



Kids, TV Viewing, and Aggressive Behavior

NEARLY TWO DECADES BEFORE THE appearance of J. G. Johnson *et al.*'s impressive study of television viewing and aggressive behavior ("Television viewing and aggressive behavior during adolescence and adulthood," Reports, 29 March, p. 2468), L. Joy *et al.* published an even more persuasive study of television's influence on behavior (*I*). These authors located three similar communities in Canada that differed in their degree of television saturation. One had no television at all, another only CBC programming, and the third a full spectrum of commercial programs. Over a period of many months, they followed the behavior of children of different ages and contrasted the results on



play behavior, reading, social interactions, and aggression across communities.

Aside from coming to much the same conclusions as Johnson *et al.*, Joy and colleagues were able to demonstrate that neither the amount of television watched nor the content made much difference: The children who saw only quality CBC programs (comparable to PBS in the United States) were scarcely distinguishable from those who watched anything and everything.

The results of television viewing on reading skills and social behavior were so drastic that when we encountered the study, we expected that there would soon be a nationwide move to ban children from television rooms. Not only did this not occur, but scarcely any reviews of the Joy *et al.* study made it into print, nor have I seen it cited, although the authors have credibility and stature in their disciplines and the

design and analysis of their study meet every reasonable standard. I am surprised that the Joy *et al.* study is still failing to receive the attention it deserves.

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References and Notes

1. L. Joy *et al.*, *The Impact of Television. A Naturalistic Study in Three Communities* (Harcourt, Brace, Jovanovich, London, 1986).

THE ASSOCIATION BETWEEN TELEVISION viewing and subsequent aggressive behavior is shown by Johnson and colleagues to occur over a longer time frame than commonly believed. In particular, prolonged television viewing by young adults was found to be linked with an elevated risk for engaging in aggressive acts against others. These findings suggest that media violence places certain individuals at risk of developing aggressive dispositions or even psychiatric conditions.

Subsequent research in this area should be focused on creating a risk factor catalog that will aid professionals in identifying those children and adolescents who are susceptible to the presumed effects of television violence. In addition, risk factor profiles can suggest certain interventions that can be directed against one or more of these risks. As Johnson *et al.* note, their study supports the hypothesis that television viewing may partially mediate the association between risks such as childhood neglect or low family income and subsequent aggressive behavior. Consequently, interventions like those used by Huesmann (*I*), in which children's attitudes to media violence are modified, may be more effective if targeted to individuals who

Letters to the Editor

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exhibit such risk factors. This study also indicates that the use of interventions may still be beneficial if applied to young adults as well as adolescents. Although not providing definitive evidence for causality, Johnson and coauthors ultimately offer clear directions for society to seriously address the problems of television-generated aggression and violence.

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THE REPORT BY JOHNSON ET AL. IS INTERESTING in that it presents an association between the amount of television viewed at young ages and subsequent aggressive behavior as adults; however, it does not show causation. It is not at all surprising that aggressive adults preferred to watch aggressive television programs as children. What this study doesn't tell us is whether they would have turned out differently if they hadn't watched television. From what we know from twin studies on behavioral traits, I would contend that they would not (*I*, *2*). Another failing of this study was the choice of total television viewing hours with no reference to content—for all we know, they may have been watching reruns of "The Brady Bunch."

I must take issue with the one-sided presentation of this research by *Science* in that the Perspective ("The effects of media violence on society," 29 March, p. 2377) commenting on the Johnson *et al.* report is written by C. A. Anderson and B. J. Bushman, whose conservative views in this area are well known. They state that there is a consensus among experts on the connection between media violence and aggressive behavior. This is not the case. There have been several reviews in Australia and elsewhere on the effect of exposure to media violence on aggressive behavior, none of which were able to conclude a causative relationship (*3–5*). In fact, a study of violence in video games by the Australian Office of Film and Literature Classification concluded that the playing of video games, particularly in a social setting, had mainly positive benefits (*6*).

From an Australian perspective, the attention paid to this subject in the United States

seems out of balance when other more important aspects of controlling violence, such as gun control, are apparently given much lower priority.

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Response

WE AGREE WITH KLOPFER THAT THE WORK of Joy *et al.* (1) provides compelling evidence in support of the hypothesis that television viewing contributes to increased risk for aggressive behavior. It is important to note, however, that there is considerable evidence indicating that both the amount and content of television programming have important influences on behavioral and health outcomes (2–6).

We concur with Bakshi's observation that extensive viewing of media violence throughout childhood and adolescence may contribute to the development of an aggressive disposition, conduct disorder, and some types of personality disorder symptoms, particularly among youths who have a history of childhood maltreatment, maladaptive parenting, or other childhood adversities, and agree that it will be important for researchers to develop a multifactorial model that can explain how media violence interacts with other risk factors to contribute to aggressive behavior.

We find Hockey's letter to be problematic in several respects. Although our findings do not prove conclusively that extensive television viewing causes some youths to engage in acts of physical aggression, they are consistent with the findings of many other studies supporting such a causal inference (2, 3). Hockey's suggestion that our findings can be explained by a tendency of aggressive youths to spend more time watching violent television programs may be incorrect because, in our study, television-viewing time was associated with increased risk for serious acts of aggression even among youths without a prior history of aggressive behavior. Considerable evidence from other studies indicates that there is a bidirectional association between media violence and aggressive behavior (3). Our review of the literature suggests that there may tend to be a vicious spiral among at-risk

youths, in which media violence contributes to the development of aggressive attitudes and feelings, which promote further viewing of media violence, increasing the likelihood of aggressive behavior.

With regard to the role of genetic factors, twin studies support the conclusion that aggressive behavior is caused by environmental as well as genetic factors (7, 8). The findings of our study and numerous other studies have indicated that media violence may be one of these environmental factors that contribute to the development of aggressive behavior.

Hockey correctly points out that our study did not assess the content of television programming that was viewed. This prevented us from examining which types of television programming are most strongly associated with risk for aggressive behavior. Previous research has provided considerable support for the inference that televised violence accounts for much of the association between television viewing and aggressive behavior. Because well over half of the programs on television depict violent acts, there is a strong association between overall television-viewing time and the amount of televised violence that is viewed (2). However, even extensive viewing of television programs containing little violence may indirectly contribute to increased risk for aggressive behavior. Youths who spend a great deal of time watching television are less likely to spend time engaging in interpersonal activities that promote social interaction skills. Such youths with relatively poor social skills may tend to have difficulty resolving interpersonal conflicts in a nonaggressive manner.

We believe that Hockey is mistaken in disputing Anderson and Bushman's observation (2) that there is a general consensus among most experts on the association between media violence and aggressive behavior. As they correctly pointed out, the American Medical Association and five other major health organizations have expressed the consensus opinion that "the data point overwhelmingly to a causal connection between media violence and aggressive behavior in some children" (9). Although a small number of studies have failed to support a causal inference and some scholars have been skeptical about the evidence supporting such an inference, it has become increasingly difficult to justify such skepticism in the face of a much larger and growing body of evidence indicating that media violence does tend to promote aggressive behavior.

Physical aggression, including bullying during childhood and adolescence, physical child abuse, domestic violence, brawling, street fighting, and violent crime, is a major public health problem in the United States and throughout the world. To reduce the frequency and severity of aggressive behavior, it is likely that many different kinds of interven-

tion strategies will need to be implemented. One of the most effective ways to promote reductions in aggressive behavior may be to increase public awareness of the risk factors that contribute to interpersonal aggression. Reductions in television viewing are likely to contribute to significant reductions in aggressive behavior and violent crime (10, 11).

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Smallpox Transmission Risks: How Bad?

MARTIN ENSERINK'S ARTICLE "How devastating would a smallpox attack really be?" (News Focus, 31 May, p. 1592) asserts that smallpox transmission primarily occurs after several hours spent in close contact with the index patient (i.e., the first infected patient in an outbreak). Although this may be the case, the recent report of a Soviet smallpox outbreak in 1971, in which a crew member of an offshore ship became infected after inhaling smallpox viral particles downwind from a military test site, illustrates that airborne transmission of the disease can occur over substantial distances (1).

The 1947 New York City smallpox outbreak occurred when an index patient infected others who were in the hospital at the same time. Indeed, one adult male patient became infected with smallpox while he was seven floors above the index patient (2). Another victim, a baby who had never been vaccinated, developed smallpox after he had been on the same hospital ward as the index patient. Nei-