Dearing, 1988; Strange & Leung, 1999) as well as on public policy (e.g., Jordan & Page, 1992; Page & Shapiro, 1989). Thus, it is important that news reports on scientific findings accurately reflect ongoing changes in the state of knowledge in the field.

To quantify and analyze mass media reports of the effect of violent media on aggression and violence, we coded every newspaper and magazine article we could find on the topic. All forms of mass media were considered (e.g., television, film, music, video games, pornographic magazines, comic books). Six computer databases were searched from the year each individual database started until 2000. The six databases were (a) *Readers' Guide Abstracts* (1890–2000), (b) *Alternative Press Index* (1969–2000), (c) *Access* (1975–2000), (d) *Expanded Academic Index ASAP* (1980–2000), (e) *Periodical Abstracts* (1987–2000), and (f) *National Newspaper Index* (1994–2000). The following key words were used in the computer searches: *violence** or *aggression**, as well as *TV*, *television**, *film*, *movie*, *screen*, *music*, *radio*, *video game*, *computer game*, *electronic game*, *cartoon*, *comic*, *pornograph**, *erotic**, *news*, *book*, *magazine*, or *sport**. The asterisk option retrieves words containing the letter string with all possible endings. The search yielded 636 articles concerned with media violence effects on aggression.

The newspaper and magazine articles were rated using a 21-point scale that ranged from –10 to 10. The scale contained five verbal anchors. The article was given a rating of –10 if it said that viewing violent media causes a decrease in aggression. The article was given a rating of –5 if it only said or implied that parents should encourage their children to consume violent media. The article was given a rating of 0 if it said there was no relationship between violent media and aggression. The article was given a rating of 5 if it only said or implied that parents should discourage their children from consuming violent media. The article was given a rating of 10 if it said that viewing violent media causes an increase in aggression and violence in society.²

Each article was rated by one judge. For purposes of assessing reliability, an additional three judges each rated a random sample of 50 articles using the same scale. A different random sample (with replacement) of articles was selected for each additional judge. Reliability coefficients ranged from .77 to .96. Thus, there was a high degree of agreement among judges regarding the portrayal of violent-media effects in magazine and newspaper articles.

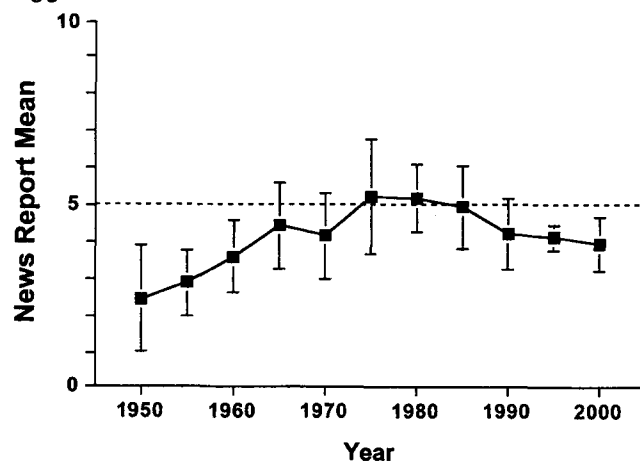
² The same pattern of results occurred when, instead of using these ratings as a continuous measure, we used the percentage of articles stating that viewing violence causes an increase in aggression or the percentage that implied that parents should discourage their children from consuming violent media.

The average rating for the 636 articles was 4.15 ($SD = 3.25$), a value significantly less than 5, $t(635) = 6.60$, $p < .0001$. Recall that an article was given a rating of 5 if it merely said or implied that parents should discourage their children from consuming violent media. On average, the mass media acknowledge that media violence is positively related to aggression, although they tend to claim that the relationship is not very strong. Of the 636 articles coded, only 36 (5.7%) stated that media violence was a cause of societal violence. Almost half of the articles (305, or 48%) did not even advise parents to discourage their children from consuming violent media.

Of more interest is the pattern of news reports across time. Because media violence studies did not exist in the early years of societal concern, one might expect that early mass media reports would on average note that there is little relationship between media violence and aggression. Because the evidence did accumulate in support of the conclusion that media violence is positively (and causally) related to aggression, one might also expect that the average news report would shift over time to the positive end of the 21-point rating scales.

For each five-year period between 1950 and 2000, we plotted the mean article ratings and 95% confidence intervals. These data are depicted in Figure 3. As one can see in Figure 3, the average mass media perspective has generally been that media violence is positively, but only weakly, related to aggression. This view was held even before there were any published scientific studies on the issue (i.e., the 1955 and 1960 data points in Figure 3). There has been

Figure 3
News Reports of the Effect of Media Violence on Aggression



Note. News report means are the average rated conclusions of newspaper and magazine articles. A rating of 0 indicates that the article said there was no relationship between violent media and aggression. A rating of 5 indicates that the article urged parents to discourage their children from consuming violent media. A rating of 10 indicates that the article said that viewing violence caused an increase in aggression. Capped vertical bars denote 95% confidence intervals.

some systematic fluctuation over time, with the strongest statements about this effect occurring in late 1970s and early 1980s (i.e., the 1980 and 1985 data points in Figure 3). Unfortunately, in more recent years the average news media article does not even warn parents that they should prevent their children from viewing violent TV shows and movies or playing violent video games. Thus, mass media news reports in recent years have edged away from the already weak message being given to the public in earlier years.

We used polynomial regression analysis to examine the linear and quadratic effects for news reports over time. The linear effect was nonsignificant (even with a sample size of 636), $t(634) = 0.59$, $p > .05$. The correlation between publication year and article rating was .02. However, the curvilinear effect, as modeled by a quadratic term, confirms that the observed increase and subsequent decrease is indeed a statistically significant pattern, $t(633) = 3.98$, $p < .0001$. Furthermore, the mean rating for the 1975–1985 intervals was significantly higher than the mean rating for the 1990–2000 intervals, $M_s = 5.09$ and 4.06, respectively, $t(521) = 2.79$, $p < .01$, $d = 0.31$. Thus, mass media news reports in recent years have edged away from the already weak message being given to the public in earlier years.

IS THERE ANY CORRESPONDENCE BETWEEN THE CUMULATIVE SCIENTIFIC KNOWLEDGE ABOUT MEDIA VIOLENCE EFFECTS ON AGGRESSION AND NEWS REPORTS ABOUT THIS LINK?

To assess the accumulated scientific knowledge about media violence effects, we did a cumulative meta-analysis on empirical studies of the relationship between exposure to violent media and aggression (e.g., Lau, Schmid, & Chalmers, 1995). In cumulative meta-analysis, the scientific studies are arranged in a chronological sequence, from the earliest study to the latest study. A meta-analysis is performed on the first two studies, then on the first three studies, then on the first four studies, and so on. At each step, the reviewer can test whether the combined effect is significantly different from zero. This allows the reviewer to determine the point in time when enough studies had been conducted to yield a significant treatment effect.

Aggression was defined as any behavior intended to harm another individual who is motivated to avoid that harm. Because several previous meta-analyses did not report detailed results on their data matrix and sometimes included broader definitions of aggression, we conducted an entirely new meta-analysis. We then compared the results of our cumulative meta-analysis of media violence effects on aggression with the news reports of such effects.

Cumulative Meta-Analysis

Literature Search

To retrieve relevant studies, we searched the *PsycINFO* database from 1887 (starting date) to 2000 using the fol-

lowing terms: *violen** or *aggress**, as well as *TV, televis**, *film, movie, screen, music, radio, video game, computer game, electronic game, cartoon, comic, pornograph*, erotic*, news, book, magazine, or sport*. We restricted the search to empirical studies involving human participants. We also combed the reference sections of the four previous meta-analyses of violent media and aggression (Hearold, 1986; Hogben, 1998; Paik & Comstock, 1994; Wood et al., 1991).

Criteria for Relevance

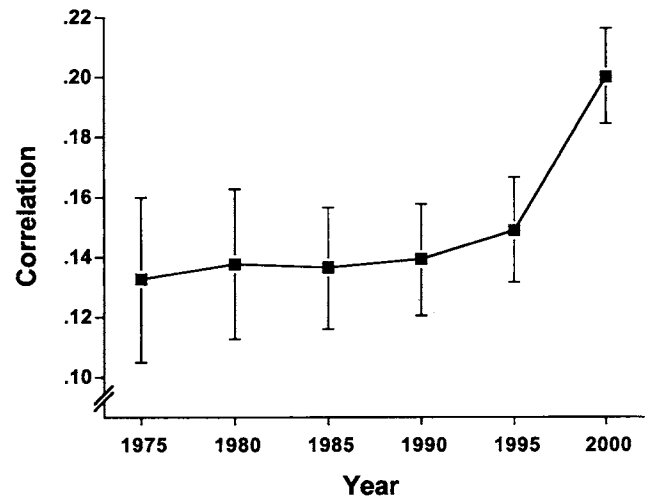
Because the mass media news industry has easy access only to published research on the effects of violent media, we excluded unpublished studies. However, the results are virtually identical if unpublished studies are included in the cumulative meta-analysis. Also, publication status did not influence the magnitude of the relationship between violent media and aggression, $\chi^2(1, k = 262) = 2.70, p > .05$. We also included only those studies that examined aggressive behavior. Thus, we excluded studies that examined the effect of violent media on aggressive affect, aggressive cognition, physiological arousal, and prosocial behavior. The literature search resulted in 202 independent samples from published articles concerned with media violence effects on aggressive behavior, with a total sample size of 43,306 participants.

Each research report discovered by the *PsycINFO* search was coded by one judge ($k = 478$). To assess coding reliability, an additional three judges each coded a random sample of 50 articles. A different random sample (with replacement) of articles was selected for each additional judge. The judges coded the year the research report was released, whether the research report was published (e.g., journal article) or unpublished (e.g., doctoral dissertation), sample size, effect-size estimate (if reported), type of study (i.e., experimental vs. nonexperimental),³ and type of dependent measure (i.e., aggressive behavior, aggressive cognition, aggressive affect, prosocial behavior). If the dependent measure was aggressive behavior, judges coded whether the target was a real person or an inanimate object (e.g., an inflatable doll). There was perfect agreement among judges on the coded characteristics.

Results

All studies combined. The data are plotted in Figure 4 in five-year intervals, beginning with 1975. We started the plot in 1975 because fewer than 30 studies had been published before 1970. By 1975, 80 studies had been published. As one can see from the cumulative effects plotted in Figure 4, the magnitude of the violent-media effect on aggression has increased over time and shows no sign of leveling off or decreasing. To be conservative, we used 99.9% confidence intervals instead of 95% confidence intervals. None of the confidence intervals include the value zero. Note also that the confidence intervals have become narrower over time, as more studies were conducted. Thus, an accurate reading of the research literature over time would be that as time passed, scientific evidence regarding the effect of vio-

Figure 4
Cumulative Meta-Analysis of Scientific Studies on Media-Related Aggression



Note. A positive correlation indicates that media violence was positively related to aggression. Capped vertical bars denote 99.9% confidence intervals.

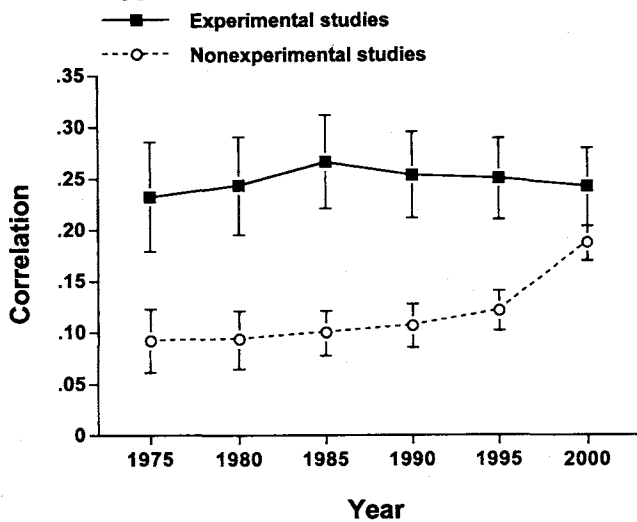
lent media on aggression increased. Since 1975, the media violence effect has been significantly greater than zero.

From a skeptic's perspective, the data points of most importance might well be the lower boundaries of the 99.9% confidence intervals, because these represent a very conservative estimate of how small the true effect might be. As shown in Figure 4, the lower boundary estimates increased at each interval. Thus, even if news media reports were based on a very conservative reading of the actual scientific state of knowledge, the ratings of news reports should have increased across time; as we saw earlier, the curvilinear trend for news report conclusions was essentially opposite in form.

Experimental versus nonexperimental studies. We also did cumulative meta-analyses separately for the experimental and nonexperimental studies. The results are presented in Figure 5. Four points are particularly interesting from these data. First, the experimental studies yielded average effect sizes that are significantly greater than zero at each time, establishing a causal link early in the history of media violence research. Second, the nonexperimental studies yielded average effect sizes that are significantly greater than zero at each time period, indicating a significant relationship between expo-

³ In true experiments, the experimenter manipulates the treatment (i.e., violent versus nonviolent or no media exposure) and research participants are randomly assigned to different levels of the treatment. Random assignment reduces the likelihood of any potential confounds, thus allowing much stronger causal statements to be made about the results.

Figure 5
Cumulative Meta-Analysis of Experimental and Nonexperimental Studies on Media-Related Aggression



Note. A positive correlation indicates that media violence was positively related to aggression. Capped vertical bars denote 99.9% confidence intervals.

sure to violent media and real-world measures of aggression (e.g., assault). Third, the effects are larger for experimental studies than for correlational studies, although this difference has decreased over time.⁴ Fourth, the experimental effects did not change much across time, whereas the nonexperimental effects systematically increased.

To further investigate these time-based trends, we used polynomial regression analysis to examine the linear and quadratic effects for scientific studies over time. When all studies were in the model, the linear effect was significant, $t(200) = 6.05, p < .0001$. The correlation between publication year and violent media effect size was .40. The curvilinear effect was also significant, $t(199) = 5.82, p < .0001$. However, as noted earlier, the cumulative analyses suggested that this time trend was operative only in nonexperimental studies. We therefore investigated this effect separately for experimental and nonexperimental studies.

Polynomial regressions confirmed these differential shifts. For experimental studies, the linear and quadratic terms were both nonsignificant, $t_s(114) = -1.33$ and -0.06 , respectively, $ps > .05$. But for nonexperimental studies, the linear and quadratic terms were both significant, $t_s(114) = 6.46$ and 4.16 , respectively, $ps < .0001$. Figure 6 displays the best-fitting regression line relating time to the size of the media violence effect in nonexperimental studies.⁵

There are at least four plausible explanations for the recent increase in effect size found in nonexperimental studies. One explanation is that the research methodology in nonexperimental studies has improved, reducing mea-

surement error. For example, better measures of exposure to media violence or of aggressive behavior would tend to produce larger effect sizes, if the true effect is positive. A second possibility is that media consumption itself has increased over time, thus increasing the amount of violent media consumed by some portion of the population and thereby increasing the effect size. A third possibility is that the amount of violence in entertainment media is increasing (e.g., there is more violence in G-rated movies of recent years than in earlier G movies; Yokota & Thompson, 2000). A fourth possibility is that the distribution of violent media consumption changed. Specifically, if the variance (or range) of media violence consumption increased, such that a relatively larger proportion of the population consumed more violent media and a correspondingly larger proportion of the population consumed less violent media, the observed effect size would increase. This could come about, for instance, if one portion of the population believed reports of potential problems and subsequently decreased their own and their children's violent media consumption, whereas another portion believed claims of no effect or of beneficial effects of consumption and subsequently increased consumption of violent media.

We presently do not have data that would allow testing of these possibilities. Such testing is largely irrelevant to the present article, so we end this section by simply noting that these time-based trends are interesting and worthy of additional investigation.

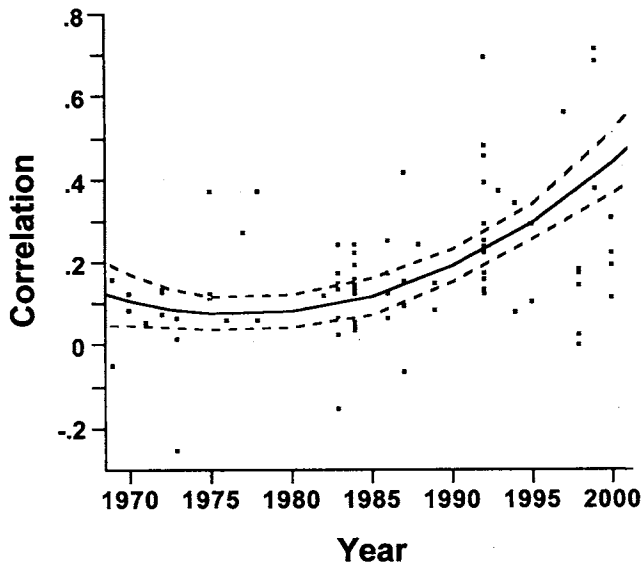
Comparison of Actual Effects to News Reports

To address more clearly the question of whether there is any correspondence between the accumulating scientific evidence concerning media violence and aggression and the news media reports on the same empirical question, we plotted the average ratings of the news reports and the cumulative correlations on the same plot, shown in Figure 7. The discrepancy is disheartening at best, especially since 1985. As it became clearer to the scientific community that media violence effects were real and significant, the news media reports actually got weaker. In fact, there is a strong negative correlation between the average effect size and average news report rating for the six data points in Figure 7 from 1975 to 2000, $r = -.68$. The correlation is even

⁴ There are at least three possible explanations for the relatively large effects in experimental studies. First, experimental studies are more effective at controlling extraneous variables than are nonexperimental studies. Second, the violent media is generally more concentrated in experimental studies than in nonexperimental studies. Third, the time between exposure to violent media and measurement of aggression is generally shorter in experimental studies than in nonexperimental studies. In sum, regardless of preference for experimental or nonexperimental methods, it has been decades since one could reasonably claim that there is little reason for concern about media violence effects.

⁵ For ease of interpretation, Figures 4, 5, 6, and 7 show correlation coefficients. The analyses, however, are based on Fisher's z scores. Each Fisher's z score was weighted by the inverse of its variance (i.e., $n - 3$). These procedures and the rationale for using them are described in Wang and Bushman (1999).

Figure 6
Violent Media Effects for Nonexperimental Studies Over Time



Note. The equation for the curve is $r = -18.93 + 0.0095933 \times \text{year} + 0.00069 \times (\text{year} - 1983.99)^2$. To reduce multicollinearity, year is centered for the quadratic term. The middle solid line is the regression line, and the upper and lower dashed lines are the upper and lower 95% confidence interval bands, respectively.

stronger if the conservative lower boundary estimates of the effect size are used instead of the average effect size, $r = -.75$. In summary, whatever is driving the shifts in news reports over time, it is clearly not the empirical data.

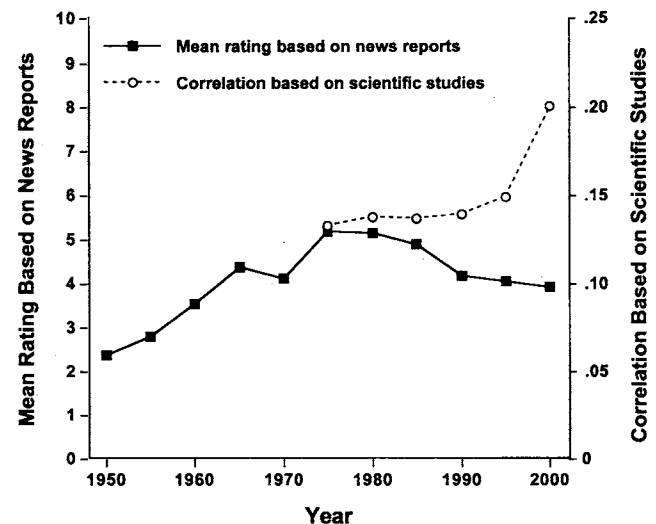
General Discussion

In 1995, *Newsweek* magazine published an article that claimed there was no solid evidence that exposure to media violence increases aggression (Leland, 1995). We wrote a letter to the editor in an attempt to correct this factually incorrect statement. The reply said that they were not interested in publishing our letter. More recently, *The New York Times* published an op-ed article (Rhodes, 2000) that similarly attacked extant media violence research in general and specifically targeted the pioneering and ongoing research of Rowell Huesmann and Leonard Eron (e.g., Huesmann et al., 2000). Despite protests from a variety of sources, including a very thoughtful reply by Huesmann and Eron, no rebuttal, retraction, or reply was ever published (International Society for Research on Aggression, 2001). In an age of multinational, multimedia mega-corporations, perhaps it should not be surprising that truth in journalism has been forced to the back of the bus, as if it is not as important or valuable as profits or a good story. Nonetheless, the *Newsweek* incident was a shock to us, one that instigated the present research. *The New York Times* incident confirms the generality of this problem, as does Figure 7.

Figure 7 reveals a major problem in the public reporting of social science information. Mass media magazines and newspapers have consistently failed to capture the changes in the scientific state of knowledge as research evidence supporting the causal link between exposure to media violence and aggression has accumulated. By 1975, the effect was clear, yet major news sources continue today to suggest to the U.S. public that there is relatively little reason to be concerned about media violence. Indeed, since the mid-1980s, the average news story has actually softened a bit on the media violence problem, even though the cumulative evidence is now more overwhelming in showing that short- and long-term exposure to media violence causes significant increases in aggression.

There are several plausible explanations for this apparently irresponsible reporting pattern. The simplest, perhaps, is that the print news media industry has a vested interest in denying a strong link between exposure to media violence and aggression. There are at least three ways in which such a denial might serve the profits of the news media companies. First, many print news media companies are part of larger conglomerates that directly profit from the sale of violent media such as television and movies. Second, many print news media get a lot of their advertising revenue from companies that produce and sell violent media. For example, almost all newspapers advertise movies. Third, the print news media may fear they will offend their readers by printing stories with which their readers might disagree. Given the large number of people who consume

Figure 7
Effect of Media Violence on Aggression:
News Reports Versus Scientific Studies



Note. Ratings based on news reports are positive if the article said that exposure to media violence is positively related to aggression. Correlations based on scientific studies are positive if media violence was positively related to aggression.

violent media and who allow their children to do likewise, such fears might be legitimate, even though the biased reporting of scientific "fact" is not.

A second plausible explanation for the apparent misreporting of the state of media violence evidence concerns a misapplied fairness doctrine. There may be a sort of journalistic "fairness" heuristic guiding the reporting of scientific findings that systematically leads to an overemphasis on minority views. Specifically, an attempt to get both sides of the story may itself lead to a final story that puts too little emphasis on the findings and opinions of leading researchers and puts too much emphasis on the few dissidents who can be found on almost any scientific issue. Indeed, a reading of even a small sample of the print media reports on media violence reveals that this fairness doctrine extends even to the public opinions of people who clearly have a monetary interest in befuddling the general public. Of course, the mass media industry has the money and the expertise to hire top guns to create such obfuscations and to deliver them in a convincing fashion, much as the tobacco industry successfully did for several decades.

A third plausible explanation involves the failure of the research community to effectively argue its case. There are at least four contributing factors involved. First, research scientists typically do not see themselves as public policy advocates. It is not normally considered a part of their jobs to take on the task of educating the general public. Second, the scientist role itself includes a very conservative norm against publicly making the kinds of claims that scientists privately believe to be true, especially concerning the generalizability of their results and the ability to draw causal inferences from their studies. It is deemed more proper to discuss limitations of a particular study, especially if it is a scientist's own study. Third, research scientists do not have the time needed to educate reporters or to respond to the hired guns whose only job is to attack the research base of the undesired findings. Fourth, attempting to educate the general public is very costly in many ways, not just in the amount of time required. For instance, hate mail is one additional cost that must be borne by anyone who appears in mass media sources with an opinion on a controversial issue. The Internet has made such hate mail easier to send and seemingly more prevalent. Also, there are security risks associated with becoming a more public figure. A more mundane yet real cost involves expenses accrued in presenting scientific information to appropriate sources. For instance, as one of us—Craig A. Anderson—recently discovered, the U.S. Senate does not pay travel expenses associated with testifying for one of their myriad committees. In addition, public debates about media violence effects make it more difficult to continue to conduct research on media-related aggression, because the participant pool becomes less naive and more suspicious of the research.

It is likely that all three of the explanations—the vested interests of the news media industry, a misapplied fairness doctrine, and communication failures—are operative, in both the specific case of research on media violence and aggression and more generally. The research commu-

nity can do relatively little about the first two. However, we believe that the research community can more effectively present the research findings.

One major step would be to realize that the conservative scientist role and the public educator role are two very different roles with different norms. When the U.S. Senate, CNN, *The New York Times*, or the *London Daily Observer* asks researchers whether they believe that exposure to violent media causes an increase in aggression, they are not asking for the overly conservative, self-defensive kind of answer that is appropriate when discussing their latest research projects at an APA convention. They are asking for their opinions, based on their knowledge of the research literature and their general knowledge of their scientific fields. For instance, in recent testimony before the U.S. Senate Committee on Commerce, Science, and Transportation, Craig A. Anderson testified that there is now a sufficient empirical database to state that exposure to violent video games can cause increases in aggression (C. A. Anderson, 2000). This assessment was based on a thorough review of the video game literature, our own recent research on this topic (C. A. Anderson & Bushman, in press), knowledge of the vast TV and movie violence literature, and knowledge about the key psychological processes at work in the media violence phenomenon. This is not to say that scientists should abandon all caution and deliver outlandish, quotable statements. For instance, we also testified that although there are good reasons to expect that the negative effects of exposure to violent video games will be larger than the comparable TV violence effects, there currently was not sufficient research evidence to claim this effect had been demonstrated as a fact. (Of course, many newspaper and Web-based accounts misreported what was actually said.)

One way to decide the proper response for the public education role might be for scientists to ask themselves what sort of actions they are taking in their personal lives relevant to the issue being considered. For instance, in deciding whether to state that they believe that playing violent video games can cause increases in aggression, scientists might ask whether they allow (or would allow) their children to play such violent games. If their answer is "no," and if that answer is based on their knowledge of the research literature, then the proper answer to the question, "Can playing violent video games cause increases in aggression?" would be some version of "Yes, on the basis of the research in the TV literature as well as the video game literature, I believe that exposure to violent video games can cause increases in aggression and that this effect is serious enough to lead me to prevent my own children from playing such games." Admittedly, this is not a great sound bite, but it is appropriate. Additional caveats may be appropriate, of course, but in our view, it would not be appropriate to hide behind the conservative scientist role and deny a belief in the causal role of media violence.

Another major step that researchers can take is to realize that the role of disseminating insights gained from their research is a part of their job, along with restructuring evaluation systems so that they explicitly include a public

education component. For the typical faculty member at a research university, this suggests that departments need to add a public-education-efforts dimension to the annual performance evaluations (it could be part of the research service or teaching components).

A third step—public education efforts by relevant professional associations—is already being taken to some extent. Both APA and the American Psychological Society have made such efforts. For example, APA's Science Advocacy Training Workshops bring in a group of researchers who are experts on a particular topic, create a forum in which to discuss some of the issues involving the future of research on this topic, and arrange meetings with appropriate congressional staff. A recent report revealed that one such workshop group succeeded in getting language incorporated into a house committee report accompanying the Veterans Administration–Department of Housing and Urban Development bill “urging the NSF [National Science Foundation] to increase efforts to fund research on the impact of emerging media on children's cognitive, social and emotional development” (Kobar, 2000, p. 6).

We believe that more efforts along this line can be made. For instance, when a major news source such as *Newsweek* magazine misrepresents the current state of psychological science knowledge, one or more of the relevant professional associations could take an active role in countering that misrepresentation, perhaps by issuing a press release.

Finally, scientists must be willing to pay some of the unavoidable costs, both monetary and personal, associated with educating the public. Some of the monetary costs can be defrayed by relevant organizations: For example, APA generously picked up some of the travel costs for some of the participants in the Senate hearings mentioned earlier. However, other costs, such as time or having to deal with hate mail, are costs that individual researchers may simply have to pay on their own. We believe that the benefit to society of more effectively communicating to a broad general audience the knowledge gained from psychological research is worth the cost. We also hope that the research presented in this article helps to correct the continuing public misrepresentation of what is known about the effects of exposure to media violence on aggressive behavior.

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