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MEDIA VIOLENCE—THE EFFECTS ARE BOTH REAL AND STRONG

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The culture of childhood in the United States is rife with violence in entertainment—portrayed as socially acceptable and even “fun” in the latest breed of video games. We can benefit from 50 years of research on television (Pecora, Murray & Wartella, 2006) to begin to understand the effects of violent content in all media. In our review of research over the past 50 years, we catalogued almost two thousand studies (1,945 to be precise) conducted on various aspects of television’s impact, with about 600 studies related directly to the violence issue.

The violent face of television has been presented to audiences from the first broadcasts of this medium. Television broadcasting in the United States began in the early 1940s, with full development following the Second World War. Although extensive broadcast schedules did not begin until the late 1940s, and violence was not as graphic as it would become in later years, the first public concerns about violence were evident in the 1950s. The early Congressional hearings (United States Congress, 1952; 1955) set the stage for similar expressions of public concern that have continued through the 20th Century and into the 21st Century (United States Congress, 1990; 2001; 2005). What have we learned from all of this research and discussion on the “violent face of television” and what can be done to mitigate the harmful influences?

Research and Social Concerns upon the Introduction of Television

The early studies of television's influence began almost simultaneously in England and the United States and Canada in the mid-1950's. They were designed to take advantage of the regulated introduction of the new medium. Later studies---in the 1970's-- would revisit these issues and this research strategy when television was being

introduced into isolated communities in Australia (Murray & Kippax, 1977; 1978; 1979) and Canada (Williams, 1986; MacBeth, 1996).

In England, a group of researchers at the London School of Economics and Political Science, under the direction of Hilde Himmelweit, a Reader in Social Psychology, began the first study of children's television viewing patterns while TV was still relatively new (only three million TV sets were installed in the 15 million households in England). This study was proposed by the Audience Research Department of the British Broadcasting Corporation (BBC) but was conducted by independent researchers. The research, begun in 1955, was published in a 1958 report, *Television and the Child: An Empirical Study of the Effect of Television on the Young* (Himmelweit, Oppenheim, & Vince, 1958). The American and Canadian study was conducted by Wilbur Schramm and his colleagues in communications at Stanford University. This project began in 1957 and was published in a 1961 report, *Television in the Lives of Our Children* (Schramm, Lyle, & Parker, 1961).

The British and American/Canadian surveys provided a very important benchmark for understanding the broad and general effects of television on children. For example, Himmelweit, et al., noted: "We have found a number of instances where viewers and controls differed in their outlook; differences which did not exist before television came on the scene. There was a small but consistent influence of television on the way children thought generally about jobs, job values, success, and social surroundings." (pp.17-18). With regard to aggression, these correlational studies did not support an association. Himmelweit and her colleagues noted: "We did not find that the viewers were any more aggressive or maladjusted than the controls; television is unlikely

to cause aggressive behaviour, although it could precipitate it in those few children who are emotionally disturbed. On the other hand, there was little support for the view that programmes of violence are beneficial; we found that they aroused aggression as often as they discharged it." (p. 20). The conclusions of Schramm, Lyle and Parker were something of a mantra:

For *some* children under *some* conditions *some* television is harmful. For *other* children under the same conditions, or for the same children under *other* conditions, it may be beneficial. For *most* children under *most* conditions, *most* television is probably neither particularly harmful nor particularly beneficial. (p. 1; original italics)

But their conclusions also included the observation that those Canadian and American children who had high exposure to television and low exposure to print were more aggressive than those with the reverse pattern. Thus, the early correlational studies or surveys identified some areas of concern about television violence and set the stage for more focused investigations.

First Experimental Studies

Moving beyond these 1950's surveys, there was another set of studies that emerged in the early 1960's---not surveys or correlational studies but experimental studies that were addressed to cause and effect relationships in the TV-violence/aggressive-behavior equation. These initial experiments were conducted by Albert Bandura, at Stanford University, who studied preschool age children, and Leonard Berkowitz, at the University of Wisconsin, who worked with college-age youth. In both instances, the studies were experimental in design, which meant that subjects were

randomly assigned to various viewing experiences and therefore the results of this manipulated viewing could be used to address the issue of causal relationships between viewing and behavior. The early Bandura studies, such as *Transmission of aggression through imitation of aggressive models* (Bandura, Ross, & Ross, 1961) or *Imitation of film-mediated aggressive models* (Bandura, Ross, & Ross, 1963), were set within a social learning paradigm and were designed to identify the processes governing the ways that children learn by observing and imitating the behavior of others. In this context, therefore, the studies used stimulus films (videotape was not generally available) back projected on a simulated television screen, and the behavior of the children was observed and recorded in a playroom setting, immediately following the viewing period. Despite the structured nature of these studies, Bandura's research was central to the debate about the influence of media violence. Moreover, the work of Berkowitz and his colleagues, such as *Effects of film violence on inhibitions against subsequent aggression* (Berkowitz & Rawlings, 1963) or *Film violence and the cue properties of available targets* (Berkowitz & Geen, 1966), studied the simulated aggressive behavior of youth and young adults following the viewing of segments of violent films, such as a Kirk Douglas boxing film, *The Champion*. The demonstration of increased willingness to use aggression against others following viewing, further fueled the debate about the influence of media violence.

Concern about the influence of TV violence began as early as the start of this new medium. The first Congressional hearings were held in the early 1950s (United States Congress, 1952; 1955). At these early hearings, developmental psychologist Eleanor Maccoby (1954) and sociologist Paul Lazarsfeld (1955) presented testimony that relied

upon some early studies of violence in films, such as the 1930s report, *Boys, Movies and City Streets* (Cressey & Thrasher, 1933) to outline a necessary program of research on the issue of TV violence and its effects on children.

As the 1960's progressed, concern in the United States about violence in the streets and the assassinations of President John F. Kennedy, Martin Luther King, Jr., and Robert Kennedy stimulated continuing interest in media violence. In response, several major government commissions and scientific and professional review committees were established, from the late 1960's through the 1990's, to summarize the research evidence and public policy issues regarding the role of television violence in salving or savaging young viewers.

The Five Principal US Commissions

The five principal US commissions and review panels--National Commission on the Causes and Prevention of Violence (Baker & Ball, 1969); Surgeon General's Scientific Advisory Committee on Television and Social Behavior (1972; Murray, 1973); National Institute of Mental Health (1982) Television and Behavior Project; Group for the Advancement of Psychiatry (1982) Child and Television Drama Review; and the American Psychological Association Task Force on Television and Society (Huston, et al., 1992)--have been central to setting the agenda for research and public discussion.

In 1982, the National Institute of Mental Health (NIMH) published a 10 year follow up of the 1972 Surgeon General's study. The two volume report (National Institute of Mental Health, 1982; Pearl, Bouthilet, & Lazar, 1982), collectively titled, *Television and Behavior: Ten Years of Scientific Progress and Implications for the Eighties*,

provided a reminder of the breadth and depth of knowledge that has accumulated on the issue of TV violence. In this regard, the NIMH staff and consultants concluded:

After 10 more years of research, the consensus among most of the research community is that violence on television does lead to aggressive behavior by children and teenagers who watch the programs. This conclusion is based on laboratory experiments and on field studies. Not all children become aggressive, of course, but the correlations between violence and aggression are positive. In magnitude, television violence is as strongly correlated with aggressive behavior as any other behavioral variable that has been measured. (p. 10)

In 1986, the American Psychological Association (APA) empanelled a Task Force on Television and Society to review the research and professional concerns about the impact of television on children and adults. The nine psychologists assigned to this committee undertook reviews of relevant research, conducted interviews with television industry and public policy professionals, and discussed concerns with representatives of government regulatory agencies and public interest organizations. The final report, entitled *Big World, Small Screen: The Role of Television in American Society* (Huston et al., 1992) included the following observation about television violence:

American television has been violent for many years. Over the past 20 years, the rate of violence on prime time evening television has remained at about 5 to 6 incidents per hour, whereas the rate on children's Saturday morning programs is typically 20 to 25 acts per hour. There is clear evidence that

television violence can cause aggressive behavior and can cultivate values favoring the use of aggression to resolve conflicts. (p. 136)

The extent of concern—both social and scientific—is demonstrated by the fact that over the past half century, about 1,000 reports have been published on the issue of TV violence (Murray, 1980; Pecora, Murray, & Wartella, in press). Of course, only a small percentage of these thousands of pages represent original studies or research reports, but there is an extensive body of research on the impact of TV violence. Nevertheless, the research history is best described in terms of the nature of the research approaches: Correlational and Experimental and their variants cross-lagged panel studies and field studies.

Correlational Research

The demonstration of a relationship between viewing and aggressive behavior is a logical precursor to studies of the causal role that TV violence may play in promoting aggressive behavior. In the typical correlational studies that followed the Himmelweit, et al. and Schramm, et al. studies, such as those conducted for the Surgeon General's research program (McLeod, Atkin & Chaffee, 1972a; 1972b; Dominick & Greenberg, 1972; Robinson & Bachman, 1972), the researchers found consistent patterns of significant correlations between the number of hours of television viewed or the frequency of viewing violent programs and various measures of aggressive attitudes or behavior. Also, another study, Atkin, Greenberg, Korzenny and McDermott (1979) found that heavy TV-violence viewers were more likely to choose physical and verbal aggressive responses to solve hypothetical interpersonal conflict situations (i.e., 45% of the heavy violence viewers chose physical/verbal aggressive responses vs. 21% of the low violence

viewers) . Similarly, a further study in this genre (Walker & Morley, 1991) found that adolescents who reported enjoying TV violence were more likely to hold attitudes and values favorable to behaving aggressively in conflict situations.

In a another approach, a large database, the Cultural Indicators Project, has been used to explore the relationship between television portrayals and the viewer's fearful conception of the world. In a series of studies begun in the 1960s, George Gerbner and his colleagues at the University of Pennsylvania (Gerbner, 1970; Gerbner, Gross, Morgan, & Signorelli, 1994) have tracked public perceptions of society in relation to the respondent's extent of television viewing. Of relevance to the violence issue, these researchers have identified differences in the risk-of-victimization perceptions, described as the "mean world syndrome" effect, of light vs. heavy viewers. The heavy viewers (usually, 5 or more hours per day) are much more fearful of the world around them than are light viewers (about 2 or fewer hours per day). When questioned about their perceptions of risk, heavy viewers are much more likely to overestimate (i.e., greater than the FBI crime reports for their locale would suggest) the chance that they will be the victim of crime in the ensuing six months, have taken greater precautions by changing the security of their homes or restricting their travels at night, and are generally more fearful of the world. As Gerbner et al. (1994) note:

We have found that long-term exposure to television, in which frequent violence is virtually inescapable, tends to cultivate the image of a relatively mean and dangerous world ... in which greater protection is needed, most people cannot be trusted, *and most people are just looking out for themselves* [italics added]. (p30)

Special-Case Correlational Research

Studies such as the early surveys clearly demonstrate that violence viewing and aggressive behavior are related but they do not address the issue of cause-and-effect. And yet, there are some special-case correlational studies in which "*intimations of causation*" can be derived from the fact that these studies were conducted over several time periods. There have been three major "panel" studies: A study funded by CBS (Belson 1978), one funded by NBC (Milavsky, Kessler, Stipp, & Rubens, 1992), and the third funded by the Surgeon General's Committee and NIMH (Lefkowitz, Eron, Walder, & Huesmann, 1972; Huesmann, Eron, Lefkowitz, & Walder, 1984; Huesmann & Eron, 1986).

The CBS study (Belson, 1978) was conducted in England with 1,565 youths who were a representative sample of 13 to 17 year old males living in London. The boys were interviewed concerning the extent of their exposure to a selection of violent television programs (broadcast during the period 1959 through 1971 and rated by members of the BBC viewing panel for level of violence) as well as each boy's level of violent behavior as determined by his report of how often he had been involved in any of 53 categories of violence over the previous six months. The degree of seriousness of the acts reported by the boys ranged from only slightly violent aggravation, such as taunting, to more serious and very violent behavior such as: "I tried to force a girl to have sexual intercourse with me"; "I bashed a boy's head against a wall"; "I burned a boy on the chest with a cigarette while my mates held him down;" and "I threatened to kill my father." Approximately 50% of the 1,565 boys were not involved in any violent acts during the six-month period. However, of those who were involved in violence, 188 (12%) were involved in 10 or more acts during the six-month period. When Belson compared the behavior of boys who

had higher exposure to televised violence to those who had lower exposure (and had been matched on a wide variety of possible contributing factors), he found that the high-violence viewers were more involved in serious interpersonal violence.

The NBC study (Milavsky, Kessler, Stipp, & Rubens, 1982) was conducted over a three year period from May 1970 to December 1973 in two cities, Fort Worth and Minneapolis. Interviews were conducted with samples of second- to sixth-grade boys and girls and a special sample of teenage boys. In the elementary school sample, the information on television viewing and measures of aggression were collected in six time periods over the three years. The aggression measure consisted of peer ratings of aggressive behavior based on the work of Eron and his colleagues (Eron, Walder, & Lefkowitz, 1971). In the teenage sample there were five waves of interviews over the three years and the aggression measures were self-report rather than peer-reported aggression. In summarizing the results of this study, the authors concluded: "On the basis of the analyses we carried out to test for such a causal connection there is no evidence that television exposure has a consistently significant effect on subsequent aggressive behavior in the [elementary school] sample of boys." (Milavsky, et al., 1982, p.482). Similar null findings were reported for the elementary school girls and the teenage boys. However, re-analyses of these data by Kenny (1984) and Cook and his associates (Cook, Kendzierski, & Thomas, 1983) have concluded that there are small but clear causal effects in the NBC data and that these effects become stronger when analyzed over longer time periods through successive waves of interviews.

Finally, one of the longest panel studies, 22 years, is the work of Leonard Eron and his colleagues (Eron, 1963; Lefkowitz, Eron, Walder & Huesmann, 1972; Eron,

1982; Huesmann, Eron, Lefkowitz & Walder, 1984; Husemann & Eron, 1986). In the initial studies, conducted for the Surgeon General's investigation of TV violence (Lefkowitz, et al., 1972), the researchers were able to document the long-term effects of violence viewing by studying children over a 10-year period from age 8 to age 18. At these two time periods, the youngsters were interviewed about their program preferences and information was collected from peer ratings of aggressive behavior. The violence levels of their preferred TV programs and other media and measures of aggression across these two time periods suggested the possibility that early television violence viewing was one factor in producing later aggressive behavior. In particular, the findings for 211 boys followed in this longitudinal study demonstrated that TV violence at age 8 was significantly related to aggression at age 8 ($r = .21$) and the 8-year old violent TV preferences were significantly related to aggression at age 18 ($r = .31$) but TV violence preferences at age 18 were not related to aggressive behavior at the earlier time period, age 8 ($r = .01$). When other possible variables, such as parenting practices and discipline style, were controlled it was still clear that early media violence could be part of the cause of later aggressive behavior. Furthermore, in a follow-up study, when these young men were now age 30 (Huesmann, Eron, Lefkowitz & Walder, 1984), the authors found a significant correlation ($r = .41$) between TV violence levels at age 8 and serious interpersonal criminal behavior (e.g., assault, murder, child abuse, spouse abuse, rape) at age 30.

Thus, it seems clear that a correlation between television violence and aggression can be established from diverse studies. And, some special cases of longitudinal correlational studies (described as cross-lagged/panel studies) can lead to intimations of

causation. However, the issue of causation is best assessed in experimental designs that allow for random assignment of subjects to various treatment conditions or, in the case of field studies, take advantage of naturally occurring variations in television viewing experiences.

Experimental Studies

Experimental studies by Bandura (e.g., Bandura, Ross & Ross, 1961;1963) and Berkowitz (e.g., Berkowitz & Rawlings, 1963) set the stage for later experimental studies in which causal influences of TV violence could be assessed by randomly assigning subjects to various viewing conditions. These later studies employed both the structured, laboratory-based, settings as well as more naturalistic settings in schools and communities.

One of the earlier studies in this latter genre (Liebert & Baron, 1972), assessed the effects of viewing segments of a violent television program, *The Untouchables*, on the aggressive behavior of 5 to 9 year old boys and girls. In this study, the children viewed either *The Untouchables* or a neutral, but active, track race. Following viewing, the child was placed in a playroom setting in which he or she could help or hurt another child who was ostensibly playing a game in another room. The subject could help the other child by pressing a button that would make the game easier to play and allow the other child to win more points. Similarly, the child could hurt the other child by pressing a button that would make the game very difficult play and hence lose points. The results indicated that youngsters who had viewed the violent program manifested a greater willingness to hurt the other child than youngsters who had watched the neutral program. Moreover, an elaboration of this study by Paul Ekman and colleagues (Ekman, Liebert, Friesen,

Harrison, Zlatchin, Malmstrom, & Baron, 1972) included the recording of the facial expressions of these children while they were watching the television violence. In this instance, the children whose facial expressions indicated interest or pleasure while watching TV violence were more willing to hurt the other child than the youngsters whose facial expressions indicated disinterest or displeasure while watching TV violence. Thus, this set of studies identified some potential moderating variables in the violence-viewing/aggressive-behavior equation.

Other early experiments by researchers using physiological measures of arousal (e.g., GSR, heart rate, respiration changes) while watching violent cartoons (Osborn & Endsley, 1971; Cline, Croft & Courier, 1973) found that children are emotionally responsive even to cartoon violence. So too, other studies (Ellis & Sekyra, 1972; Hapkiewitz & Roden, 1971; Lovaas, 1961; Mussen & Rutherford, 1961; Ross, 1972) found that exposure to even one violent cartoon leads to increased aggression in the structured playroom settings. Furthermore, studies by Drabman and his colleagues (Drabman & Thomas, 1974; Thomas, Horton, Lippincott & Drabman, 1977) have shown that children who view violent television programs become desensitized to violence and are more willing to tolerate aggressive behavior in others. Moreover, later studies with emotionally disturbed children (Gadow & Sprafkin, 1993; Grimes, Vernberg, & Cathers, 1997) have found that these youngsters may be more vulnerable to the influence of TV violence. For example, Grimes et al. (1997) found that 8 to 12 year-olds who were diagnosed as having either attention-deficit-hyperactivity disorder, oppositional defiant disorder, or conduct disorder, manifested less emotional concern for victims and were

more willing to accept violence as justified than a matched group of children who did not have these disorders.

All of the studies described above were conducted in fairly structured laboratory or playroom settings where the display of aggression or emotional arousal or desensitization were relatively contiguous to the viewing of TV violence. Questions remain about what might happen in more naturalistic settings or field studies of violence viewing and aggressive behavior. One early study that assessed these issues in was the work of Aletha (Stein) Huston and Lynette (Friedrich) Cofer (Stein & Friedrich, 1972; Friedrich & Stein, 1973) in which they assessed the impact of viewing aggressive vs. prosocial television programs on the behavior of preschoolers in their normal child-care settings.

In this study, the preschoolers were assigned to view a diet of either Batman and Superman cartoons, or Mister Rogers' Neighborhood, or neutral programming that contained neither aggressive nor prosocial material (i.e., special travel stories for preschoolers). The "diet" consisted of 12 half-hour episodes that were viewed one half-hour per day, three days per week, for four weeks. The researchers observed the children in the classroom and on the playground for three weeks prior to the start of the viewing period, to establish a baseline for the amount of aggression or prosocial behavior, and continued to observe the children during the four weeks of viewing and for an additional two weeks.

The results were that children who were initially more aggressive and had viewed the diet of Batman and Superman cartoons were more active in the classroom and on the playground, played more roughly with toys, got into more aggressive encounters.

Conversely, youngsters from lower income families who had viewed the Mister Roger's diet increased their prosocial helping behavior. One suggestion from this early field study is that viewing aggressive program content can lead to changes in aggressive behavior, while the opposite is also true for prosocial programming. Moreover, these changes were demonstrated in a relatively short viewing period (12 half hours) and in the context of other viewing that took place outside of the classroom setting.

Other field studies have used restricted populations such as boys in detention centers or secure residential settings. In one such study, conducted for NBC, Feshbach and Singer (1971) presented preadolescent and adolescent males in a security facility with a diet of aggressive or nonaggressive television programs over a six week period and measured their daily aggressive behavior. They found that the youngsters who watched the nonaggressive programs were more aggressive than the other group. However, this study was criticized on methodological grounds relating to the selection of subjects and the assignment of viewing conditions (Liebert, Sobel & Davidson, 1972) and a subsequent replication (Wells, 1973) failed to duplicate the findings. Moreover, a later study conducted by Berkowitz and his colleagues (Parke, Berkowitz, Leyens, West & Sebastian, 1977), using aggressive or nonaggressive films presented to adolescent males living in minimum security institutions, did demonstrate increases in both verbal and physical interpersonal aggression among the teens viewing the aggressive diet.

Another approach to field studies involved the assessment of the effects of naturally occurring differences in the television exposure available to children in communities with or without television or communities with differing television content. In one set of studies (Murray & Kippax, 1977; 1978) the researchers were able to study

the introduction of television in a rural community in Australia, in contrast to two similar communities that had differing experiences with television. In a second set of studies (Williams, 1986; Macbeth, 1996), the research team studied the introduction of television in a rural Canadian community, in contrast to two similar communities with differing television experience. In general, the results of both the Australian and Canadian studies converge in showing that the introduction of television had a major influence on restructuring the social lives of children in these rural communities. In this regard, both studies found that television displaced other media use and involvement in various social activities—a finding not dissimilar to the earlier studies of children in England (Himmelweit, et al., 1958) or the U.S. and Canada (Schramm, et al., 1961). However, with regard to the effects of TV violence, these newer field studies provide stronger evidence of negative influence, in differing but complementary ways. Murray and Kippax (Murray, 1980) found changes in perceptions of the seriousness and prevalence of crime among children in the town exposed to higher levels of television violence, while Williams/Macbeth (Joy, Kimball, & Zabrack, 1986) found increases in aggression among children following the introduction of television in the town.

What Have We Learned?

Research conducted over the past 50 years leads to the conclusion that televised violence does affect viewers' attitudes, values and behavior (Hearold, 1986; Murray, 1994; Paik & Comstock, 1994). In general, there seem to be three main classes of effects—aggression, desensitization, and fear:

- Aggression: Heightened levels of viewing televised violence can lead to increases in aggressive behavior and/or changes in attitudes and values favoring the use of aggression to solve conflicts;
- Desensitization: Extensive violence viewing may lead to decreased sensitivity to violence and a greater willingness to tolerate increasing levels of violence in society;
- Fear: Extensive exposure to television violence may produce the "mean world syndrome" in which viewers overestimate their risk of victimization.

Although the body of research on the effects of viewing television violence is extensive and fairly coherent in demonstrating systematic patterns of influence, we know surprisingly little about the processes involved in the production of these effects.

Although we know that viewing televised violence can lead to increases in aggressive behavior or fearfulness and changed attitudes and values about the role of violence in society, it would be helpful to know more about how these changes occur in viewers.

To set the context for the continuing research—within the broad framework of a social learning paradigm--we know that changes in behavior and thoughts can result from observing models in the world around us, be they parents, peers, or other role models, such as those provided by mass media. The processes involved in "modeling" or imitation and vicarious learning of overt behavior were addressed in social learning theories in the 1960's (Bandura, 1962; 1965; 1969; Berkowitz 1962; 1965) but we need to expand our understanding of the neurological processes that might govern the translation of the observed models into thoughts and actions.

As a start in this new direction, both Bandura (1994) and Berkowitz (1984) have provided some theoretical foundations for the translation of communication "events" into thoughts and actions. Bandura's "social-cognitive" approach and Berkowitz's outline of a "cognitive-neoassociation" analysis, posit a role for emotional arousal as an affective tag that may facilitate lasting influences. As Bandura (1994) notes: "People are easily aroused by the emotional expressions of others. Vicarious arousal operates mainly through an intervening self-arousal process. ... That is, seeing others react emotionally to instigating conditions activates emotion-arousing thoughts and imagery in observers." (p. 75). With regard to aggression, we know that viewing television violence can be emotionally arousing (e.g., Cline, Croft, & Courier, 1973; Osborn & Endsley, 1971; Zillman, 1971; 1982) but we lack direct measures of cortical arousal or activation patterns in relation to violence viewing.

The pursuit of neurological patterns of cortical arousal in violence viewing would likely start with the amygdala because it has a well-established role in the control of physiological responses to emotionally arousing or threatening stimuli (Damasio, 1994; 1999; Kosslyn & Koenig, 1995; LeDoux, 1996; LeDoux & Hirst, 1986; Ornstein, 1997; Panksepp, 1998; Steward, 2000). Indeed, a recent National Research Council (1993) report from the Panel on the Understanding and Control of Violent Behavior, concludes:

All human behavior, including aggression and violence, is the outcome of complex processes in the brain. Violent behaviors may result from relatively permanent conditions or from temporary states. ... Biological research on aggressive and violent behavior has given particular attention to the following in recent years: ... (2) functioning of steroid hormones such as testosterone and

glucocorticoids, especially their action on steroid receptors in the brain; ... (6) neurophysiological (i.e., brain wave) abnormalities, particularly in the temporal lobe of the brain; (7) brain dysfunctions that interfere with language processing or cognition; (pp. 115-116).

Thus, one suggestion for further research on the impact of media violence is to assess some of the neurological correlates of viewing televised violence. In particular, the use of videotape violent scenes can serve as the ideal stimulus for assessing activation patterns in response to violence. These neurobiological studies hold the key to understanding the ways in which children might respond to seeing violence in entertainment and this might also be the key to thinking about the desensitization to violence, or what some might describe as a ‘drugging’ effect on the developing child. To assess this possibility, we embarked on an initial study of children’s brain activations while the youngsters viewed violent and non-violent video program material. We reasoned that there may be similarities between the ways humans respond to the threats of physical violence in the real world and the neurobiological response to so-called “entertainment” violence.

We began our study with some notions and expectations drawn from previous research suggesting that we might find the ‘threat recognition’ system—involving the limbic system and right hemisphere of the brain—as an area that will be activated while viewing video violence. The development of hypotheses about violence viewing and brain activation, however, needs to start with research on physiological arousal (e.g., Osborn & Endsley, 1971; Zillmann, 1982; Zillmann & Bryant, 1994) and link this to cortical arousal (Ekman, & Davidson, 1993; Ekman, & Davidson, 1994; Ekman,

Davidson, & Friesen, 1990; Davidson, Ekman, Saron, Senulis, & Friesen, 1990; Davidson & Tomarken, 1989).

In our pilot study (Murray, et al., in press; Murray, 2001), we found that both violent and nonviolent viewing activated regions implicated in aspects of visual and auditory processing. In contrast, however, viewing TV violence selectively recruited right precuneus, right posterior cingulate, right amygdala, bilateral hippocampus and parahippocampus, bilateral pulvinar, right inferior parietal and prefrontal, and right premotor cortex. Thus, TV violence viewing appears to activate brain areas involved in arousal/attention, detection of threat, episodic memory encoding and retrieval, and motor programming. These findings are displayed in Figure 1, showing the significant

Insert Figure 1 about here

contrasts between Violence Viewing and Non-Violence Viewing by brain lobe/region in the xyz stereotaxic atlas coordinates (Talairach & Tournoux, 1988).

It can be seen that the Regions of Interest (ROI) of the composite activations of 8 children, combined in adjusted Talairach space, include the amygdala, hippocampus, and posterior cingulate. These areas are important because they are likely indicators of the perception of threat and possible long-term memory storage of the threat-event (particularly, these patterns are similar to the memory storage of traumatic events by PTSD patients). These activation patterns demonstrate that video violence viewing selectively activates right hemisphere, and some bilateral areas, that collectively suggest significant emotional processing of video violence.

Our continuing research at Harvard Medical School, Children's Hospital Boston is designed to address these questions about violence viewing in a more robust study that employs a larger and more differentiated sample of children who have had differing experiences with violence (e.g., children who are identified as high or low in aggressive tendencies and children who have been victims of abuse). We will continue to use the methods and procedures that were demonstrated to be effective in the pilot study--we will conjoin measures of physiological arousal (e.g., GSR, heart rate) with neuroimaging techniques (e.g., functional Magnetic Resonance Imaging-fMRI) to track the emotional and neurological processes involved in viewing televised violence. We anticipate finding clear differences in the three groups of children, with the victims of violence—the abused youngsters—being most responsive to viewing media violence and the aggressive youngsters being the least responsive to the entertainment violence; this is the desensitization effect that results from extensive violence viewing and acting out the violence witnessed in the entertainment world of film, television and video game violence.

So, what is a reasonable set of conclusions that can be drawn from these data found in these and the hundreds of studies of media violence and children that have been conducted over the past half century? First, as the American Psychological Association (APA) has noted in a recent public policy resolution (August, 2005), there is ample evidence that violence in media does lead to increases in aggressive behavior. This new resolution follows on a 1984 (American Psychological Association, 1984) resolution condemning TV violence. As a result, the new APA resolution targets video games and other interactive media, drawing on the research on TV violence and other media, and

calls for a reduction of violence in interactive media used by children and adolescents. In particular, the APA—which speaks in behalf of more than 300,000 psychologists in North America—recommends that American society should:

Teach media literacy to children so they will have the ability to critically evaluate interactive media;

Encourage the entertainment industry to link violent behaviors with negative social consequences

Develop and disseminate a content-based rating system that accurately reflects the content of video games and interactive media;

Encourage developers of violent video games and interactive media to address the issues that playing these games may increase aggressive thoughts and behaviors in children and adolescents and that these effects may potentially be greater than the effects of exposure to violent television and movies.

It is this ever rising level of concern about violent media and the harmful effects on youth that fuels the demands for action from the media industries, government, professional and public policy observers, and educators and parents. The suggestions outlined by the American Psychological Association, noted above, are a good starting point for action. The success of such action depends upon the involvement of parents as a driving force for change in the home environment by focusing attention on the need to limit children's access to violent media (television, films, video games, especially) and to take positive steps to intervene in children's engagement in and response to violent entertainment.. As the esteemed philosopher Plato observed in 434 BCE, a society

should be very concerned about the ways in which its citizens choose to amuse themselves. We run the risk of amusing ourselves to death.

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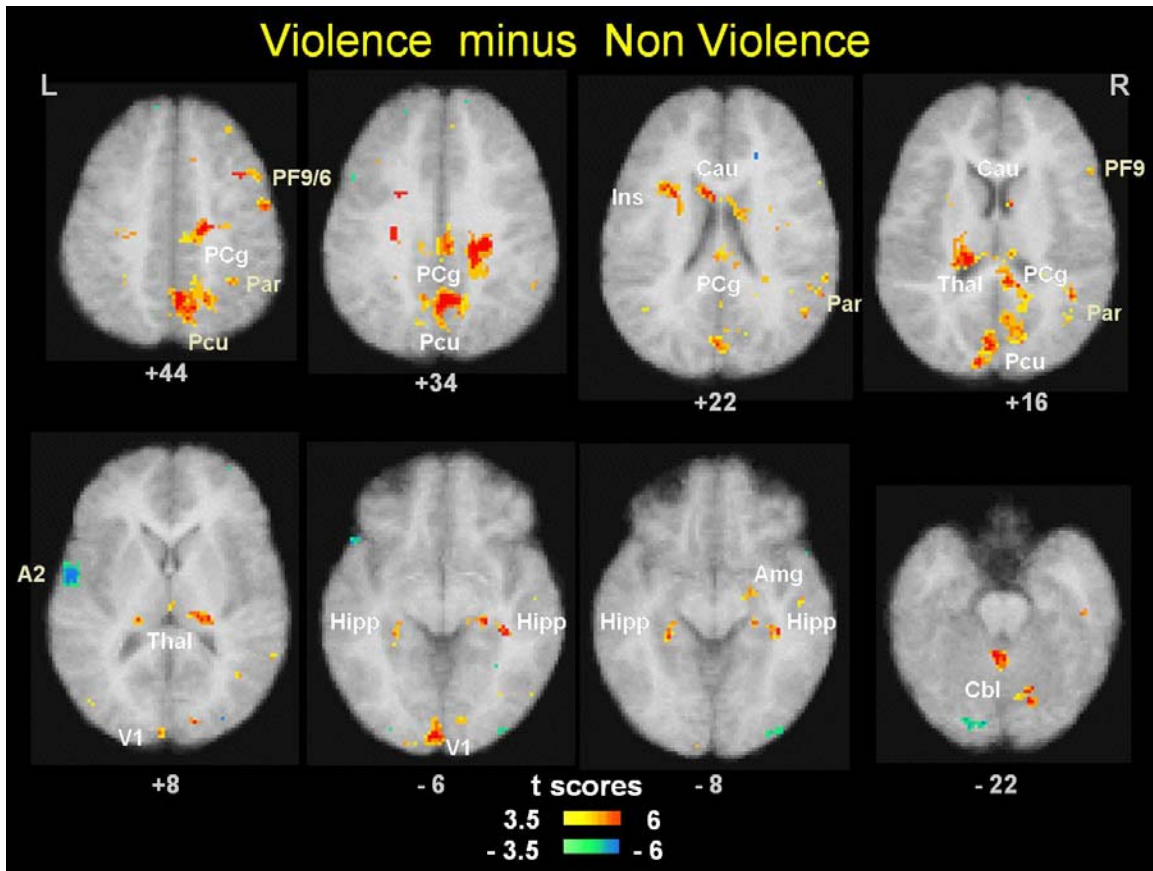


Figure Caption/Legend:

Figure 1: Total volume of activated voxels for Violence minus Nonviolence. Blood oxygenation-level dependent (BOLD) increases only. (Cut-off “t” level = 7 at + or - 3.5, p less than .01 uncorrected). Note L=left hemisphere; R=right hemisphere; A2=secondary auditory area cortex; V1=primary visual area; Thal=Thalamus; PcU=precuneus; PCg=posterior cingulate; PF9/6=prefrontal cortex9 and 6; Ins=insula;; Cau=caudate nucleus; Par=parietal lobe; Hipp=hippocampal region; Amg=amygdala; Cbl=cerebellum. (Source: Murray, et al., 2006)